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ENCYCLOPÆDIA BRITANNICA

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THE

ENCYCLOPÆDIA BRITANNICA

OR

DICTIONARY

OF

ARTS, SCIENCES, AND GENERAL LITERATURE.

SEVENTH EDITION,

WITH PRELIMINARY DISSERTATIONS ON THE HISTORY OF THE SCIENCES,

AND

OTHER EXTENSIVE IMPROVEMENTS AND ADDITIONS;

INCLUDING THE LATE SUPPLEMENT,

A GENERAL INDEX,

AND NUMEROUS ENGRAVINGS.

VOLUME XIX.

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ENCYCLOPÆDIA BRITANNICA.

R, or *r*, a liquid consonant, being the seventeenth letter of our alphabet. Its sound is formed by a guttural extrusion of breath vibrated through the mouth, with a sort of quivering motion of the tongue drawn from the teeth, and canulated with the tip a little elevated towards the palate. In Greek words it is frequently aspirated with an *h* after it, as in *rhapsody*, *rhetoric*, and so forth; otherwise it is always followed by a vowel at the beginning of words and syllables.

In the notes of the ancients, R. or RO. signifies *Roma*, R. C. *Romana civitas;* R. G. C. *rei gerendæ causa;* R. F. E. D. *recte factum et dictum;* R. G. F. *regis filius;* R. P. *res publica*, or *Romani principes*, and R. R. R. F. F. F. *res Romana ruet ferro, fame, flamma.* Used as a numeral, R anciently stood for 80; and with a dash over it thus $\overline{R}$, for 80,000; but the Greek *r*, *ρ′*, with a small mark over it, signified 100; with the same mark under it, it denoted 1000 × 10; thus *ρ͵* signifies 100,000. In the Hebrew numeration ר denoted 200; and with two horizontal points over it 1000 × 200; thus ר̈ = 200,000. In the prescriptions of physicians, R or ℞ stands for *recipe*, that is, "take."

RAAB, a city of the Austrian kingdom of Hungary, in the province of the hither Danube, the capital of a circle of the same name, and of the mouth of the Raab. It is well built, and contains 1540 houses, with 14,000 inhabitants. It is the seat of a Catholic bishop, and of an academy with ten professors, and of several normal schools. The chief employment consists in making woollen goods, and its chief trade arises from its fairs. Lat. 47. 41. 15. Long. 27. 31. 13. E.

RABANA, a sort of drum used in India as an accompaniment to the voice in singing.

RABASTENS, a city of France, in the department of the Tarn, and arrondisement of Caillac. It is situated on the right bank of the river Tarn, and is but poorly built, but in 1837 it contained 6966 inhabitants, who were employed in making woollen cloths, and producing some good wine. Lat. 43. 50. Long. 1. 37. E.

RABBETTING, in *Carpentry*, the planing or cutting of channels or grooves. In ship-carpentry, it signifies the letting in of the planks of the ship into the keel, which, in the rake and run of a ship, is hollowed away, that the planks may join the closer.

RABBIS, or RABBIN, a title which the Pharisees and doctors of the law amongst the Jews assumed, and which literally signifies "masters." There were several gradations before they arrived at the dignity of rabbin, which was not conferred until they had acquired the profoundest knowledge of the law and the traditions. It does not, however, appear that there was any fixed age or previous examination necessary; but when a man had distinguished himself by his skill in the written and traditional law, and passed through the subordinate degrees, he was saluted as rabbi by the public voice. Amongst the modern Jews, for nearly seven hundred years past, the learned men retain no other title than that of rabbin; they have great respect paid them, and the first places or seats in the synagogues; they determine all matters of controversy, and frequently pronounce upon civil affairs; and they have even power to excommunicate the disobedient.

RABBINISTS, amongst the modern Jews, an appellation given to the doctrine of the rabbin concerning traditions, in opposition to the Caraites, who reject all traditions.

RABELAIS, DR. FRANCIS, immortalized by his Romance of *Gargantua and Pantagruel*, was born at Chinon, a little town of Touraine, in 1483. His father, Thomas Rabelais, is generally understood to have been an apothecary of that town, and proprietor of the farm of La Devinière in the neighbourhood, where, it is said, a great part of the romance was written. According to some biographers, however, he was a vintner in Chinon, and kept a cabaret there at the sign of the Lamprey. The probability is, that he combined both occupations, dealing in drugs and spices, "and other things of great price;" and also disposing of the wine produced upon his own property, a traffic very different in its nature from that suggested by the modern ideas of an apothecary and keeper of a cabaret. He was unquestionably a man of substance, and able to procure for his son an education of as high a character as was then to be obtained. He sent him to be educated by the monks of Sevillé, an abbey not far from Chinon, but the boy's progress under their care was so unpromising, as to occasion his removal to the University of Angers, where he studied for some time at the convent of La Baumette, but apparently with no greater proficiency than before. It was at this establishment that he made the acquaintance of the brothers Du Bellay, one of them afterwards the celebrated Cardinal, a connexion which lasted through life, and ultimately proved of the greatest service to him. After passing through the usual preparatory studies, Rabelais was admitted into the order of Cordeliers at the convent of Fontenay-le-Compte in Poitou, where he assumed the religious habit. Here he prosecuted his studies with such zeal, as to retrieve any loss of time which indifference or injudicious tutors might previously have occasioned. Striking out of the usual routine of scholastic study, which then held undivided sway in the monastic houses, he applied himself, with unusual industry and research, to the cultivation of the sciences It was his aim, says Niceron, to become a grammarian, poet, philosopher, physician, jurisconsult, and astronomer, and his works bear ample testimony to his success. He possessed a peculiar aptitude for the acquisition of the languages; an aptitude which afterwards showed itself in his command of Italian, Spanish, German, English, Hebrew, and Arabic. At this period, in fact, he was a perfect master of the Latin and Greek tongues, the latter of which had for some time been engaging the attention of the most enlightened spirits of the age. Within the walls of Fontenay-le-Compte, however, a Greek book was looked upon as no better than a work of magic, and the man who commanded the key to its secrets passed for a trafficker in "the arts inhibited;" and it appears, by a letter from Budæus to a friend, that Rabelais' attachment to the Greek writers drew upon him the hatred and persecution of his fellow monks. His independence of spirit, and generous ardour in the pursuit of learning, which could not but be felt as a reproach to their own resolute ignorance, pedantry, and sloth, was continually furnishing fresh incentives to their rancour, and they omitted no opportunity of subjecting him to annoyance. Worn out by repeated aggressions, he followed the advice of his friends, and resolved to quit a society where he found so little that was congenial to his own disposition. It has been alleged, that the true cause of this step was his own profligacy; but this is only the first of the many groundless charges against him, engendered either by the malice of his enemies, or originating in a misapprehension of his character as seen in his writings, namely, that of a man whose whole life was a noisy jest, a soulless round of sensual indulgences. Had such really been his character, as has been pertinently remarked by Père Niceron, "these were not the days, when, for such a cause, he needed to have left his monastery; he might have given free rein to his propensities there, and yet not have been going out of the ordinary course." The authority of a churchman on such a point is conclusive.

In 1523, a brief was obtained from Pope Clement VII., allowing him to pass from the order of St. Francis into that of St. Benedict, and leaving this "pack of capuchins, monks, who forbade the use of beans, that is, Pantagrueline books," to borrow a phrase from the prologue to the fifth book of his Romance, he entered the monastery of Maillezais in Poitou, where he remained during several years. But he appears to have found himself little better off in his present situation, than in that which he had left. It did not present him, it is said, with such resources as he desired for extending the limits of his knowledge, more especially as regarded medical science. His motives for this step were doubtless of a mingled nature, of which it is but reasonable to suppose the chief was a disgust at the torpor and profitless seclusion of a monastic life, by escaping from which he could alone hope to find opportunities for exercising his stirring and strongly practical intellect in a field of action, observation, and experience, sufficiently ample for its desires. However this may be, he laid down the regular habit for that of a secular priest, and quitted Maillezais without the sanction of his superior, a breach of ecclesiastical discipline which exposed him to its severest censures. After rambling about for some time in the diligent pursuit of medical knowledge, as he says himself in his petition to Pope Paul III. praying for absolution from the penalties incurred by his unauthorised retirement from Maillezais, he settled at Montpellier, after taking his physician's degree at its university, and practised the medical profession there with credit and success. It appears by the dedication to Godefroy D'Estissac, bishop of Maillezais, of an edition of Hippocrates's *Aphorisms*, and the *Ars Parva* of Galen, published by Rabelais in 1532, at Lyons, and highly esteemed by the medical and literary men of the time, that his lectures on physic at the university of that place had attracted considerable attention. Such, indeed, was the distinction he attained, that he was selected by the university as their deputy to procure a restitution of the privileges of which one of its colleges had been denuded by the chancellor Du Prat. The means employed by Rabelais for obtaining access to the chancellor have formed the subject of a story to be found in all his biographies; but it is too obviously a fabrication from an incident in his own Romance, (the introduction of Panurge to Pantagruel, book ii. c. ix.) to be worth a place here. He succeeded in the object of his mission, and his services to the university were perpetuated in a custom, still, according to the *Biographie Universelle*, in existence, by which every candidate is required to put on Rabelais' gown upon receiving his physician's degree.

In 1533, we find him established at Lyons, where he was hospital physician, and taught and practised for several years. At the commencement of the year 1534, his old schoolfellow and friend, Jean du Bellay, then bishop of Paris, having occcasion to pass through Lyons on his way to the papal court, regarding the divorce of Henry VIII. of England, took Rabelais along with him in the capacity of his physician; thus enabling him to realise, what had long been his passionate wish, a personal acquaintance with Italy and the Eternal City. For, to use the words of his dedication to Du Bellay of an edition of Marliani's *Typographia Antiquæ Romæ*, published, under Rabelais' superintendence, by Gryphius, at Lyons, in 1534, "from the first moment that I was able to appreciate the worth of polite learning, it was amongst the foremost of my desires to travel throughout Italy, and visit the capital of the Roman world." The opportunity for gratifying the popular conceptions of his character, afforded by this visit of the great satirist of the abuses of the Romish church to the court of its supreme head, has not been let slip by the anecdote-mongers; and several absurd stories of his conduct have accordingly been handed down from biographer to biographer, till they seem almost to have acquired the authority of undoubted truths. One specimen of these will be sufficient. When the Cardinal Du Bellay was presented to the Pope, he, as ambassador of Francis I., went through the usual ceremony of kissing his holiness's slipper. His suite followed his example, all except Rabelais, who remained leaning against a pillar, and exclaimed loud enough to be heard, That if his master, who was a great lord in France, were unworthy to kiss the pope's feet, his holiness might untruss, and possibly, after reasonable abstersion, a part might be found, where an humble follower like himself might presume to apply his lips. The improbability, that Rabelais should have expressed himself in these terms, filling the situation which he did, and when, too, he was on the eve of supplicating a release from this very pope from the ecclesiastical penalties he had incurred by his unauthorised desertion of the monastery of Maillezais, speaks sufficiently for the worthlessness of this story. But its real source is obvious enough, and may be found in book iv. c. 48. of his Romance. It needed but a poor invention to construct such a tale out of the extravagant devotion of the worthies that greeted Pantagruel and his band, on their arrival at the Island of Papimany. That, however, which, as told by Rabelais himself, is a stroke of the most caustic satire, makes but a sorry jest in the hands of those who first built up a theory of his character according to an idea of their own, and then fabricated anecdotes to support and illustrate it. Rabelais' judgment, it is certain, was quite as powerful as his wit; and he knew too well when to discharge his bolt with effect, ever to let it fly where detriment to the archer himself could alone be the result. The veil of extravagance, which he has thrown over his great satirical work, is the best possible proof how unlikely he was to be guilty of any such piece of superfluous imprudence. At the same time, it is to be remarked further, in confutation of this particular story, that it was to Clement VII. and not to Paul III., that Du Bellay must have been introduced in the capacity of ambassador on the occasion alluded to; but, as invention and historical truth are two distinct things, this discrepancy in fact is not greatly to be wondered at.

Rabelais seems to have gone back to Lyons for a time, as his Epistle Dedicatory to Du Bellay of his edition of Marham's *Antiquitates Romæ Antiquæ* is dated from that city on the 31st of August 1534. He returned shortly afterwards to Rome, and rejoined Du Bellay, who had been created Cardinal on the 21st of May 1535. His letters to Godefroy D'Estissac, whose favour he had won during his residence at his Abbey of Maillezais, and continued ever afterwards to retain, are dated from Rome during the two following years. Availing himself of the opportunity which his presence on the spot afforded, he petitioned Pope Paul III. to be absolved from the penalties incurred by the abandonment of his order. Rabelais' merits had secured him the esteem of Cardinals de Genutiis and Simonetta, and they combined with Du Bellay and the Bishop of Mascon, in forwarding his petition. By their exertions a bull in his favour was obtained gratis, contrary to the usual practice. It was granted on the 17th of January 1536, in terms of his request, allowing him to return into any house of the Benedictine order that would receive him, and to practise physic upon condition of his doing so without hope of fee or reward. This release from the ecclesiastical disabilities consequent upon his transgression of the church's rules enabled the Cardinal Du Bellay to assign him a place in his Abbey of St. Maur des Fossez, near Paris. Here he remained until the year 1542, when he was appointed by the same friend to the cure of Meudon; and he continued in the zealous discharge of the duties of this station down to the time of his death. "Ever mindful," says Niceron, "to instruct his people, he made it part of his care to give their children a knowledge of church music, of which he was himself a thorough master. His house was ever open to the poor and wretched, whom he assisted to the utmost of his means; and he was in the habit of drawing men of learning and science about him, to discourse with them upon their several pursuits. Against women, however, his gates were barred, and his reputation on this score is wholly without blemish. This," he adds, "is the uniform testimony of contemporary biographers; and Antony Le Roi, who wrote a life of him in 1649, avers that such was then the prevailing tradition at Meudon. His knowledge of medicine rendered him doubly useful to his parishioners, who invariably found him ready to minister to their wants both corporal and spiritual." He died in Paris, in 1553, in the Rue des Jardins, parish of St. Paul, and was buried in the cemetery of that church.

His death-bed has not escaped profanation by the caterers for the jest-books; and there are few stories more common, than his calling for his domino, when he felt his end approaching, with the words, "Beati qui in Domino moriuntur." Another anecdote, even more detrimental to his character, is in every-day circulation, by which he is reported to have replied to a page sent by Du Bellay to inquire after his health, "Tell your master the state you find me in; I am going in quest of a Great Perhaps. He is up in the jay's nest. Bid him keep where he is; and for you, you will never be anything but a fool. Draw the curtain; the farce is ended." Those who have read Rabelais' spirit aright need no confutation of this slanderous fabrication of monkish malice, the miserable patchwork from some half-dozen threadbare facetiæ. The simple fact recorded by Du Verdier, is worth a thousand such tales; and it determines, if, indeed, such evidence were necessary, Rabelais' opinion as to the momentous doctrine which he is here represented to have viewed as no more than "a great perhaps." In a copy of Galen, annotated throughout in the handwriting of Rabelais, that had come into the Bishop of Evreux's possession, opposite a passage in which Galen argues for the mortality of the soul, Rabelais had written, "Hic vero Galenus se plumbeum ostendit." Du Verdier also states, whilst at the same time he retracts what he had formerly been led, in accordance with the popular voice, to say against Rabelais in his *Bibliothèque Française*, that "the manner of his death compels us to form a judgment of him totally at variance with that which is currently received." The particular circumstances of this event are not now known, but they were doubtless such as became a pious and eminently thoughtful man.

One cannot help regretting, with Coleridge, "that no friend of Rabelais, and surely friend he must have had, has left an account of him." Had any such account existed, it would unquestionably have conveyed an impression of his personal character very different from that which the current anecdotes of him are calculated to produce. It is the peculiar misfortune of distinguished humourists to have the paternity of such jests as are tossing unclaimed about the world laid to their charge. They become a sort of Foundling Hospitals for Wit; and Rabelais has had more than his share of this abandoned progeny thrust upon him. His reputation as a man has suffered accordingly, and this for an obvious reason; for just in the degree that a great man's mind is marked by features, which puzzle the finest sagacity to discriminate and reconcile, are people disposed to pronounce an authoritative judgment regarding him. In all such cases, a lively anecdote, or sparkling witticism, is too cheap and pleasant a method of settling a doubtful character, not to be generally adopted. They commonly fall in with the conclusion that lies nearest the surface, and, being thus most easily come at, they are eagerly caught up and borne along from mouth to mouth, till their mere repetition sanctifies the delusion out of which they sprung. One common character runs throughout all the anecdotes of which Rabelais is the hero. They show a mind without gravity or depth, giving head to its most wayward sallies, neglectful of self-respect, and reckless of present circumstances, or of possible results. Such is just the character which a superficial observer is likely to form of him from his own romance. The rhodomantade, the coarseness, the downright nonsense, the reckless exuberance of humour, are easily noted; whilst the vein of deep and earnest thought that ever and anon shows itself amid the surrounding extravagance, the infinite good sense, the high-toned and enlightened philanthropy, and the great moral purpose which the author had in view, escape the careless and unpenetrating eye. The vices, which he has laid bare with such masterly tact, have been set down as his own, and he is charged with having been a profligate, a debauchee, and a buffoon, destitute alike of self-respect, and reverence for whatsoever is sacred or noble. But every thing that is known of his life, as well as what may be inferred from a study of his works, goes to discountenance such a conclusion. He was beloved and respected by many of the most illustrious and virtuous prelates of his time, admitted into their most private councils, and charged with the most important trusts. All his works, except his romance, which, being a reflection of the time, must needs carry its grossness and licentiousness upon its front, are conceived in a uniformly grave and learned spirit; and in his letters, where certainly a light or ribald mind was most likely to have shown itself, there is nothing to be found unworthy of the scholar and the churchman. These facts are utterly inconsistent with the charges of buffoonery, immorality, and irreligion, which are usually coupled with his name; and who can doubt, that, had his life given any warrant for such charges, there were jealous enemies enough to have placed the fact beyond the uncertainty of mere assertion?

In common with the other great assailants of religious abuses, Rabelais was branded with the names of heretic and atheist, and the Dedication of the Fourth Book of his Romance makes an indignant allusion to the circumstance. Epithets like these, however, he could well afford to share with such men as Erasmus, Luther, and Melancthon. Had he escaped them, indeed, there would have been some cause for wonder; for, assuredly, the severest blow ever levelled against the Roman Catholic church was the publication of the *Chronicle of the Wondrous Deeds of Gargantua and Pantagruel.* The popularity of its form secured it attention, where a formal censure would have been disregarded; and it was read on every hand with unexampled avidity. Calvin spoke of part of it with asperity, but others of the reformers, penetrating its real spirit, gave it their warmest approval, and Beza's well-known epigram has long graced every edition of the book.

> *Qui sic nugatur, tractantem ut seria vincat,*
> *Cum seria faciet dic, rogo, quantus erit?*
>
> If he, who in his frolic mood
> Outdoes the lore of toilsome sages,
> Should don grave wisdom's reverend hood,
> What might be looked for from his pages?

"Beyond a doubt," says Coleridge, "he was among the deepest as well as boldest thinkers of his age. His buffoonery was not merely Brutus' rough stick, which contained a rod of gold; it was necessary as an amulet against the monks and bigots. Never was there a more plausible, and seldom, I am persuaded, a less appropriate line, than the thousand times quoted

> Rabelais laughing in his easy chair

of Mr. Pope. The caricature of his filth and zanyism proves how fully he both knew and felt the danger in which he stood. I could write a treatise in praise of the moral elevation of Rabelais' work, which would make the church stare, and the conventicle groan, and yet would be the truth, and nothing but the truth. I class Rabelais with the great creative minds of the world, [Homer,] Shakspeare, Dante, Cervantes, &c." The prevalent coarseness, though this even is not always without its meaning, of Rabelais' great work, makes it repulsive to the mass of readers; and this it is, probably, which has enabled modern writers to appropriate its thoughts and witticisms with impunity. But the richness of invention, the dramatic force of the characters, the originality and vigour of thought, the wit, the learning, the satire, poignant yet without cynicism, the wise philosophy, and the atmosphere of triumphant joyousness that invests the whole, justify the praises of Coleridge, and will secure its fame, as long as vice remains to be lashed, and folly to be ridiculed, or the love of genial humour, and far-sighted wisdom is not utterly extinct.

It is impossible not to admire the robust and healthy nature of the mind of Rabelais, which, at a time when earnestness was constantly running into extravagant excesses in the persons of the other great reformers of the period, maintained its equipoise, without losing any of its intensity in seizing and grappling with the predominant abuses. Nor is its moral culture less conspicuous, which, in an age when the face of society presented so much to impress a conviction of the farce and hollowness of the world, preserved him, in despite of his acute sense of the absurd, the false, and the contemptible, as well as of his strong satirical bias, from becoming a morbid and misanthropical reviler of mankind. "I ask not," says Coleridge, "the genius of a Machiavel, a Tacitus, or a Swift; it needs only a worldly experience, and an observing mind, to convince a man of forty, that there is no medium between the creed of misanthropy and that of the gospel." Which of these, then, was Rabelais? Most certainly the latter. He hates cant in all its shapes, hypocrisy under all its disguises; tyranny, intolerance, villainy, selfishness, and all its brood of tyrant vices, are his abhorrence; mere folly he makes his sport, and he dallies with absurdity with a very wantonness. But he never forgets, that he, the satirist, is himself come of the stock of Adam, or libels heaven, by flying in the face of that nature, which, good or bad, is all that himself and his fellow-men have got to struggle through the world with. He takes life as it is; he would fain see it better, and lends a helping hand to make it so. Like his great countryman Beranger.

> De l'univers observant la machine,
> Il y voit du mal, et n'aime que le bien.

He detests the evil that is in the world, but he never abandons his faith in the good. His satire is not the angry yelping of a currish nature, the overflow of sour secretions and accumulated bile. Where it is grave, it is the commanding voice of honest indignation; where jovial, there is a kindliness of tone with it, that makes you like the man, whilst you admire his genius. He is essentially good-natured even in his severest moods; and this is apparent in the very form of his satire. Its most caustic strokes are given with a merry voice and laughing eye; and yet, whilst apparently revelling in the most unrestrained ebullitions of mere animal spirits, and licentious fancy, he is covertly stripping sensualism of its enticements, and enforcing the strongest lessons of humility. He possessed, in short, the wisdom of love, which is "the creed of the gospel," and this his book testifies in a hundred places. At the same time, its defects are great and manifold, and these cannot be better summed up than in the words of La Bruyère. "Rabelais is inexcusable in having scattered mere filth throughout his writings. His book is a chimera. It is the face of a beautiful woman with the tail of a serpent, or of some other still more unsightly monster. It is a monstrous jumble of a fine and delicately wrought moral, and of the most offensive grossness. Where it is bad, it is as bad as can be,—the very scum of the world might batten on it; where it is good, nothing can be more choice or excellent; it *can* furnish most dainty fare."

For bibliographical details as to the works of Rabelais, see *Biographie Universelle*, tome xxxvi. A careful memoir of him will be found in Niceron's *Mémoires des Hommes Illustres*, and also in Chauffepié's Supplement to Bayle. Rabelais has been naturalised amongst ourselves, more successfully, perhaps, than any other foreign writer, by Sir T. Urquhart and Motteux's admirable version of his romance. (B. F.)

RABBIT. See MAMMALIA.

RABIRIUS, C., a Roman knight, who lent an immense sum of money to Ptolemy Auletes, king of Egypt. The monarch afterwards not only refused to repay him, but even confined him, and endangered his life. Rabirius escaped with difficulty from Egypt; and at his return to Rome he was accused by the senate of having lent money to an African prince for unlawful purposes. He was ably defended by Cicero, and acquitted with difficulty.

In the age of Augustus, there was a Latin poet of the same name, who wrote a poem on the victory which the emperor had gained over Antony at Actium. Seneca has compared him to Virgil for elegance and majesty; but Quintilian is not so favourable in judging his poetry.

RABNABAD, a low muddy island in the bay of Bengal, formed out of the sediment deposited by the river Ganges, or by the Rabnabad, one of its branches, and separated from the mainland by a narrow strait. It is fifteen miles in length, by five in breadth, and at neap tide it is scarcely above water, whilst at high tides it is nearly submerged. It is covered with long grass and underwood, which affords cover for deer and tigers.

RABOGH, a village of Yemen in Arabia, near the coast of the Red Sea, and occupied by Arabs living in tents. It is seventy-eight miles north of Zidda.

RACCA, a town of Diarbekir, in the pachalik of Onafa, situated on the eastern bank of the Euphrates, at the mouth of a small river named Beles. It was once the favourite residence of Haroun al Raschid. The town and adjoining country are inhabited by different tribes of wandering Arabs. Long. 38. 50. E. Lat. 36. 5. N.

RACE, in general, signifies running with others in order to obtain a prize, either on foot, or by riding on horseback, in chariots, or otherwise. The race was one of the exercises amongst the ancient Grecian games, which was performed in a course containing one hundred and twenty-five yards; and those who contended in the foot races were frequently clothed in armour. Chariot and horse races also formed a part of the ancient games. Races were known in England in very early times. Fitzstephen, who wrote in the days of Henry II. mentions the great delight which the citizens of London took in this diversion. From his words, however, it does not appear to have been designed for the purposes of gaming, but merely to have sprung from a generous emulation of showing superior skill in horsemanship. Races appear to have been in vogue in the reign of Elizabeth, and to have been carried to such excess as to injure the fortunes of the nobility. George earl of Cumberland is recorded to have wasted more of his estate than any of his ancestors, and chiefly by his extreme love of horse-races, tiltings, and other expensive diversions.

RACE, in genealogy, a lineage or extraction continued from father to son. See DESCENT.

RACHORE, a town and district of Hindustan, in the province of Bejapore. It is bounded on the north by the river Kistnah, and on the south by Tungbudra. The capital, of the same name, is pleasantly situated on the south back of the river Kistnah. Long. 78. 52. E. Lat. 16. 20. N.

RACHONTY, a town of Hindustan, in the Balaghaut ceded territory, and district of Gurrumcondah, 125 miles north-west of Madras. Long. 78. 49. 20. E. Lat. 18. 26. N.

RACINE, JOHN, a great and illustrious French poet, was born at Ferté-Milon on the 21st of December, 1630. He was the son of John Racine, controller of the salt magazine of that city, and of Joan Sconin, daughter of the king's warden of the woods and waters of Villers-Caterets. Deprived of his father and mother at the early age of three, he passed under the guardianship of his paternal grandfather, also named John Racine, who, not long afterwards, bequeathed the trust to his widow. He studied first at Beauvais; next at Paris, in the college of Fearcount; and lastly at Port-Royal-des-Champs, whither a number of eminent persons had retired to devote themselves to piety and the instruction of youth, amongst whom were the advocate Lemaitre, Dr. Hamon, Nicole, Lacy, and Launcelot, authors of the *Logic*, the *General Grammar*, and other works, known under the title of *Methodes de Port-Royal*. Launcelot, in particular, undertook to teach Greek to the youthful Racine. But besides the taste for sound literature and serious studies, these immortal solitaries inspired their pupil with those religious principles which never abandoned him, and which were common to all the great writers and great men of that age. The docility of Racine towards his masters equalled his ardour for study. On one occasion, however, he showed himself refractory. Having accidentally met with the Greek romance of *Theagenes and Chariclea*, he commenced the perusal of this work of fiction, when his master surprising him, whilst thus engaged, took from him the book, and consigned it to the flames. The youth procured another copy, and learned it by heart, after which he placed it in the hands of Launcelot, saying, "You may burn this also." An act of disobedience of a kind so novel was the more readily excused because it was not likely to have many imitators.

The first poetical essay of Racine was *La Nymphe de la Seine*, an ode which he composed for the marriage of Louis XIV. and which having made him known to Chaplain, the temporary arbiter of literary reputations and court favours, produced him a hundred louis, which Colbert sent him on the part of the king; and not long afterwards, he received a pension of six hundred livres. Four years later, towards the close of 1663, another ode, *La Renommée aux Muses*, composed on the occasion of the establishment of the three Academies, procured for him a second royal gratuity, the order for which was couched in terms peculiarly flattering to the youthful poet. This ode, though inferior to the preceding, was nevertheless more fortunate. Recompensed, like the other, by the king, it had the good fortune to be criticised by Boileau. The poet took an early opportunity to thank the critic, and this proved the origin of that connexion so intimate, so honourable, so useful to Racine, and which was not one of the least advantages which fortune gave him over Corneille. A little before this period, Racine had made the acquaintance of Molière, and had communicated to him a tragedy, entitled *Theagène et Chariclée*, taken from the romance, which had afforded him such delight at Port-Royal. Molière, disapproving of this production, gave him the plan of the *Thébaïde, ou les Frères Ennemis*, a subject on which it is alleged that he had himself been engaged. Racine executed the design, and the piece had some success. *Alexandre*, which was performed the following year, 1665, met with a still more favourable reception, and showed great progress in the versification of the author, who was then only twenty-five years of age. But, excepting the verses, neither of these works gave any indication of what Racine afterwards proved. They were but feeble imitations of Corneille, of whom, by a misfortune common to all imitators, Racine had only adopted the defects; that is, the cold gallantry mixed with heroism, the idle maxims, the metaphysical reasonings, and the elaborate declamation. Corneille, to whom Racine read his *Alexandre*, counselled him, it is said, to write no more tragedies. At a subsequent period the same advice was given to Voltaire by Fontenelle, after the reading of *Brutus*. But it is fortunate for letters that such counsels are never followed. Voltaire replied to Fontenelle by the production of *Zaïre*, and Racine responded to Corneille by that of his *Andromaque*. Finding himself pursuing a wrong direction, he suddenly changed his route and took a different one, unknown perhaps even to Corneille himself. The latter had astonished and surprised his audience; his young rival sought to move and to soften them. Pity appeared to him a tragic resource more active, more extensive, and of an effect more penetrating and less transitory, than admiration. He studied the human heart, its passions, its weaknesses, and its most secret recesses, and there he discovered a species of tragedy altogether new, of which he gave the first and probably most inimitable model in his *Andromaque*; that one of all his tragedies which, without being the most perfect, produces the greatest effect on the stage, by the vigorous and just expression of the sentiments and characters, and by the alternations of hope and fear, of terror and pity, with which the poet agitates the soul.

The representation of the *Andromaque* in 1667, was followed almost every year by a new masterpiece. But at first Racine surprised the public by an excursion into the domain of Molière. The *Plaideurs*, imitated from the *Wasps* of Aristophanes, is a comedy the plot of which is somewhat feeble and inartificial; but in nature, truth, facility, and gaiety, it is admirable, and its verses became so fixed in the general mind that they passed into proverbs. The piece was first represented at Paris in 1668, when it was indifferently received; but it succeeded pretty well at Versailles, and the players, elated with the success, came to awaken Racine in the middle of the night, to communicate the good news. The noise of vehicles at such an hour, in the Rue des Marais, convinced first the neighbours, and next day all Paris, that justice had avenged itself on the author of the *Plaideurs*, by causing him to be seized and sent to the Bastille. This pleasant mistake, and the knowledge which soon became general, that the comedy had obtained the suffrage of the monarch, conciliated the favour of the loyal Parisians; and from that time the piece has continued in possession of the stage, privileged to extort a smile, perchance a laugh, even from the iron visage of justice herself. It is not true, as has sometimes been said, that the *Plaideurs* is the work of several hands. Racine may have received from his friends hints or suggestions for some scenes, and borrowed from certain *hommes de palais*, or gentlemen of the robe, some formulas and expressions foreign to his habitual studies; but the unity of the style and the general coherence of the whole are too perfect to be the work of any but one and the same hand.

The success of the *Andromaque*, which was only equalled by that of the *Cid*, had excited envy; perhaps, also, it had rendered the public fastidious. In 1669, *Britannicus* was coldly received, and with difficulty reached the eighth representation. At first no one felt the truth, the depth, and the force displayed in the magnificent historical picture of Nero and his court. Boileau alone was struck with its merit, and hurrying to embrace Racine, he exclaimed, "Voila ce que vous avez fait de mieux." This great critic was not only useful to Racine in praising his performance, his severity was of full more service in inducing him to suppress two scenes which deformed his work; one between Burrhus and Narcissa, at the commencement of the third act; and another, in the fifth, in which Junia is brought back into the presence of Nero. *Britannicus* was followed by *Berenice*, which, in some respects, is one of the most remarkable of Racine's works. At the solicitation of the celebrated Henrietta of England, Racine and Corneille both treated this subject which is so little fitted for representation, neither being aware that the other was engaged upon it. Besides the pleasure of seeing two illustrious rivals unconsciously contending for the palm, this princess secretly promised herself another, in the treatment of the heroic separation of the two august lovers; but a premature death deprived her of the pleasure she had anticipated, in witnessing this singular competition. Three words of Suetonius represent the subject of the piece: *Invitus invitam dimisit;* too slight a foundation upon which to work, and in the case of Corneille, who was now old, an ungrateful task, far more dangerous to him than even to Racine. The two rival plays were represented towards the close of 1670; that of Corneille at the Palais-Royal, by the company of Molière, and that of Racine at the Hôtel de Bourgogne. Corneille's totally failed; that of Racine had thirty consecutive representations, during which it drew tears alike from the court and the city. The great Condé replied to some criticisms which were made in his hearing in the following verses of the piece itself:

> Depuis cinq ans entiers chaque jour je la vois,
> Et crois toujours la voir pour la première fois.

It has been said, and even zealous admirers of Racine have confessed, that *Berenice* was not a veritable tragedy. But, tragedy or drama, what signifies the title which may be given to it, provided we be agreed that it is a miracle of art, and that never, in any piece, were greater difficulties more meritoriously overcome. The style possesses exquisite beauties in detail, and an inexpressible charm pervades the diction throughout.

Bajazet appeared in 1672, and obtained immediate vogue, partly, no doubt, from the novelty of the manners and costumes, but in a greater degree, from admiration of the force and truth with which the poet had delineated the characters of Roxana and Acomat; two real creations, which, in spite of all its faults, will make *Bajazet* immortal. At the same time, there is not a little truth in the remark of Corneille, that though the costumes be Turkish, the characters are French. *Mithridate*, which was represented for the first time in January 1678, is, according to Laharpe, the work where Racine appears to have come nearest to Corneille in bringing on the stage the great personages of antiquity, as they are delineated in history. Few characters, indeed, have, upon the whole, been more vigorously traced than that of Mithridates; and were it not that Racine, sacrificing to the taste of the time, has made the hero amorous and jealous, Corneille would not have enjoyed unquestioned supremacy in reviving and reanimating history. Voltaire regards *Iphigénie*, first represented in 1674, as the masterpiece of the stage. Do we desire grandeur? We find it in Achilles. Do we wish for true policy? It is exemplified in the part of Ulysses; a policy founded solely on the love of the public good, and equally adroit, dignified, and resolute. Clytemnestra is the model of the lofty pathetic; Iphigenia, that of noble and touching simplicity. Agamemnon is as he should be; and, then as to the style, Voltaire has declared it to be the true sublime. Three years elapsed between the appearance of *Iphigénie* and that of *Phèdre*, which was first represented in 1677. The former had been the object of sundry ill-natured and depreciatory criticisms; but all these were only a feeble essay, or rather a mere foretaste, of the attacks which were now directed against the latter, chiefly at the instigation of the Duke de Nevers and the Duchess de Bouillon, nephew and niece of Cardinal Mazarin, the declared enemies of Racine, though for what reason does not appear. Every engine was put in action to ensure the condemnation of Racine's *Phèdre*, and extol to the skies that of Pradon, a person of no genius, and whose name is not worth remembering, except that he was employed by the chiefs of his odious cabal to have a drama on the same subject ready for representation against the time when Racine's was to appear. Pradon lent himself to the vengeance of these intriguers; his *Phèdre* was represented four days after that of Racine; and, for the moment, the cabal were successful. But, in about a year, each piece found its natural level, and Pradon and his *Phèdre* were alike forgotten or despised.

This tardy reparation, however, could not console Racine; and, besides, it was poisoned by new indignities, which were heaped upon him by his indefatigable enemies. Disgusted with the theatre, where he had met with such injustice, he now determined to renounce it for ever; though not more than thirty-eight years of age, and still in all the vigour and maturity of his genius. Besides, in his infancy, he had imbibed a deep sense of religion, which, suppressed for a while by his connexion with the theatre, now returned in full force. He conceived that his past life had been full of errors, nay, even tainted by vices, and, under this impression he not only resolved to write no more plays, but had even thoughts of devoting himself to penitence and prayer in monastic solitude. His spiritual guide, however, justly distrusting a zeal springing out of wounded feelings, advised him to marry and settle in the world; and this judicious advice Racine had the good sense to comply withal. In the year 1677 he married the daughter of the treasurer of Amiens, a fortunate choice, which greatly contributed to his future happiness. He next effected a reconciliation with the solitaries of Port-Royal, whose censures of dramatic composition, which had formerly offended him, he now acknowledged. He first made his peace with Nicole, who received him with open arms; and Boileau introduced him to Arnauld, who also embraced him tenderly, at the same time freely forgiving him all his satire. About the same time Louis XIV. appointed Racine and Boileau historiographers of France, upon the understanding, of course, that they were to write the history of his reign; and the public expected great things from two writers of such distinguished reputation. But both the king and his subjects were equally disappointed. Boileau and Racine, after having for some time laboured at the work, perceived that it was entirely opposite to the genius of each; and they also judged, with reason, that the history of such a king could not, and indeed ought not, to be written until long after his death, unless it were to be made up of extracts of gazettes and such like materials.

During a period of twelve years, Racine had steadily adhered to his resolution not to write any more poetry, especially for the stage; but the entreaties of Madame de Maintenon so far prevailed as to induce him to resume his dramatic character, and in consequence he composed his *Esther*, which was to be represented, not on the French stage, but in the house of Saint-Cyr. On the 20th of January 1689, it was performed for the first time, and had prodigious success. "It appears to me very remarkable," says Voltaire, "that this tragedy should then have had universal success, and that two years afterwards *Athalie*, though performed by the same persons, had none. It happened quite otherwise when these pieces were acted at Paris long after the death of the author, and when prejudice and partiality had ceased. *Athalie*, represented in 1717, was received, as it deserved to be, with transport; whilst *Esther*, in 1721, inspired nothing but coldness, and never appeared again. But at that time there were no courtiers who complaisantly acknowledged Esther in Madame de Maintenon, and with equal malignity saw Vashti in Madame de Montespan, Haman in M. de Louvois, and above all, the persecution of the Hugonots by this minister, in the proscription of the Hebrews." The same writer, who had no taste for scriptural subjects, thinks the story of *Esther* uninteresting and even improbable; "but, notwithstanding the badness of the subject," he adds, "thirty verses of *Esther* are of more value than many tragedies which have had great success."

Athalie, composed, like Esther, for Saint-Cyr, had, as already intimated, a very different fate. Envy masked under a false zeal prevented the representation. It was only performed twice at Versailles, in a chamber without scenes and costumes, by the ladies of Saint-Cyr. Racine having originally intended it for publication, now sent it to the press; but, to the eternal disgrace of the age and nation, this masterpiece of sublime genius, unsurpassed either in ancient or in modern times, found no readers; and, in some societies of pretended wits, the perusal of it was ironically prescribed as penance. It is in truth lamentable to think that Racine should have descended to the grave suffering under this injustice, and with the bitter feeling of seeing his age dissatisfied with his immortal work. In vain did Arnauld, from the depth of his solitude, try to sustain, by his suffrage, the sinking spirits of his old pupil; in vain did Boileau repeat, "C'est votre meilleur ouvrage, le public y reviendra." Racine almost believed that he had survived his genius, and the authority of Boileau, so potential with posterity, was disregarded during the lifetime of his friend. This second injustice of the public towards Racine reopened the wound inflicted by the first, completed his disgust, and decided him to abandon definitively writing for the theatre, which, in fact, his religious impressions had, for some time, led him to regard as incompatible with the Christian life. He accordingly withdrew from all connection with the stage, and employed the remainder of his days in the grateful and almost filial task of composing a history of Port-Royal, the place of his education, which is drawn up with equal taste and elegance, but was not published till 1767, when it appeared in two volumes 12mo.

Racine, although he had conversed much with the court, had not learned to disguise his sentiments, the usual, perhaps the necessary accomplishment of a courtier. In 1697, during one of those interviews which Madame de Maintenon frequently granted him, the conversation having turned upon the misery of the people exhausted by long wars, and the best means of affording them relief, this celebrated woman entreated the poet to throw his ideas on the subject into the form of a memoir, promising that the writing should not pass out of her hands. Racine consented, not from the mere complaisance of a courtier, and still less from any ambitious view, which the whole tenor of his life contradicts, but solely with the design of being useful. The king surprised this memoir in the hands of his mistress, and the name of the author was disclosed. Perhaps the lesson was a little too direct, since the monarch, who had all along favoured the poet, immediately took offence. "Because he makes good verses," said Louis, "does he think he knows every thing? and because he is a great poet, does he pretend to be a statesman?" Racine was greatly hurt by this observation, not from any selfish consideration, but from the idea of having unnecessarily offended his royal benefactor. But to say as some have done, that it shortened his days, is manifestly absurd. His constitution had for several years been sinking under the wasting influence of excitement, and, in consequence, the term of his earthly career was now fast approaching. During his last illness, however, the king evinced the greatest interest in the expiring poet, about whom he daily sent to make the most anxious inquiries; and his benefits followed him even beyond the tomb. Racine died on the 22d of April, 1699, after much suffering, borne with truly Christian fortitude, and was interred, according to his wish, at Port-Royal, at the feet of Dr. Hamon, that he might not be separated even in death, from the master whom he so loved and respected in life. After the destruction of this monastery, his remains were transported to Paris, and deposited in the church of Saint-Etienne-du-Mont, where they were placed beside those of Pascal.

Racine was naturally melancholy when alone, though gentle and pleasing with others. His nature was tender and affectionate, inclined to indulge sorrowful or religious emotions rather than those which spring out of mirth or joy. He was generous, and knew how to preserve the means of being so by much order and economy. He afforded assistance to a number of distant relations, and had a regard almost filial for his nurse, whom he did not forget in his will. There was no better husband, no more affectionate father. The Christian education of his children formed his chief concern. He had family prayers daily, at the same time reading and explaining a portion of the gospel to his wife, his children, and his domestics. During the last ten years of his life, all his pleasures, and all his happiness were concentred in his domestic circle. He no longer went to court except when called thither by the duties of his charge, and the interests of his family; and yet who else could boast of the same means of pleasing and making himself beloved; his fine and noble figure, his gracious manners, all the charms of wit, all the splendour of renown, united with the happy art of causing them to be forgotten? He was, indeed, what the ladies of Saint-Cyr described him, a man of great genius and great simplicity; and he had, in fact, enchanted the world, more by the amenity and grace of his instructions, than by his talent for declamation, which, however, he possessed in the very highest degree. No man of his time read and recited better than Racine. One day, at Boileau's, in his house at Anteuil, reading and translating off-hand the *Œdipus* of Sophocles, he drew tears from all present. He also taught Baron and La Champmâlé a system of declamation more conformable to nature and good taste, or, to express it more correctly, he taught them to speak and not to declaim.

As to his works, his countrymen have reason to be proud of them. He is the poet of the heart and the affections, and yields to none in the truth, the beauty, and the force of his delineations. If Corneille surpassed him in heroic sentiments, and the grand character of his personages, he was inferior to Racine in moving the passions, and in purity of diction. Such is the perfection of Racine in this last respect, that in all his pieces, there is not perhaps, we do not say a scene, but even a single verse, which could be replaced by another. All is just and true; all is full of that poetry of images and sentiments, and that continued elegance which, since the time of the Greeks, Virgil and Racine have alone possessed. But above all, it is in *Esther* and in *Athalie*, particularly in the choruses of these two tragedies, that, sustained by the most sublime models, he is himself almost always sublime. It is there that Racine has all the elevation of a Hebrew prophet, who had come to announce divine truths in strains almost divine. But that which chiefly characterises Racine is the complete union, perhaps unique, of two qualities which appear to be incompatible; of imagination the most brilliant, and reason the most perfect, of sensibility the most exquisite, with good sense the most invariable. Reason, in fact, as much and even more perhaps than imagination, predominates in the conception of his most touching productions, in the execution of his most dramatic scenes, in the choice of his richest expressions, and in his boldest combinations, as well as most elliptical turns. Boileau, who has been surnamed the poet of reason, is not, even in this view, superior to Racine; and, besides, the quality here mentioned is the less astonishing in him, because it is accompanied with an imagination much less lively. Racine has often been pronounced the greatest of the French poets. He should also be set down as the most rational; or rather, it is precisely because he really is the most rational, that he is likewise the greatest.

There are some smaller pieces of Racine which have not been mentioned in the course of this article, particularly Idylle sur la Paix, 1685; Discours prononcé à l'Académie Française, en 1685; Cantiques Spirituelles, 1689; and Epigrammes Diverses. The most complete edition of the Works of Racine is that which M. Aimé Martin published at Paris in six vols. 8vo. in 1820, reprinted by Lefèvre in 1822.

RACING, the riding heats for a plate, or other premium. The amusement of horse-racing, which is now so common, was not unknown amongst the great nations of antiquity, nor wholly unpractised even by our ancestors in Britain. In 1599, private matches between gentlemen, who rode their own horses, were very common; and in the reign of James I. public races were established at various places, when the discipline, and mode of preparing the horses for running, were much the same as they are now. The most celebrated races of that time were called bell-courses, the prize of the conqueror being a bell; and hence, perhaps, is derived the phrase "bearing the bell," when applied to excellence. For a full account of the race-horse, see Horse.

RACK, Edmund, a person well known in the literary world by his attachment to, and promotion of, agricultural knowledge. He was a native of Norfolk, and a Quaker. His education was common, and he was originally apprenticed to a shopkeeper. In this situation his society was select, and by improving himself in learning, his conversation was enjoyed by some respectable acquaintance. He wrote many essays, poems, and letters, and some few controversial tracts. His last engagement was the History of Somersetshire, where the parochial surveys were his. This work, in three volumes 4to. was published in 1791, by his colleague, Mr. Collinson. Mr. Rack died of an asthma in February 1787, aged fifty-two.

Rack, an engine of torture, furnished with pulleys, cords, and other means, for extorting confession from criminals. The trial by rack is unknown to the law of England; though once, when the Dukes of Exeter and Suffolk, and other ministers of Henry VI. had formed a design to introduce the civil law into this kingdom as the rule of government, they erected a rack for torture, which was called in derision the Duke of Exeter's Daughter, and still remains in the Tower of London, where it was occasionally used as an engine of state, not of law, in the reign of Queen Elizabeth. But when, upon the assassination of Villiers duke of Buckingham, by Felton, it was proposed in the privy council to put the assassin to the rack in order to discover his accomplices, the judges, being consulted, declared unanimously, that no such proceeding was allowable by the laws of England. It seems astonishing that the usage of administering the torture should be said to arise from tenderness to the lives of men; and yet this is the reason assigned for its introduction in the civil law, and its subsequent adoption by the French and other foreign nations, namely, because the laws cannot endure that any man should die upon the evidence of a false or even a single witness, and therefore contrived this method that innocence should manifest itself by a stout denial, or guilt by a plain confession; thus rating a man's virtue by the hardiness of his constitution, and his guilt by the sensibility of his nerves. The Marquis of Beccaria, in an exquisite piece of raillery, has proposed this problem, with a gravity and precision that are truly mathematical: "The force of the muscles and the sensibility of the nerves of an innocent person being given; it is required to find the degree of pain necessary to make him confess himself guilty of a given crime."

RACKOKE, one of the Kurile isles, about 13 miles in length, and the same in breadth. It contains an active volcano.

RACONIGHI, a city of the province of Saluzzo, in the kingdom of Sardinia in Italy. It is situated on the river Maira, where there is a magnificent palace of the Prince Carignan. It contains four monastic and two parish churches, and 1300 houses, with 11,200 inhabitants, who produce silk, and make it into various articles, and have also a considerable trade in corn, as well as in raw and organzined silk.

RADCLIFFE, Mrs. Ann, the celebrated author of the *Romance of the Forest*, and the *Mysteries of Udolpho*, was born in London on the 9th of July 1764. She was the daughter of William and Ann Ward, who, though in trade, were respectably connected, and nearly the only persons of their two families not living in handsome, or at least easy independence. Her paternal grandmother was a Cheselden, the sister of the celebrated surgeon, of whose kind regard her father had a grateful recollection; and her maternal grandmother was Anne Oates, sister of Dr. Samuel Jebb of Stratford, the father of Sir Richard, on which side she was also related to Dr. Halifax, bishop of Gloucester, and to a gentleman of the same name, who was physician to the king. Of the history of her early years, during which the mind usually gives indications of its prevailing tendencies, no record whatever has been preserved. About the time of her twentieth year, however, she is described as possessing a figure exquisitely proportioned, a fine complexion, a beautiful and expressive countenance, and tastes which led her to take delight in contemplating the glories of creation, particularly the grander features they display, listening to music skilfully performed, hearing passages from the Greek and Latin classics recited and translated, and preferring the pleasures of meditation to those of society.

Thus respectably born and connected, Miss Ward, at the age of twenty-three, acquired the name which she subsequently rendered so celebrated, by marrying Mr. William Radcliffe, a graduate of Oxford, and then a student of law. This gentleman, however, renounced the prosecution of his legal studies, and afterwards became proprietor and editor of the *English Chronicle*. Mrs. Radcliffe having thus a strong inducement to cultivate her literary powers, first came before the public as a novelist in 1789, two years after her marriage, and when she was yet only twenty-five years of age. The romance which she then produced, however, gave but a faint indication of the eminent powers afterwards displayed by the author. In the *Castles of Athlin and Dunbayne*, the scene is laid in Scotland during the dark ages, but without any attempt to delineate the peculiar manners or scenery of that country; and although we may trace some germs of that talent for the wild, the romantic, and the mysterious, which she afterwards employed with so much effect, yet, on the whole, this production cannot be regarded as at all worthy of her pen. Mrs. Radcliffe's genius, however, was more advantageously displayed in the *Sicilian Romance*, which appeared in 1790, and attracted a considerable share of public attention. This work displays the exuberant fertility of imagination which formed the principal characteristic of the author's mind. Adventures heaped on adventures, in rapid and brilliant succession, with all the hair-breadth charms of escape or capture, hurry the reader along with them; whilst the imagery and scenery by which the action is relieved, resemble those of a splendid oriental tale. Still the work bore marked traces of the defects incident to an unpractised author. The scenes were inartificially connected, and the characters hastily sketched, without any attempt at individual distinctions; the staple materials consisted of ardent lovers and tyrannical parents, with domestic ruffians, guards, and others, who had wept or stormed through the scenes of romance, without much change of character or features, for half a century before. Nevertheless, this praise may be claimed for Mrs. Radcliffe, that she was the first to introduce into her prose fictions a beautiful and fanciful tone of natural description and impressive narrative, which had hitherto been exclusively applied to poetry. Her style was as full of imagination as her subject, and she established a clear title to be considered as the first poetess of romantic fiction, that is, taking poetry in its true acceptation, apart from the mere accessory of rhythm.

The Romance of the Forest appeared in the year 1791, and at once raised the author to that pre-eminence in her own style of composition, which her works have ever since maintained. In this new effort, her fancy was more regulated, and subjected to the fetters of a regular story. The characters, too, were depicted with skill far superior to that which the author had hitherto displayed, and the work attracted the public attention in proportion. That of La Motte, indeed, is sketched with particular talent, and the interest of the piece mainly depends upon the vacillations of a character, which weakness and vice are at every moment on the point of rendering an agent in the greatest atrocities. He is the exact picture of the needy man who has known better days; one who, spited at the world, from which he had been driven with contempt, and condemned to seek an asylum in a desolate mansion full of mysteries and horrors, avenges himself by playing the gloomy despot within his own family, and tyrannising over those who were subjected to him only by their strong sense of duty. The heroine, too, has some pleasant touches of originality, which she displays in her grateful affection for the La Motte family, and her reliance on their truth and honour, when the wife had become unkind, and the father treacherous. But this was not the department of art on which Mrs. Radcliffe's popularity rested. "The public," says Sir Walter Scott, "were chiefly aroused, or rather fascinated, by the wonderful conduct of a story, in which the author so successfully called out the feelings of mystery and awe, while chapter after chapter, and incident after incident, maintained the thrilling attraction of awakened curiosity and suspended interest. Of these every reader felt the force, from the sage in his study, to the family group in middle life, which assembles round the evening taper, to seek a solace from the toils of ordinary existence, by an excursion into the regions of imagination. The tale was the more striking, because varied and relieved by descriptions of the ruined mansion, and the forest with which it is surrounded, under so many different points of view, now pleasing and serene, now gloomy, now terrible; scenes which could only have been drawn by one to whom nature had given the eye of a painter, with the spirit of a poet."

In 1798 Mrs. Radcliffe visited the scenery on the Rhine, and it is supposed that the *Mysteries of Udolpho* were written, or at least corrected, after the period of this journey; the mouldering castles of the robber-chivalry of Germany, situated on the romantic banks of that celebrated stream, having, it is thought, given a bolder flight to her imagination, and a more glowing character to her colouring. The scenery on the Lakes of Westmoreland, which Mrs. Radcliffe had about the same period visited, was also calculated to awaken her fancy; nature having in these wild but beautiful regions, realised the descriptions in which she delighted to indulge. Her remarks upon the countries through which she travelled were given to the public in 1793, under the title of a *Journey through Holland*, &c. This, however, was merely a sort of intercalary production. As already hinted, her next effort in the province of romance, was the *Mysteries of Udolpho*. Of this much was of course expected; and the booksellers felt themselves authorised in offering for the work, what was then considered as an unprecedented sum, namely, L.500. But although a writer's previous reputation often proves the greatest enemy he has to encounter in a second attempt upon public favour, yet Mrs. Radcliffe's popularity stood the test, and was enhanced rather than abated by the *Mysteries of Udolpho*. "The very name," says Scott, "was fascinating; and the public, who rushed upon it with all the eagerness of curiosity, rose from it with unsated appetite." The author pursuing her own favourite bent of composition, and again waving her wand over the world of wonder and imagination, had judiciously employed a spell of broader and more potent command. Every thing in the *Mysteries of Udolpho* is on a larger and more sublime scale than in the *Romance of the Forest*. The interest is of a more agitating and tremendous nature; the scenery is of a wilder and more terrific description; the characters are distinguished by fiercer and more gigantic features. "Montoni, a lofty-souled desperado, and captain of Condottieri, stands beside La Motte and his Marquis, like one of Milton's fiends beside a witch's familiar. Adeline is confined within a ruined mansion-house; but her sister-heroine, Emily, is imprisoned in a huge castle, like those of feudal times. The one is attacked and defended by bands of armed banditti; the other only threatened by a visit from constables and thief-takers. The scale of the landscape is equally different; the quiet and limited woodland scenery of the one work, forming a contrast with the splendid and high-wrought descriptions of Italian mountain grandeur which occur in the other. In a word, the *Mysteries of Udolpho* was, at its first appearance, considered as a step beyond Mrs. Radcliffe's former work, high as it had justly raised her; and this impression has been confirmed by subsequent comparative perusal."

The next production by which Mrs. Radcliffe arrested the attention of the public, was destined to be her last. The *Italian*, which appeared in 1797, was purchased by the booksellers for L.800, and favourably received by the public. Sir Walter Scott praises the author for her judgment "in taking such a point of distance and distinction, that while employing her own peculiar talent, and painting in the style of which she may be considered the inventor, she cannot be charged with repeating or copying herself." But mere change of subject, or taking a point of distance and distinction, as remote as possible from the scenes in which her imagination had previously expatiated, does not necessarily imply originality of invention in the construction and development of her story. On the contrary, she selected a species of machinery afforded her by the most vulgar conceptions entertained of the Catholic religion, when established in its paramount superiority; and instead of contemplating it calmly as reflected in the glass of history, she adopted all the conventional and ready-made horrors that came in her way, and had thus at her disposal the usual apparatus of monks, spies, dungeons, the mute obedience of the familiars of the Inquisition, and the dark, domineering spirit of the crafty emissaries of Rome. "This fortunate adoption," as Sir Walter Scott calls it, "placed in the hands of the authoress, a set of agents powerful enough to act forcibly on imaginations in which they were associated with all imaginable kinds of atrocity and wickedness, and furnished at once the means of producing a strong effect, without the trouble of inventing new characters, or creating original combinations. But it may be questioned whether such agents, with all their conventional attributes, were suited to the purposes for which they were employed, or whether, even by their instrumentality, any tinge of probability could be imparted to those parts of the story which are most at variance with the ordinary course of human actions and events." The *Italian*, however, was well received by the public, to whom delineations which flatter their religious pride or hatred are always welcome; and after its publication in 1797, the world were not favoured with any more of Mrs. Radcliffe's works. "Like an actress in full possession of applauded powers, she chose to retire from the stage in the very blaze of her fame; and, for more than twenty years, an imagination naturally so prolific, was, for reasons which we are left in vain to conjecture, condemned to inaction and sterility."

The tenor of Mrs. Radcliffe's domestic life seems to have been peculiarly calm and sequestered. She appears to have declined the notoriety which, in London society, usually attaches to persons of literary distinction; and perhaps no author whose works were so universally read and admired, was so little known personally, even to the most bustling of that class who rest their pretensions to fashion upon the selection of literary society. She no doubt consulted her own feelings, happy in equally avoiding the stare of the curious or the scrutiny of the malignant. Nor did it at all disturb her domestic comforts, although many of her admirers believed, that from brooding over imaginary terrors, her reason had at length been overcome, and that the gifted author of the *Mysteries of Udolpho* existed only as the inmate of a private madhouse. For this belief, however, there neither was, nor ever had been the most distant foundation; although the rumour on which it was founded had been generally spread, and confidently repeated in print as well as in conversation. During the last twelve years of her life, Mrs. Radcliffe suffered from a spasmodic asthma, which considerably affected both her health and her spirits. This chronic disorder, however, at length took a more fatal turn, on the 9th of January 1823, and on the 7th of February ensuing, it terminated the life of this ingenious and gifted woman, at her own house in London.

Mrs. Radcliffe, considered as an author, is fully entitled to take her place amongst those who have been distinguished as the founders of a class or school. She led the way in a species of composition, which has since been attempted by many, but in which no one has attained, or even approached the excellencies of the original inventor. The species of romance which she introduced bears nearly the same relation to the novel that a melodrame does to the legitimate drama. It does not appeal to the judgment, by searching delineations of human feeling, nor stir the passions by scenes of deep pathos, nor awaken the fancy, by tracing out the higher marks of life and manners, nor excite mirth, by strong representations of the ludicrous or the humorous. It attains its interest neither by the path of comedy nor by that of tragedy; and yet it has, notwithstanding, a deep, decided, and powerful effect, gained by means independent of both; in other words, by an appeal to the passion of fear, whether excited by natural dangers, or by the suggestions of superstition. The force of the production consists in the delineation of external incidents, whilst the character of the agents are entirely subordinate to the scenes in which they are placed, and only distinguished by such outlines as to make them seem appropriate to their respective situations. The persons introduced bear the features, not of individuals, but of the class to which they belong; and if they be dressed in the proper costume, and converse in language sufficiently appropriate to their stations and qualities, nothing more is required. The primary object is the generation of awe and terror, and everything ministers to the production of this effect. It is enough if the characters be truly and forcibly sketched in outline; they are accessaries rather than principals, and for the most part rather passive than active, so that in throwing upon them and their actions just enough of that dubious light which mystery requires, Mrs. Radcliffe does all that is requisite for the accomplishment of her object. It were easy to find fault with a proceeding like this, which, dispensing with scenes of passion such as those of Richardson, or delineations of life and manners, as in the pages of Fielding and Smollett, carries us back to the fare of the nursery, and gorges us with the wild and improbable fictions of an overheated imagination. And there might be some truth in this, if it were only predicated of the crowd of copyists who came forward as imitators of Mrs. Radcliffe, and assumed her wand, without having the power of wielding it with the same magical effect. But no author can be arraigned for the deficiencies of servile imitators, who present an obscure, distorted, and indistinct outline of what is in itself clear, precise, and distinct; nor can it be truly said that the applause with which the romances of Mrs. Radcliffe were received, argued a great and increasing degradation of the public taste, the corruption of which is almost never the consequence of power and originality; whilst the inferiority of the servile race is much more likely to put the style they imitate out of fashion, than to engraft its peculiarities upon that of a nation. [See Sir Walter Scott's *Biographical Notice of Mrs Ann Radcliffe.*] (A.)

RADCLIFFE, Dr. John, an English physician of great eminence in his time, was born at Wakefield in Yorkshire in 1650. He was educated at Oxford, and enrolled himself in the physical line; but it was remarked that he recommended himself much more by his ready wit and vivacity, than by any extraordinary acquisitions in learning. He began to practise at Oxford in 1675, but never paid any regard to established rules, which he censured whenever he thought fit, with great freedom and acrimony; and as this drew all the old practitioners upon him, he lived in a state of continual hostility with them. He died in 1714; and if he never attempted to write any thing himself, he has perpetuated his memory by founding a fine library at Oxford, to preserve the writings of other men.

RADE, sometimes called Bade by the Forest, a city of the Prussian government of Cleves, in the circle of Lennep. It is fortified, and having been burned down in 1802, has since been regularly built. It contains 510 houses, with 4950 inhabitants, diligently employed in manufactures of cloths, hosiery, serges, and hardware.

RADICAL, in general, something that serves as a basis or foundation. Hence physicians talk much of a radical moisture. In grammar, the appellation of *radical* is applied to primitives, in contradistinction to compounds and derivatives. Algebraists also speak of the radical sign of quantities, which is the character expressing their roots.

RADICLE, that part of the seeds of all plants which upon vegetating becomes their root, and is discoverable by the microscope.

RADIUS, in *Geometry*, the semidiameter of a circle, or a right line drawn from the centre to the circumference.

Radius, in *Anatomy*, the exterior bone of the arm, descending along with the ulna from the elbow to the wrist.

RADNOR, NEW, a market and borough town in the county of Radnor, in South Wales, 159 miles from London. It was formerly defended by a strong castle at the entrance of the pass between the two hills in which it is built, but that was destroyed by Owen Glendower in the reign of Henry IV. It is still a borough, and has a market which is held on Saturday. The population was in 1801, 329; in 1811, 380; in 1821, 426; and in 1831, 472. It now returns one member conjointly with the boroughs of Knighton, Rhayadyr, Cefn-llys, and Crwclas.

RADNORSHIRE, an inland county of South Wales, bounded on the north by Montgomeryshire, on the west by the counties of Cardigan and Brecon, on the south-east by Herefordshire, and on the north-east by Shropshire. Its extremities from east to west are twenty miles, and from north to south twenty-four miles, as under. Its surface is computed to measure 426 square miles, or 272,640 English statute acres.

The population in 1811, amounted to 20,900 souls, in 1821 to 22,503, and in 1831 to 24,651, of whom 12,453 were males, and 12,198 females. The total sum charged to the property tax in 1811, under the heads of rents of land and tithes, was, for the former, L.88,250, and for the latter, L.9373. On comparing these numbers with the other returns of Great Britain, it appears that this county is the lowest in numerical population, except the county of Rutland; although its annual rental is higher than either Anglesey or Merioneth.

This district of country continued under the jurisdiction of the Lords Marchers, until it obtained the privileges of a county by act of Henry VIII., and was divided into the hundreds of Radnor, Knighton, Painscastle, Rhayder, Coluyn, and Kevenlleece. By the same act it was also empowered to return two members to Parliament, one for the county, and one for the contributory boroughs of Radnor, Rhayder, Knighton, Knuclas, and Kevenlleece. The county is further divided into parishes and townships. The former are fifty-two in number, and are all in the diocese of St. David's, except five, which are included in the English diocese of Hereford. New Radnor, said to have been at one period the principal town, is now a very poor village; it was an ancient borough by prescription, and has also had charters granted by Queen Elizabeth, and by George II.

Two-thirds of the whole area of the county are supposed to be unenclosed and uncultivated. An extensive mountainous tract, nearly in the centre, is usually called the Forest, though there is no reason to believe it was ever covered with trees. A part of this range still belongs to the Crown, although the forests of Radnor and Blathvagh have both been alienated, and are now held by Mr. Thomas Frankland Lewis, and Mr. Richard Price, as foresters. There is nothing remarkable in the circumstances or character of these mountains, the summit of which was ascertained by Colonel Mudge, to be 2163 feet above the level of the sea. Within their limits is a torrent, called by a name, which, when translated, is "Water-break-its-neck," that falls abruptly from a height of about 150 feet. The higher ranges produce only heath, but the sides and lower parts of the hills, which are less exposed to the winds, are entirely devoted to the pasturage of sheep and small horses. The north-western angle of the county is mountainous and unenclosed, and it was in the recesses of these wilds, that the British monarch, Vortigern, retreated from the Saxons. On the eastern and southern districts, the valleys are wider and more fertile, and abound with small rivulets; but the hills are less elevated, and are partially clothed with wood.

The soil of this country is as varied in quality as its position differs in elevation. A small portion of the southern angle is composed of the fertile red earth which prevails in the adjoining counties of Brecon and Hereford. The mountains upon the western side are chiefly of the primary slate rocks which abound in Wales; and the valleys between these and the forest have frequently a clayey substratum retentive of water. The forest, and the other subordinate hills connected with it, consist of a slatey rock, containing a portion of lime, which decomposes rapidly on exposure to the atmosphere. The valleys to the eastward of this range are chiefly of a fertile loamy soil, incumbent on an extremely absorbent gravel. The climate is wet and stormy, and the spring months are particularly cold and ungenial. It is, nevertheless, healthy; there are no peculiar or prevalent diseases, and the inhabitants are robust and long-lived.

The principal river is the Wye, which enters the county at Savan y Coed, and flows to the south till it divides it from Brecon. Its tributary streams are the Elan, the Ithon, the Edda, and the Mackwy. The river Terne flows on the eastern border, and continues its course by Ludlow to the Severn. The Lug and the Arrow, in the more central parts, form considerable streams before they enter the county of Hereford. There are some small lakes or pools requiring notice only as contributing to the beauty of the scenery. These are, Llyn, Llanbychllyn, Hendwell Pool, and Llyn-Gwyn. A cataract at Rhayader, was formerly an object much visited by travellers; but the construction of a bridge has widened the channel, and deprived it of much of its remarkable character.

The agriculture of the county is gradually improving. Irrigation has long been practised to a considerable extent, and its effects on absorbent soils are found to be highly beneficial; but the process is not conducted in the most scientific manner. Lime is abundantly used as a manure, and is chiefly supplied from a valuable stratum of rock near Old Radnor. The ploughing was usually performed by two oxen and two horses; but oxen are now seldom used, and the plough with two horses is in gradual adoption. The implements of husbandry are, for the most part, in a rude form. Most of the farms consist of an equal portion of arable and of grass land. The latter is generally appropriated to the dairy, and the young cattle are reared on the more hilly and barren spots. About one-fifth of the county is under the plough, and one-tenth meadow; the remainder is generally used for sheep walks.

In the mountainous districts the cattle differ little from those which are common in the principality of Wales, but in the more fertile parts, the Herefordshire breed prevails. The sheep are small, and when fattened, their mutton is excellent; the horses also are generally small, strong, and hardy.

There is little commerce carried on in this county, and the only manufactures are of flannels and coarse woollen cloths, which the inhabitants make for their own use. Cattle, sheep, horses, woollen, butter, and, from the south-east districts, a surplus of grain, are sent annually to the markets of England. The county is not known to contain any valuable minerals. A lead mine has been opened and abandoned, and, in some places, an uncertain belief has prevailed of the existence of copper. Various mineral springs are known, and Llandrindad is a place of resort on account of the medicinal qualities of its saline, sulphureous, and chalybeate wells. In several other parts there are similar springs, the properties of which have not been accurately ascertained.

In Radnorshire there are many vestiges of antiquity. The Abbey of Cwm Hir stood formerly in a singularly retired and romantic situation on the banks of a rivulet which runs into the Wye. A small vestige remains of a castle at New Radnor, which was assailed and destroyed "by the irregular and wild Glendower," previously to the battle noticed by Shakspeare, in the first part of Henry IV., when Mortimer was taken prisoner. It was fought at Pilleth in this county.

A Roman road, which reached from Chester to Caermarthen, traversed this county, entering its confines on the northern extremity, in the direction of Newtown, following the valley of the river Ithon, and crossing the Wye into Brecknockshire, near the town of Beulth. At Cwm, near Llandrindad, the remains of a Roman station, on this road, are still discernible.

The market towns, and their present population, in 1831, were as follow: Presteign, 1529; Knighton, 1259; Rhayader, 669.

RAFT, a sort of float, formed by an assemblage of various planks or pieces of timber, fastened together side by side, so as to be conveyed more commodiously to any short distance in a harbour or road than if they were separate. The timber and plank with which merchant-ships are laden, in the different parts of the Baltic sea, are attached together in this manner, in order to float them off to the shipping.

RAFTERS, in building, are pieces of timber, which, standing by pairs on the reason or railing piece, meet in an angle at the top, and form the roof of a building.

RAFUR, a town of Hindustan in the Mahratta territories, and province of Aurungabad, forty-three miles S.S.E. from Ahmednuggur. Long. 75. 20. E. Lat.18. 26. N.

RAGECS, a market town of Hungary, in the province of Hither Danube, and circle of Trentsin. It contains two churches, a synagogue, 490 houses, and 4560 inhabitants, who carry on the trades of sadlers and paper-makers. Near to it are warm baths, much frequented by invalids. Lat. 49. 5. 35. Long. 18. 32. 25. E.

RAGMAN'S Roll, so called, as some think, from one Ragimund a legate in Scotland, who calling before him all the beneficed clergyman in that kingdom, caused them on oath to give in *the true value* of their benefices, according to which they were afterwards taxed by the court of Rome; and this roll, amongst other records, being taken from the Scotch by Edward I. was delivered to them in the beginning of the reign of Edward III.

RAGNIT, a town of the province of East Prussia, in the government of Gumbinnen. It is the capital of a circle of the same name, which extends over 466 square miles, and comprehends one city and six parishes, with 23,100 inhabitants. The town is on the river Memel, where that stream enters the Prussian from the Russian dominions. It contains 196 houses, with 2200 inhabitants, chiefly depending upon agriculture and internal trade. Lat. 55. 1. Long. 21. 56. E.

RAGSTONE, a coarse kind of sandstone which is used as a whetstone for coarse cutting tools. It is found in the hills about Newcastle, and in many other parts of England, where there are large rocks of it.

RAGULED, or Ragged, in *Heraldry*, jagged or knotted. This term is applied to a cross formed of the trunks of two trees without their branches, of which they show only the stumps. *Raguled* differs from *indented* in this that the latter is regular, and the former not.

RAGUSA. A circle in the Austrian province of Dalmatia, composed of what was formerly the independent state of that name, of the peninsula of Sabioncello, and of several islands on the shores of the Adriatic. It was formerly an aristocratical republic, with the peasants feudatories to the nobles; and its constitution was under the guarantee of the Sultan, of the king of the two Sicilies, and of the republic of Venice. When, in the course of the war, the French took possession of the district, the bondage of the labourers was lightened, and when it was ceded to Austria by the congress of Vienna in 1815, the freedom of all was secured. The circle is 1232 square miles in extent, and contains about 50,000 inhabitants. The capital is the city of the same name, the Rausium of antiquity. It is situated in a small bay which forms an excellent haven, from being protected by the island of St. Locromo. It is surrounded with walls, and the gates which, under the old aristocracy, were only opened a few hours each day, now constantly afford ingress and egress to strangers and inhabitants. There is a fine palace formerly the residence of the chief, the cathedral of a Catholic archbishop, several monasteries and churches for both Catholics and Greeks, a college, an hospital, 1280 houses, and 7450 inhabitants, who are employed in building ships, in manufacturing silk, and in making soap, snuff, and various cordials. There are belonging to the port more than 300 vessels, of which about thirty are equipped for distant voyages. This place is celebrated for having given birth to the celebrated Jesuit and mathematician Boscovich. Lat. 42. 36. 40. Long. 18. 6. 25. E.

Ragusa is a city of the island of Sicily in the district of Noto, and intendency of Liragosa. It is situated on an Alpine mountain, but watered by the river of its own name. The situation is tolerably salubrious, and 120 miles from Palermo. It contains 16,600 inhabitants, who make woollen cloths and some other goods, and have a considerable general trade. It was the ancient Hybla, and near to it are many remains of antiquity, and several caverns in which the celebrated honey is still to be obtained.

RAHABEK, a village in the desert part of Irak Arabia, near the Euphrates, on the road frequented by the caravans from Syria to Irak Arabia, 110 miles south-west of Mosul. Also a village of Diarbekir in Asiatic Turkey, on the Euphrates, fifty miles south of Kerkesich.

RAHALY, a town of Irak Arabia, ten miles distant from the Euphrates, and seventy miles N.W. of Meshed Ali.

RAHAPA, a small island in the eastern seas, near the east coast of Borneo. Long. 119. 4. E. Lat. 4. 58. N.

RAHAT, a town of Hindustan, in the province of Allahabad, and district of Bemdelarnel, forty miles N.N.E. from Chakerpoor. Long. 80. E. Lat. 25. 32. N.

RAHDUNPOOR, a town of Hindustan, in the province of Gujerat, and district of Werrear, belonging to a Mahommedan chief, who formerly possessed a much more extensive territory. It contains 6000 houses, 1400 of which are inhabited by shroffs or bankers, some of whom are possessed of property, and carry on an extensive commerce. It is well situated for commerce, and forms an emporium for the trade of Merwur and Cutch, though the road has of late years been infested by a tribe of robbers, called Coolies. The valuable caravans formerly travelled by this route; but they are deterred by the danger of the road. The inhabitants are mostly engaged in agriculture, and they have brought the vicinity of the town into a high state of cultivation. They have no manufactories of any consequence, except one of very coarse cloth for the Coolies. This principality was founded by a Balvocky chief who came from Paakur; and Shah Jehan built the wall in order to repress the invasions of the Coolies. When the Gurcowar compelled the father of the present nabob to resign his claims to Pattan and its nine dependent pergunnahs, he was permitted to retain Rahdunpore, Manjepoor, and Sommee, which formed part of the original possessions of the family. Long. 71. 45. E. Lat. 24. N.

RAHOON, a town of Hindustan in the Sikh territories, and province of Lahore. It is situated about four miles west of the Sutlege river, and has a considerable manufacture of cotton cloths. During the height of the rains, the river here is above one and a half mile broad. From Rahoon, buffas and piece goods are carried to the fair at Hurdwar, 115 miles south-east from the city of Lahore. Long. 75. 35. E. Lat. 25. 53. N.

RAIE, a small town of Diarbekir in Asiatic Turkey, 118 miles south-west of Diarbekir.

RAILLERY, according to Dr. Johnson, means slight satire, or satirical merriment; and a beautiful writer of the last century compares it to a light which dazzles, but does not burn.

RAILWAYS.

In treating of the construction and mode of working railways, we shall confine ourselves principally to those which are intended for the transit of passengers and goods, and which are now opening so vast a field for the improvement of the human race; an improvement, in fact, entering into all the relations between man and man, and which no one, be he ever so sanguine, can venture to fix a limit to.

From the middle of the seventeenth century various contrivances have been in use for decreasing friction on roads, particularly near the collieries in the north, such as laying down tracks of wood and stone for the wheels of waggons; it having been found that the much greater quantity of work performed by horses on these tracks, or, in other words, the less number of horses required to do a given portion of labour, more than repaid the expenses attendant on forming the tracks. These, in general, gave way to the flat or tram rail, made of iron; but the improvements were very slow, and at last were only applicable to certain circumscribed localities and materials for carriage.

Possessing little general interest, and chiefly benefiting individuals, the attention they attracted was principally confined to the parties immediately connected with them. But how different is the prospect now before us, since we have seen the magnificent creations of George Stephenson? Packhorses are still the only mode of transit for traffic in many parts of the world; and within seventy years this was the general mode of conveyance for the carrying trade to Yorkshire and Lancashire from the west of England and Birmingham. In the year 1830, when the London and Birmingham railway was projected, the expense of constructing it was stated at L.6000 per mile with one line of rails, which were to be worked by horses, and warranted to go eight miles an hour; now the public are complaining of going *only* twenty miles an hour, and we have a right to expect that, at no very distant period, this velocity will at least be doubled; in fact, at the rate improvements have been advancing for the last few years, we know not where to place a limit of increase in speed.

It is of these splendid creations that we have here to speak. We shall shew the method of conducting a modern railway, from its earliest commencement, through all its various stages in each department, both in and out of doors, up to the period of its final completion; and shall end by explaining the method of setting it in full operation, pointing out, in each division of the labour, those modes of proceeding which will most conduce to a satisfactory result, and marking those things which practice has shewn should be avoided; collecting the contrivances and appliances which have been found useful, from whatever source they may be derived, and setting a beacon upon shipwrecks, that they may become other men's landmarks.

When a railway is proposed between any two places, the public want to know how to distinguish between a bubble speculation, got up by a few interested individuals, a crudely-formed and hastily-adopted, but really good project, and a line got up with care and attention through all its parts, shewing it to be the result of patient research and of matured judgment; and according as inquirers find the following directions more or less attended to, they may place confidence in the scheme which is laid before them.

These undertakings generally begin with a few individuals interested in the line of railway proposed, when the project is honestly intended; but the great mass of original proprietors are men of a speculative and adventurous turn of mind, who enter into these concerns for the mere purpose of making money. If the thing succeeds, and the shares rise to a large premium, as they often do, the original holders realize the profits at once, by selling out, and then apply their surplus capital in other projects, with the same hope of gain. These people, by going out, make way for another class of proprietors, namely, those who look to their shares as a permanent investment, and hope to make by them a greater annual receipt than they can get in the public funds, or by any other means.

In the earlier stages the directors are generally self-elected. They should be men of local interest, rather than the lions who are too often found in these situations; men who can influence members of Parliament in either house, conciliate landholders, get off the shares, &c., and, above all, they should be of regular and businesslike habits. After a few meetings, they will find out what are their respective qualifications, and can allot themselves into sub-committees accordingly; some to look after the traffic, others the surveying, others the share list, others to attend to the canvassing along the line, &c. Almost their first duty will be to choose the secretary, the engineer, the solicitor, and the banker.

On the appointment of the first three much of the future success of the company will depend. The secretary should be a man of firmness and nerve, with conciliatory and gentlemanly manners; of a strong habit of body, able to rough it out in travelling, and possessing a stock of scientific and mechanical knowledge. If he is a draughtsman so much the better, and he should have been habituated to command large bodies of men, and be able to make a public speech at a short notice. With these qualifications, habits of order, and plain common sense, he will be a most valuable man.

The engineer must be judged of by the works he has executed, either by himself or under the direction of a superior; the first, of course, being the most conclusive, but the second by no means to be neglected. Skill and genius may often be very prominent in subordinate situations. Of course, all other things being equal, one who has been employed on railways should be preferred to one who has not. The solicitor should, if possible, have been connected with a railway bill before, and should have not only ability, but zeal. The advantage of having one who had been connected with a previous undertaking is obvious, and if he has had much experience in parliamentary business, so much the better; a local acquaintance amongst the landowners and residents along the line is also of much use.

Preliminary inquiries.

We suppose that, prior to advancing even thus far, the promoters of the undertaking have travelled between the termini of the intended railroad, and have ascertained that there are no engineering difficulties of a marked character; and from our present stage, if the share list be found to fill, we have next to ascertain the nature and quantity of the traffic, first, as to whether it will pay for a railroad at all, and secondly, for what kind of a railroad. These questions should be met openly and honestly, or the consequences will be most disastrous.

The proper way to gain a correct knowledge of the traffic along any given line of country is, first of all, to station a man by day and another by night for two or three weeks, to count all vehicles passing a given number of spots along the intended line, (these spots should be near the principal towns), leaving out the largest terminus, as, for instance, London, and keeping the men on that side of all the respective towns which is nearest the largest terminus. For this purpose memorandum-books should be furnished them to note down all that passes. These should, at the end of their twelve hours' beat, be digested into printed forms, where each class is to be placed in its proper column, and any remarks made, if necessary. The forms are then to be daily transmitted by post to the secretary, who should make it his business to ascertain that, by fairs, races, elections, or any other causes of local excitement, the traffic is not in an unusual state. He is then to consider attentively the returns he has received, discriminating that which would be available for the railway in question, from that which would not, and bring the whole series into one general total, under the head of "direct traffic." The men are also to make a return, as nearly as they can, of the number of persons travelling in each vehicle, the quantity of goods in each waggon, van, cart, &c., distinguishing the nature of it, when practicable; also the number of all kinds of cattle passing the road, and where all the various passengers and goods are being conveyed to, as far as can be ascertained.

A similar series of observations must be carried on along the canals, if any, which lead from those parts of the line likely to become available for the intended railway, distinguishing the nature and quantity of the traffic. Most canal-boats are marked at the head and stern with the draught of water; and by finding out what they sink for every half-ton, a sufficiently near estimate may be found of the weight they carry. In certain situations the entries at the custom-house will be useful auxiliaries; the returns from clerks of markets will often materially assist as checks, as will also the rental of the various turnpikes; and no means are to be neglected to obtain a fair and honest statement of the general traffic in actual existence along the proposed line.

Traffic to be expected.

The next object is to find out what will be the probable increase on this existing traffic, when it shall be carried so much quicker and cheaper by a railway. The usual method of doing this has been to assume some ratio of increase, deduced from other undertakings of a similar nature, and two to one have been considered rather under than over the truth; but when it is remembered that the increase of passengers, these being the main contributors to a railway, has been, in all proportions, up to eighty to one, it is obvious that this is a very uncertain mode of ascertaining such an essential element.

A much better method of arriving at this point will be to take, with the help of a map, all those stage-coaches which run from places where travellers can go cheaper and quicker by the proposed railway. The numbers of these, their daily journeys and their mileage, can be readily got from the stamp-office returns, printed in Robson's *Directory*. When these various returns and data of every possible kind have been collected, and information has been brought to bear from every quarter whence it can, by any means, be obtained, the whole must be drawn up ready for calculation, so as at last to exhibit, in the simplest manner in which it can be shewn, a tabular result not only of the existing traffic, but also of that which can be affected by the proposed railway under any circumstances, which latter may be called "contingent traffic."

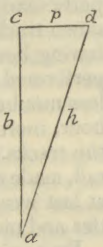
The best mode of computing the data, as above described, is to multiply the distance between the stations by the number of coaches; then by the number of daily or weekly journeys made by each; and then by the number of passengers they may fairly be presumed to carry. By proceeding in this manner, the last results, in this case, can be added in a column, which will give the number of passengers carried one mile, daily or weekly, as the case may be. This, divided by the number of miles there will be on the intended railway, and augmented so as to exhibit the yearly quantity, will give the first step in the inquiry. The same method exactly is to be made use of for the canal traffic, if any, substituting tons for passengers, which is also to be done with the waggons, vans, and other public conveyances.

The contingent traffic, or that which is obtained from the stamp-office returns, is to be handled in a similar manner, only taking care that the various coaches and other vehicles are only taken for that distance which, in all probability, they will go upon the railway. When the whole is reduced, it must be put into money, and will then contrast with the amount of the same quantity of traffic at existing prices.

It is very easy to determine a limit beyond which none of this contingent traffic will, by any possibility, be available for a railway. We shall shew how this is done, as it may serve thus far as a guide, so that no place beyond the limit need, of course, be paid any attention to.

In any triangle *a*, *c*, *d*, (fig. 1), let (*ad*) represent any increment uniformly generated with any given velocity (*h*), and let (*ac*) and (*cd*) represent any other increment uniformly generated with any other given velocities (*b*) and (*p*). Now all these velocities being in this case comparable with each other, if we represent the different increments by the times in which they are generated, we may shew by the respective portions (*ad*) (*ac*) and (*cd*), the progress of any object whose motion is uniform.

Fig. 1.



Let (*ad*) represent a part of the road now used between any two towns (*a*) and (*d*), let (*ac*) be a portion of a railroad, and let (*cd*) be a cross-road joining the railroad (*ac*) with the turnpike road (*ad*). Then if the velocity (*b*) (*p*) and (*h*) in the respective times (*t″*) (*t′*) and (*t*) are such, that.

$$t''+t' \angle \text{ or} = t$$

the point *d* would be at the limit, and no person beyond it could travel along (*dc*) and (*ca*) in order to get from (*d*) to (*a*) with advantage.

As a railway may, in general, be taken in comparison with a coach-road, both as to time and price, in the ratio of 1 : 2, price may at once be excluded from the investigation, and time only taken into account; because those to whom time is an object in travelling, by attending to that alone, will evidently reap, along with it, the benefit of cheapness also; and those to whom price is an object, will, in attending to time only, gain that advantage, and in conjunction with it, the minimum of price likewise. Particular circumstances may, in a few cases, modify this; but the general features of the comparison will be as above.

Taking, then, the ratio of $p:b=h:b=2:1$, and considering $p:h$ to be a ratio of equality, and that for one hour $h=p=10$ miles, and consequently, $b=20$ miles, or, in other words, that on the railroad (*b*), the rate of travelling will be 20 miles an hour, while on the direct road (*h*), and the cross road (*p*), the rate will be at 10 miles an hour; we have then only to add the whole of the perpendicular (*p*) to half the base (*b*), and subtract the same from the hypothenuse (*h*), which is got from the stamp-office returns for each town, and the remainder, if any, will be the miles gained by travelling over the two sides of the triangle instead of over the third, and if there is no remainder, that particular town is beyond the limits, and will not be benefited by the railway, consequently, it must be rejected from the traffic returns.

It is well there were no railroads in Euclid's days. We do not know what he would have said to our thus making the perpendicular and half the base equal to the hypothenuse; but such is the practical fact in the question we are considering, and this fact has been exemplified on every railway where the traffic can partly be derived from towns right and left of the line, which is the case almost invariably. We shall give a few instances, taken from the traffic returns of the London and Birmingham railway.

It is required to know whether the coaches running from Bedford to London ought to be included in the returns of traffic for the London and Birmingham railway, or, in other words, whether the inhabitants of Bedford would go cheaper and quicker to London, by first getting to the London and Birmingham railway, and then proceeding by that route to London, or whether they had better go by the old direct coach road, and *vice versa*, on their return from London, whether it would be cheaper and quicker for them to go along that railroad, and then by a cross country coach to Bedford, or continue to use the old road?

The nearest station for the people of Bedford on the London and Birmingham railway, is at a place called Wolverton; from Bedford to Wolverton (p) is 15 miles, to which add ($\frac{1}{2}b$) half the distance from London to Wolverton, which is 25½ miles, and the total 40½ miles, ($\frac{1}{2}b+p$) is the equivalent distance from London to Bedford, *via* the railway; that is to say, by travelling along the two sides of the triangle. Now, in the stamp-office returns, it will be found that the direct road (h) is 52 miles, consequently, either in going to London, or coming from it, the people of Bedford would in each case save 11½ miles in equivalent distance, or 1 hour and 9 minutes in time, besides money. It is clear, then, that Bedford ought to be included in the traffic returns of that railway company.

The same question is proposed as to the town of Hatfield. The nearest station on the railway to this place is at Two-waters, and the distance between them (p) is 10 miles; adding to this ($\frac{1}{2}b$), half the distance from London to Two-waters, which is 10½ miles, we have ($\frac{1}{2}b+p$), the equivalent distance *via* the railroad between London and Hatfield, equal to 20½ miles. Turning now to the stamp-office returns, we find (h) the distance from London to Hatfield by the direct road, is also 20½ miles, and consequently, the two routes being equal, that town ought not to be included in the estimate of traffic.

It is required to know the same thing with respect to the town of Hitchen? Here the inhabitants would join the railway in question at Leighton Buzzard, and we find (p)=16½ miles, ($\frac{1}{2}b$)=19 miles, total or ($\frac{1}{2}b+p$) 35½ miles, whilst (h)=36 miles; and there would be a consequent gain of half a mile in distance, or 3 minutes in time.

In the case of Oundle and London, the station where the inhabitants of that town would join the railway, is near Northampton, and we have (p)=26 miles, ($\frac{1}{2}b$)=32 miles, total or ($\frac{1}{2}b+p$)=58, whilst, by the stamp-office returns, we have (h)=81 miles; consequently, there is a gain of 23 miles, or of 2 hours and 18 miuutes, by thus travelling over two sides of the triangle instead of the third.

It is desired to know, whether the inhabitants of Leicester, in their communication to and fro with Birmingham, and *vice versa* those of Birmingham in the communication with Leicester, will be benefited by the London and Birmingham railway. Here the point where each party would either join or leave the railway would be Coventry, and we have (p)=25 miles, ($\frac{1}{2}b$)=9 miles, total or ($\frac{1}{2}b+p$)=34 miles, whilst (h)=36 miles, shewing a gain of 2 miles, or 12 minutes in time.

We will throw a few more examples into a tabular form, as this part of our subject is a very important one, and cannot be too well understood. Care will, of course, be taken, that all the distances are those really existing on the respective roads in question; and it will also be advisable to reject all minute savings from the traffic returns, in order to be under, rather than over, in the estimate.

Between what places.	Place where the railway would be joined or left.	Distance to or from that place and the required town or (p).	Half the distance from London to the point of junction with the railway, or ($\frac{1}{2}b$)	Total equivalent distance, or ($\frac{1}{2}b+p$).	h	Gain in miles.	Gain in time. H.	Gain in time. M.
Shenley Hill and London	Watford	7	7	14	17	3	0	18
St. Neot's and London	Blisworth	26	27	53	57	4	0	24
Uxbridge and London	Stanmore	5½	5½	11	17	6	0	36
Woodstock and London	Stoney Stratford	25	25	50	64	14	1	24
Stamford and London	Rugby	40	42½	82½	89	7½	0	45
Oxford and London	Fenny Stratford	27	22	49	58	9	0	54

The best way of commencing to make out the following table, will be to take a map of the railway for which it is to be formed; and this should embrace a considerable portion of the adjoining country. Draw on the map a straight line from the one terminus to the other; this will represent (b) in fig. 1, and from this, lay off at right angles from each of the termini, other straight lines; these will represent (p) in fig. 1. We shall now shew how to ascertain the point in (p) from which (h) is to be drawn in each case to the more distant terminus, and then shew the mode of using this figure when thus laid down on the map.

We have given to us by the conditions of the problem.

$$h=\frac{b}{2}+p, \tag{1}$$

$$p=h-\frac{b}{2}, \tag{2}$$

$$b=\frac{h-p}{2}, \tag{3}$$

and from the relations of a right-angled triangle we have

$$h=\sqrt{b^2+p^2}. \tag{4}$$

Substituting in this latter expression the value of (p) from equation (2),

$$\text{we get } h=\sqrt{b^2+\overline{h-\frac{b}{2}}^{\,2}},$$

$$\text{whence we have } h=\sqrt{b^2+h^2-hb+\frac{b^2}{4}},$$

$$\text{or, } h^2=b^2+h^2-hb+\frac{b^2}{4},$$

$$\text{whence } 0=b^2-hb+\frac{b^2}{4},$$

$$\text{or, } hb=b^2+\frac{b^2}{4};$$

$$\text{and finally, } h=b+\frac{b}{4}=\frac{56}{4}=1{\cdot}25\ b,$$

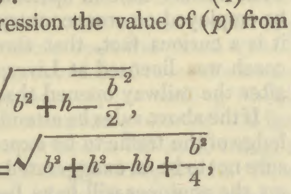
and substituting this value of (h) in equation (2),

$$\text{we have, } p=\frac{3b}{4}=0{\cdot}75\ b.$$

From this we see, that the length of (p) will always be three-fourths of (b), and the length of (h) once and a quarter that of (b).

On the map then, calling (a) (c) the termini, we set off on (p) in four directions three-fourths the length of the straight line (b), and then draw the four lines (h), (see fig. 2,) and we are sure that the four triangles (b, p, h,) include every town that can by any means come to our termini to use our whole line, and if the line b was in reality a straight one on the ground, as it is in the figure, the triangles would include

Fig. 2.



every other town throughout the whole tract of country, the inhabitants of which could avail themselves of the benefits of the railway, therefore, in using our figure, we must make the outer boundary lines (h), respectively curve right or left as the line of railway departs in either of those directions from the straight line (b). The values of ($\frac{1}{2}b$) may then be found and marked ready for use, as nearly as can be judged, by seeing where the stations would, it is presumed, be ultimately placed; then having ascertained the values of (p) and (h) from the stamp-office returns, or any other equally authentic document, they may in each case be marked against the roads for all the towns which we may see fit to calculate upon for putting or not into the traffic returns, according as their inhabitants would gain or not by using the railway.

It will, on a very slight inspection, be self-evident, that for perhaps three-fourths of the whole space included within the lines (p) and (h), there will be no need of any calculation, except to shew the quantity of saving. In the earlier stages, therefore, if it is merely required to know the amount of traffic; but only the doubtful places need be computed, and the rest may be deferred till it is desirable to complete the whole table. It must also be noted, that although a place may be actually without the boundary lines, yet there may not be a conveyance from it to either of the termini, as the case may be, and that the inhabitants, in order to be enabled to travel thither, may have to come to a place within the lines. They are then to be tried for as if they were themselves situated within the lines, and, of course, all towns beyond the termini must benefit, when travelling towards the opposite end of the line.

The effect of railways will be this: They can only be made upon main lines, because such lines will alone pay; the stage coaches will go off these lines when the railway has been a short time in operation, but the same coaches will be employed on cross country roads to feed the railway; and it is a curious fact, that through this operation one more coach was licensed at Liverpool and Manchester the year after the railway opened than there was the year before.

If the above rules be attended to, a tolerably correct knowledge of the traffic to be expected may be obtained, and it is sure not to be an exaggerated one. Whilst this has been going on, the engineer will have been employed in looking at the general features of the country preparatory to surveying and levelling it; and in most cases a man of a practised eye at this kind of work will be able at once to decide on all the principal points along which the line should go. During the same time the solicitor will have been feeling his way amongst the landowners and the occupiers, so that where much dissent is manifested, that property may if possible be avoided. Landholders have been proverbially hostile to railways, and enormous in their demands for compensation, yet they have invariably found that their property has been benefited instead of being injured; and when more land has been required from them, they have asked a higher price on account of that very railway running through their property, whose existence they had in the first instance declared to be a nuisance. This state of things cannot last much longer; but whilst it does, it must be met as far as possible in the above manner.

There are many things to be taken into consideration before definitely fixing on the precise line in which a railroad is to run. Borings should be largely taken to obtain a correct geological knowledge of the various strata. A considerable subsequent expenditure may often be saved in this way. It is of no use to put a penny on our eyes to hinder us from seeing a guinea. Borings may be carried to any depth by sinking a well part of the way, and without this they have been worked to a depth of 760 feet. The nature of the traffic must also be taken into consideration, so that when all other things are equal, the line may be run so as to include particular towns. The population of all the adjacent places should be ascertained and marked on a map; the nature of the various markets and fairs should be examined into and the state of trade; the wants of persons connected with it ought also to be taken into account; the quantity and quality of the existing goods traffic, its nature, and the demands on it with reference to any probable increase; and the capabilities of harbours, if any are within reach of the line, their draught of water, the nature of the protection they afford, their present trade, and the effect of the railroad on that trade. In this, as well as in all other cases, the results of a transition from peace to war, and *vice versa*, should be well considered, together with the effect of any future line of railway which may become a partially competing one.

The more effectually these inquiries are made, and the more fully their results are honestly put before the proprietors, together with separate estimates for the engineering department and the managing department, so will their confidence in the undertaking increase; and it is a most essential point to place this confidence on a sure basis, so that if any little mishap, which none can avoid, take place, the shares may not be suddenly thrown on the market at a ruinous sacrifice, and the undertaking abandoned, through the projectors not having had the necessary information, to enable them to see that the result of their labours would be a profitable speculation, notwithstanding any trifling losses arising from causes against which perhaps no human foresight could provide.

Cost of railways.

Railways with two lines of rails in very favourable situations have been completed for L.10,000 per mile in England. This however must be taken as the exception, and not the rule. Under very unfavourable circumstances they have cost L.50,000 per mile; and of course there will be found an expense per mile at all differences between these two, which may fairly be taken as the extreme limits. Now it is certain, that with a line 80 miles in length, a traffic of 75 tons of goods per day from each end, or 120 passengers per day each way, or with 35 tons of goods and 60 passengers per day each way, the railway, if even constructed for L.12,000 per mile, which will rarely happen, would not afford a dividend of more than a quarter per cent, and (our numbers throughout meaning daily each way) it would require 100 tons of goods, or 160 passengers, or 50 tons of goods and 80 passengers, to pay 1 per cent.; 125 tons of goods, or 200 passengers, or 62 tons of goods and 100 passengers, would but little exceed $1\frac{3}{4}$ per cent.; and it would take 200 tons of goods, or 320 passengers, or 100 tons of goods with 160 passengers, to pay $4\frac{1}{4}$ per cent.

The Americans have such facilities for these constructions, that 1600 miles of railroad have been made in that country (a good deal of it, however, being only single line) at an average cost of only L.5081 per mile; whereas in England the mere permanent way alone would amount to L.4400 per mile, if the rails were 45 lbs. to the yard, and laid upon longitudinal timbers; L.4900 per mile, with rails 42 lbs. per yard, having chairs and cast-iron supports between them, on longitudinal timbers; L.5300 per mile, with rails 42 lbs. per yard, on blocks 3 feet apart; L.4800 per mile, with the same sized rails on wooden sleepers; L.5600 per mile for 62 lb. rails, on blocks 4 feet apart, and L.5100 for the same rails on wooden sleepers; L.6000 per mile for rails of 75 lb. per yard on blocks 5 feet apart, and L.5500 per mile for the same on sleepers. These prices do not include laying the way, ballasting, and draining. Thus we see that the mere cost of the permanent way in the country, averaging L.5200 per mile, exceeds that of the whole expense of a complete railway in America; and 75 pound rails on blocks and sleepers, including laying, ballasting, sidings, turnplates, and every expense, has exceeded L.8000 per mile.

The mean receipts for five years on the Liverpool and Manchester line give the following proportions: Revenue 100, expenses 55, profits 45; and the expenses have been as high, or higher than 60. The average, however, gives the ratio of revenue to profit at 1 to .45. On the Dublin and Kingston railway the same ratio for 26½ months gives 1 to .4344. On the Brussels and Mechlin railway the ratio for 1 year is 1 to .488. On the Grand Junction railway, for 6 months, it is 1: .48. On the London and Birmingham, no data exist to form a judgment. There is a very singular coincidence in these ratios on lines so very differently circumstanced, and of lengths varying from six miles to more than 100; but we have not yet acquired any sufficient experience in railway statistics to enable us to speak with confidence on the subject. If every railway would publish yearly its experience, as was so handsomely done in the Liverpool and Manchester for several years, analyzing every source of expense, and reducing them to the ratio per passenger and per ton per mile, we should then soon acquire such a stock of knowledge as would enable all these points to be decided; indeed, of so much consequence are railways now becoming, that the legislature should take up the question, making it a law that returns should be sent yearly, according to a form arranged by some person thoroughly conversant with the subject.

When matters are so far advanced that the engineer can be directed to make out his plans and sections, he will commence by consulting the ordnance map, and by the help of that and his geological knowledge, obtained from the borings and trial shafts, together with his inspection of the wells, mines, quarries, and other excavations in the immediate vicinity of the intended work, he will proceed to lay down at least three or four lines, if some local circumstances do not absolutely limit him to one particular tract of country; endeavouring to cross all streams and rivers as near their source as possible, that being the lowest point; and where hills intersect his progress, aiming at some position where streams run down on either side in the direction as near as possible to his intended line. He should avoid going along the sides of hills, particularly if they are composed of clay or shale, in order to be clear of the unpleasant consequences which slips would give rise to in these strata. He should run through no more seats or ornamental pleasure grounds than possible, and avoid towns and villages where the land would be expensive. He should, as far as practicable, be furnished with lists of the population, the state of trade, and the numbers of the assenting and dissenting owners and occupiers of land, together with the quantity and value of their property. He should have the water analyzed with reference to its fitness for locomotive engines, inquiring into the state of the existing roads and canals, as to the facilities they afford for getting coke, building materials, &c. on to the line; also whether lodgings can conveniently be had for large bodies of men, and whether the necessary labourers and mechanics can be procured at reasonable rates in the immediate vicinity of the line; and generally he should enter into all inquiries necessary to enable him to choose the best line, and construct it at the least cost.

In order to save time and expense, it will be quite sufficient if what are called rough or flying levels are taken of these preparatory lines, for which purpose the mountain barometer will be amply sufficient, if proper care be taken to apply the necessary corrections, and strict attention be paid to comparing it as often as possible, and at stated regular times, with a stationary standard barometer. Cross stations between the lines should likewise be taken, in order to ascertain the lowest point. The rates at which streams run will also assist in giving indications, and the ordnance map may be sufficient authority for distances. He should particularly attend to curves and gradients; a curve of three-quarters of a mile radius, in conjunction with a rise of 16 feet in a mile, reducing the speed of a locomotive to nearly one-half. Where the gradient is good, curves are not of so much consequence. A curve of a quarter of a mile radius on the Bolton and Leigh railway is constantly passed with safety at a speed of thirty miles an hour, but the wear of engines and carriages must be increased.

Gradients.

The whole question of gradients is only beginning to be understood; and we have no doubt that at some future time railways will be made much more level than they now are. There is no reason why in many cases hydraulic locks should not be used to carry the trains up and down different levels, and to do away with the inclined planes. The practical effect of gravity is not well known. We have long had the angle of repose given as 1 in 280. This is correct with some carriages and waggons, but others differ extremely. Care must be taken where two planes meet that they are eased into each other if their difference is much. This is best done by laying a short piece of the line level. We have known an instance in which, at an inclination of 1 in 330, a waggon ran down 4 miles, and acquired a velocity of 8 miles an hour. The question is not at what angle a carriage will just become quiescent, but at what angle will a velocity be acquired which can have a useful practical effect. The Irish railway commissioners have taken this at 1 in 140; whilst on the London and Birmingham railway the Euston extension plane is for a considerable part of its length 1 in 75, the trains on it attaining a velocity of 30 miles an hour, and working remarkably well. It is unfortunate, too, that their classification of engines does not contain at all, those in use on that line. The third class is the nearest, but will give much too little as the power of those engines, which go 60 miles an hour up considerable inclined planes. The third class has 11-inch cylinders, 18-inch stroke and 5-feet wheels, the weight being, engine, 8½ tons, tender, 5½.

The principal difference between this class and the engines on the London and Birmingham railway is, that the latter have 5½-feet wheels and 12-inch cylinders. Taking, however, the above third-class engine, and allowing the friction of the engine gear to be 51 lbs., the friction of the engine on the railway 68 lbs., the friction of the tender 49½ lbs., and the atmospherical pressure upon the piston 190.06 inches, reduced in the inverse proportion of twice the stroke of the piston to the circumference of the working wheel, or 533½ lbs., we have a total absorbed power of 702 lbs. before the engine can move, or, which is the same thing, a steam pressure of 702 lbs. is requisite for that purpose. Now the whole power being the area of the piston multiplied by the pressure, say 64.7 lbs., when the steam is at 50 lbs., we get for the whole power of the engine 2337 lbs., or the power to propel the load 1639 lbs., which, even with 9 lbs. per ton friction caused by the load, gives a fraction of 182 tons on a level.

Supposing a load of 88 tons, including the tender, on a level, to be drawn at the rate of 20 miles an hour, and that it has to ascend afterwards a plane of 1 in 140, we have then the absorbed power =702 lbs.; 88 tons at 9 lbs. per ton =792 lbs. or 1494 lbs. power of steam pressure required for this load on a horizontal plane. But when the train comes to the inclined plane, the weight of the engine has first to be added, making the load 100 tons, or 224000 lbs., and $\frac{1}{140}$ of this, or 1600 lb., is the additional traction required, and taking every 8 lb. traction to cause 1 lb. additional friction on the engine gear, gives 200 lbs., therefore the whole power or steam pressure required is, up the plane, 3294 lbs., and the velocity being inversely as the pressure, we have 3294 : 1494=20 : 9, or the velocity will be reduced to 9 miles an hour; in other words, the time expended in ascending the inclined plane will be more than double that which would be required on an horizontal plane, but as the descending will be performed in the same time as if it was a horizontal plane, and as 1494 : 3294=1 : 2·2, the equivalent length of the horizontal plane, the length of the ascending plane being unity, will be 2·2, and the average of the two will be 1·6.

It is upon these data the Irish railway commissioners give tables of the lengths of equivalent horizontal lines to gradients from 1 in 90 to 1 in 1500, and as the errors in the data are principally on the safe side, we give here the most useful one for the description of engine we have before stated, the gross load, including the engine and tender, being 80 tons, and the length of the inclined plane being taken as unity.

Gradient.	Equivalent horizontal lines.		
	Ascending.	Descending.	Mean.
1 in 90	2·66	1·00	1·83
„ 95	2·58	1·00	1·79
„ 100	2·50	1·00	1·75
„ 110	2·36	1·00	1·68
„ 120	2·25	1·00	1·62
„ 130	2·15	1·00	1·57
„ 140	2·07	1·00	1·53
„ 160	1·94	·83	1·43
„ 180	1.83	·83	1·33
„ 200	1·75	·83	1·29
„ 250	1·60	·83	1·21
„ 300	1·50	·83	1·16
„ 350	1·43	·83	1·13
„ 400	1·37	·83	1·10
„ 500	1·30	·83	1·06
„ 750	1·20	·83	1·01
„ 1000	1·15	·85	1·00
„ 1500	1·10	·90	1·00

The following table from Mr. Pambour's work will also assist in forming a judgment; it is for engines of 8 tons, the loads being that of the train and tender. The errors here are also on the safe side.

Load—tons.	Equivalent load on a level, the inclination of the plane being					
	$\frac{1}{500}$	$\frac{1}{400}$	$\frac{1}{300}$	$\frac{1}{200}$	$\frac{1}{150}$	$\frac{1}{100}$
25	44	48	56	71	87	117
50	83	91	105	131	158	212
75	122	133	153	191	230	307
100	161	176	201	251	302	402
125	200	218	249	311	373	497
150	239	261	298	371	445	592

The great disadvantages arising from bad gradients, are capable of being tolerably well estimated by these tables; but the principal evil is the expense which they occasion, since the load to be carried along the whole line must not be heavier than can be drawn by the engines up the inclined planes, or else additional engines must be employed to assist at those places. On some of the American railways, there are planes so steep that sails are made use of in descending them to check the velocity. The Irish railway commission have computed the cost of working locomotive engines with different loads, as in the following table, in which, as in the preceding one extracted from them, the engine may be expected to do more than is stated.

This table, as far as expense goes, can only be considered as an approximation; the steam pressure too, which is taken at 9 lb. per ton, is higher than what is now found to be the case; but it will, nevertheless, shew the relative expense; for instance, if the engine can draw 191 tons on a level, and there are gradients of $\frac{1}{200}$ on the line of railway, the load, to enable the engine to ascend these, must be only 75 tons, and the ratio of expense will be 1·04—·72=·32, or the increased cost of the engine will be 32 per cent. on its journey, besides, there being three journeys to carry the 191 tons, so that the expense and locomotive power will be quadruple what it would amount to if the line was level, and double what it would be with no incline beyond $\frac{1}{100}$.

Tons load.	Steam pressure.	Relative speed.	Power expended per ton per mile.	Wages per ton per mile.	Wear and tear per ton per mile.
0	702	2·02			
10	792	1·79	4·46	4·46	4·46
20	882	1·61	2·48	2·48	2·48
30	972	1·46	1·82	1·82	1·82
40	1062	1·34	1·49	1·49	1·49
50	1152	1·23	1·29	1·29	1·29
60	1242	1·14	1·16	1·16	1·16
70	1332	1·06	1·07	1·07	1·07
80	1422	1·00	1·00	1·00	1·00
90	1512	·94	·95	·95	·95
100	1602	·89	·90	·90	·90
110	1692	·84	·86	·86	·86
120	1782	·79	·84	·84	·84
130	1872	·75	·81	·81	·81
140	1962	·72	·79	·79	·79
150	2052	·69	·77	·77	·77
160	2142	·66	·75	·75	·75
170	2232	·64	·74	·74	·74
180	2322	·63	·73	·73	·73

The following table will be useful in calculating gradients:

Table of Gradients.

Feet per mile.	Inches per chain.	Ratio of height to length.	Feet per mile.	Inches per chain.	Ratio of height to length.
1	0·15	1 in 5280	45	6·75	1 in 117·3
2	0·30	„ 2640	46	6·90	„ 114·8
3	0·45	„ 1760	47	7·05	„ 112·3
4	0·60	„ 1320	48	7·20	„ 110·0
5	0·75	„ 1056	49	7·35	„ 107·7
6	0·90	„ 880	50	7·50	„ 105·6
7	1·05	„ 754·2	51	7·65	„ 103·5
8	1·20	„ 660·0	52	7·80	„ 101.5
9	1·35	„ 586·6	53	7·95	„ 99·6
10	1·50	„ 528·0	54	8·10	„ 97·8
11	1·65	„ 480·0	55	8·25	„ 96·0
12	1·80	„ 440·0	56	8·40	„ 94·3
13	1·95	„ 406·1	57	8·55	„ 92·6
14	2·10	„ 377·1	58	8·70	„ 91.0
15	2·25	„ 352·0	59	8·85	„ 89·5
16	2·40	„ 330·0	60	9·00	„ 88·0
17	2·55	„ 310·6	61	9·15	„ 86·6
18	2·70	„ 293·3	62	9·30	„ 85·1
19	2·85	„ 277·9	63	9.45	„ 83·8
20	2·00	„ 264·0	64	9·60	„ 82·5
21	3·15	„ 251·4	65	9·75	„ 81·2
22	3·30	„ 240·0	66	9·90	„ 80·0
23	3·45	„ 229·5	67	10·05	„ 78·8
24	3·60	„ 220·0	68	10·20	„ 77·6
25	3·75	„ 211·2	69	10·35	„ 76·5
26	3·90	„ 203·1	70	10·50	„ 75·4
27	4·05	„ 195·5	71	10·65	„ 74·4
28	4·20	„ 188·6	72	10·80	„ 73·3
29	4·35	„ 182·1	73	10·95	„ 72·3
30	4·50	„ 176·0	74	11·10	„ 71·4
31	4·65	„ 170·3	75	11·25	„ 70·4
32	4·80	„ 165·0	76	11·40	„ 69·5
33	4·95	„ 160·0	77	11·55	„ 68·6

Table of Gradients continued.

Feet per mile.	Inches per chain.	Ratio of height to length.	Feet per mile.	Inches per chain.	Ratio of height to length.
34	5·10	1 in 155·3	78	11·70	1 in 67·7
35	5·25	„ 150·8	79	11·85	„ 66·8
36	5·40	„ 146·6	80	12·00	„ 66·0
37	5·55	„ 142·7	81	12·15	„ 65·2
38	5·70	„ 138·9	82	12·30	„ 64·4
39	5·85	„ 135·4	83	12·45	„ 63·6
40	6·00	„ 132·0	84	12·60	„ 62·9
41	6·15	„ 128·8	85	12·75	„ 62·1
42	6·30	„ 125·7	86	12·90	„ 61·4
43	6·45	„ 122·8	87	13·05	„ 60·7
44	6·60	„ 120·0	88	13·20	„ 60·0

When, therefore, the flying levels are complete for the three or four lines, as we have before directed, the engineer and manager, or secretary, should bring all their information together, and throwing it into one common stock, select that line out of the whole, which, on the fullest deliberation, appears to be the best with reference to its gradients, geology, commercial importance, and the facilities it affords for soundly and cheaply constructing the necessary works. This subject will of course require deep attention, and the reasons for the selection should be written out in the fullest and clearest manner, for the inspection of any proprietor who may desire to see them, publicity always insuring confidence; and in most cases, it would be best to submit vital points of this kind to a general meeting of the whole body, before proceeding to parliament to obtain an act of incorporation. This would entirely prevent any mistrust.

That these matters require the greatest consideration, will be apparent from the difficulty, delay, and expense of obtaining acts of parliament for railways. The cost of that for the Liverpool and Manchester line, for instance, thirty miles, was about L.900 per mile. That for the London and Birmingham, 112 miles, was L.72,869, or L.650, 12s. per mile; and it is well known that the expense has reached L.1000 per mile on long lines, and that latterly, in every new session of parliament, there have been fresh difficulties thrown in the way of obtaining the necessary acts, till it is now nearly impossible to succeed at all.

Parliamentary standing orders.

There are many very great hardships connected with obtaining an act of incorporation for a railway. Parliament requires that a plan and section of every part of the ground through which the intended line is to pass, shall be lodged with their clerk, and with the clerks of the peace in every county through which the railway goes. This is a very proper regulation, in order that every landholder may be able, by travelling a convenient distance, to have a personal inspection of a duly authorised document, so as to examine the nature and extent of the benefit, or the inconvenience which it may occasion to his particular property; but parliament should at the same time have given the railway companies the power of complying with this wholesome regulation, in the same way as road surveys are made in Ireland, by an order from two magistrates to enter any requisite grounds. This, however, is not done, and therefore it follows, as a necessary consequence, that the projectors of these undertakings, no matter how beneficial or important soever to the community at large, are left entirely at the mercy of the landholders, whether they can make their survey or not. We have ourselves known, that when decided opposition has been evinced to the undertaking, the engineers and surveyors have been put to all possible shifts to obtain the necessary data for their plans and sections. Working by night with lanthorns has even been unavoidably resorted to; and in one case, where the proprietor was a clergyman, he was watched on Sunday until he went into his church, and a strong party immediately setting to work, just succeeded in finishing the business as he concluded his sermon.

The facilities of opposing a bill in parliament are so great, that every temptation is held out to do so, especially when the rich harvest to counsel, solicitors, and witnesses, is considered; and as has been well observed by the Irish railway commissioners, discussions are mooted of the most discursive and discordant kinds, relating to all the abstract professional matter in the most distant manner connected with a railway. The principles of curves and gradients are entered into with mathematical precision, and the laws of friction and gravity are investigated; questions about which the counsel and the court are often equally ignorant, the one side seeking to swell the estimates and lower the profits, and the other pulling in the opposite direction, like the bulls and bears on the stock exchange, till at last, probably after the expenditure of thousands, the bill is thrown out, not on its own merits or demerits, but because, perhaps, a notice to the proprietor of five or six yards of a cabbage garden, was left next door by mistake.

The parliamentary rules are now as much too strict, as they were at first too loose. The time when the required plans and sections are to be deposited, is very inconvenient; two years at least being required between the deposits being paid and the act obtained. Thus, at the present time, if any line is wished to be procured, the surveys must be made in the autumn of 1838, the plans must be lodged and the notices given in March 1839, the petition for the bill presented to the Commons in February 1840, and supposing the act obtained the same session, little if any real work can be done until the spring of 1841. The subscription of ten per cent. required on the capital, merely leads to delusion; bankers in general advance the money, and whether the bill succeeds or fails, they get it back with interest and commission, for by the very terms of the order of the House of Commons, it may be paid back to the person advancing it. The public obtain no security against a bad project by this regulation, whilst a good one may be crushed for want of a speculating capitalist. Nobody is benefited in fact, except the banker and the broker; and that this is the process largely employed all are perfectly aware.

If a bill be lost in one session, it cannot be proceeded with in the next without a new contract deed being signed. This is a considerable hardship. The deviation in section is too limited, and should only apply to raising embankments and lowering cuttings; the reverse should be allowed to any extent, and the deviation should be reckoned from the surface of the ground, and not the lateral line. If the same line is kept, the effect would be the same, but by removing to a different level, what may be cutting in one respect may be embanking in another. The limitations in all respects as to deviations may be considered as too strict, and they always have the effect of cramping the company and their engineer; palpable improvements in many cases, have been abandoned on account of the heavy cost of going to parliament for new acts; and others in all probability would never have been made, except that the companies in question were forced to apply for a new act, in order to enable them to borrow more money, and then the improvement is put in along with the rest as a rider.

When the intended line is once decided on, the surveyors should be sent out as speedily as possible; and these are followed by the levellers, who are the engineers. It will be best to survey wide, when you are not quite certain of the exact position of the line; the surveyors give in their plans to the engineers, who proceed to lay down upon them the line as their levelling goes on, taking care as nearly as possible to balance the cuttings and embankments. It will save the engineers a deal of trouble, if, where curves are to be run, a man is sent a-head to put in marks at short distances, giving him the measure from the nearest hedge on the plan, which measure he takes on the ground, and sticks in his mark.

It will be best to take ground enough to make the embankments sufficiently wide; if this is not attended to, when they come to shrink, as they undoubtedly will, they become too narrow, and an addition has to be made to their width, which will be found a very troublesome operation, such additions being peculiarly liable to slip.

The survey, with complete plans and book of reference, containing the land for at least three times the width required for the railway, shewing every field numbered for each parish, with its owner and occupier, ought not to cost more than L.15 per mile. The best plan will be to survey as wide as is intended to apply for a power of deviation in the act of parliament.

Estimates.

The next thing is for the engineer to make out his detailed estimates, and get ready his plans and sections to be deposited in parliament, and with the clerks of the peace for the several counties through which the line will pass; he should consult the standing orders of both houses, or be supplied with such extracts as relate to his department. In his estimates there are unfortunately many difficulties; and most people forget the distinction between a railway being completed and opened, and opened and completed. Besides this, let an engineer be ever so much inclined to make a full and clear exposition of the cost of a line of railway, he may plainly see that if he does so the line will never be made, although it would be a profitable speculation. We should recommend, nevertheless, that no other but a correct and fair estimate should in all cases be furnished, in order to compare it with the traffic. For this purpose, every known bridge and viaduct should be separately computed, and ample allowance made for occupation bridges; the land, together with all the earthwork, tunnels, fencing, and permanent way should then be calculated, the secretary furnishing an estimate of the office expenses, printing, stationery, travelling expenses, law, advertising, conveyancing, and all other items of this kind. At least ten per cent. should be added to the engineering estimate for stations, and the machinery connected with them, and a full allowance for engines and carriages. When every thing that can be thought of is thus collected together, allow not less that twenty-five per cent. for contingencies; and note that by a mean of nearly 100 railways, the whole number of bridges average $2\frac{1}{4}$ per mile.

In estimating for rock, as this is seldom found except in deep cuttings, it may generally be taken as earth-work, with the necessary slopes. For instance, in a cutting forty-five deep, with slopes two to one, and a base of thirty feet, the sectional area of the opening, and of course the cubic contents of any given length, is four times the area of the cut of the same length with vertical sides, and a price on a rock cutting thus taken out, may be put at four times as much as the earth cutting with slopes, without any increase of estimate. In shallow cuttings this does not hold good; but the excess may safely be thrown on the contingencies, the amount not being great, and the occurrence seldom. In a thirty-feet cutting, the difference is only three times, which may be sufficient when the rock is not very hard, with the saving in land to assist the price; but in a sixty-feet cutting, with slopes of two to one, the quantity is five times that of vertical cutting, and with the saving in the land occupied by the slopes, would make the rock cutting much the cheapest, unless of extraordinary hardness. It will take more time to cut through the rock, length for length, but would not if it could be entered at several places at once. Where land is extremely valuable, it will in many cases be cheapest in a cutting to support the sides with retaining walls, purchasing little more than the absolute width of the railway.

The width of the land required, will of course vary with the depth of the cuttings and length of the embankments, together with the slopes necessary to be given; rock, for instance, stands generally vertical, chalk varies from $\frac{1}{6}$ to 1, to 1 to 1; gravel $1\frac{1}{2}$ to 1; the coal measures $1\frac{1}{2}$ to 1. The London clay has been made to stand at 1 to 1, and has slipped at 3 to 1, depending greatly upon the dryness of it when tipped into the embankment. Blue soapy shale has slipped at 4 to 1, for instance, on Bugbrook Downs, in Northamptonshire; and in every stratum there are great variations, much depending on the weather. Bad material in wet weather will often stand at no slope whatever. A double line will have ample width in fifteen yards, allowing two yards on each side for the drainage and fencing. The land required for this amounts to 5,455 acres per mile forward, and if 1·454545 is multiplied by the number of yards in perpendicular height, in any embankment or cutting, at slopes of 2 to 1, it will give the additional number of acres per mile forward, and by a geometrical average, the whole line may be very closely estimated in this way. For example, take a line of 112 miles in length, and 15 yards in breadth, for railway, ditching, and fencing, and averaging in height of embankments and depth of cutting 24 feet or 8 yards, then $5{\cdot}455 \times 112 = 610{\cdot}96$ acres for railway, ditching, and fencing, and $8 \times 1{\cdot}454545 \times 112 = 1303{\cdot}27$ acres, required for the slopes at 2 to 1, this giving a total of 1914 acres, and this mode of estimating may be considered to include the land required for stations and approaches to bridges.

It will be necessary to compute, in many cases, whether a viaduct will not be cheaper than an embankment. The method of doing this will be found in the article VIADUCT. Where expense is a great object, timber may be made use of; beams of which, trussed with iron, have lately been introduced instead of arches, and to a great extent in some cases, for instance the Midland Counties railway. On the North Union railway, a timber viaduct is constructed o. great height; several similar works are in course of execution in the north of England; and in some of the Scotch railways the system of trussed beams of timber has been applied to very large spans. In many instances, a considerable reduction in the cost of bridges and viaducts may thus be made, especially where the crossings are very oblique, or where the additional height of arches would involve great expense in embanked approaches.

Should money be short and time so valuable as to make the expeditious opening of the line a subject of the first importance, great part of the excavations may be removed at night after the line is open, where they are not required for the embankments. This plan is not, however, to be recommended, and still less so making the embankments less than their full width at first; the additional patch of embankments hardly ever uniting equally with the part first made, but sliding off, and leaving the side of the embankment as smooth as glass.

Expense again may be saved where land is valuable, by iron colonnade viaducts, by which means towns may be entered much farther than is now possible to do without an enormous outlay. The cost of such a viaduct will in general not exceed two-thirds of a brick one of the same height and width; in fact, there are many ways in which expenses may be lowered, and the railway got into work in a speedy and safe manner at a moderate outlay; after which, if the project turns out a successful one, ornament may be attended to, to any extent which may be thought advisable.

In the same manner it should be calculated whether a tunnel or an open cutting will be the cheapest mode of getting through hills of importance. The method of doing this will be shewn in the article TUNNEL. Where rock

Railways.

is found at the bottom of the cutting, of course the sides may be nearly vertical, and the upper strata may have any required slope given to them. In such a case it will be advisable to have a tolerably wide bench where the change of slope takes place; this should be done in every case where there is a variation in the slopes, and the drainage well attended to. By attention to these points, a greater saving will be made in the quantity of land required.

Railways.

There are so many ways of computing earth work, all of them equally accurate, that the choice consists mainly in using the one which occupies the least time. Tables have also been published for taking out the cubic contents by inspection. The following formula, however, which we have arranged for this purpose, is so very quick in bringing out the results, that we have always given it the preference over any other method.

Table of Earthwork in Cuttings or Embankments 30 *feet wide.*

Slopes 1 to 1.				Slopes 1½ to 1.				Slopes 2 to 1.			
Height in feet.	Half width at top.	Area in square yards.	Contents in cubic yards, per chain forward.	Height in feet.	Half width at top.	Area in square yards.	Contents in cubic yards, per chain forward.	Height in feet.	Half width at top.	Area in square yards.	Contents in cubic yards, per chain forward.
1	16	3·444.	75·777	1	16·5	3·500	77·000	1	17	3·555.	78·222
2	17	7·110	156·420	2	18	7·333.	161·333	2	19	7·555.	166·222
3	18	11·000	242·000	3	19·5	11·500	253·000	3	21	12·000	264·000
4	19	15·111·	332·444	4	21	16·000	352·000	4	23	16·888.	371·554
5	20	19·444·	427·777	5	22·5	20·833.	458·333	5	25	22·222.	488·888
6	21	24·000	528·000	6	24	26·000	572·000	6	27	28·000	616·000
7	22	28·777·	633·110	7	25·5	31·500	693·000	7	29	34·222.	752·888
8	23	33·777·	743·110	8	27	37·333.	821·333	8	31	40·888.	899·554
9	24	39·000	858·000	9	28·5	43·500	957·000	9	33	48·000	1056·000
10	25	44·444·	977·777	10	30	50·000	1100·000	10	35	55·555.	1222·222
11	26	50·111·	1102·444	11	31·5	56·833.	1250·333	11	37	63·555.	1398·222
12	27	56·000	1232·000	12	33	64·000	1408·000	12	39	72·000	1584·000
13	28	62·111·	1366·444	13	34·5	71·500	1573·000	13	41	80·888.	1779·554
14	29	68·444·	1505·777	14	36	79·333.	1745·333	14	43	90·222.	1984·888
15	30	75·000	1650·000	15	37·5	87·500	1925·000	15	45	100·000	2200·000
16	31	81·777·	1799·110	16	39	96·000	2112·000	16	47	110·222.	2424·888
17	32	88·777·	1953·110	17	40·5	104·833.	2306·333	17	49	120·888.	2659·554
18	33	96·000	2112·000	18	42	114·000	2508·000	18	51	132·000	2904·000
19	34	103·444·	2275·777	19	43·5	123·500	2717·000	19	53	143·555.	3158·222
20	35	111·111·	2444·444	20	45	133·333.	2933·333	20	55	155·555.	3422·222
21	36	119·000	2618·000	21	46·5	143·500	3157·000	21	57	168·000	3696·000
22	37	127·111·	2796·444	22	48	154·000	3388·000	22	59	180·888.	3979·554
23	38	135·444·	2979·777	23	49.5	164·833.	3626·333	23	61	194·222.	4272·888
24	39	144·000	3168·000	24	51	176·000	3872·000	24	63	208·000	4576·000
25	40	152·777·	3361·110	25	52·5	187·500	4125·000	25	65	222·222.	4888·888
26	41	161·777·	3599·110	26	54	199·333.	4385·333	26	67	236·888.	5211·554
27	42	171·000	3762·000	27	55·5	211·500	4653·000	27	69	252·000	5544·000
28	43	180·444·	3969·777	28	57	224·000	4928·000	28	71	267·555.	5886·222
29	44	190·111·	4182·444	29	58·5	236·833.	5210·333	29	73	283·555.	6238·222
30	45	200·000	4400·000	30	60	250·000	5500·000	30	75	300·000	6600.000
31	46	210·111·	4622·444	31	61·5	263·500	5797·000	31	77	316·888.	6971·554
32	47	220·444·	4849·777	32	63	277·333.	6101·333	32	79	334·222.	7352·888
33	48	231·000	5082·000	33	64·5	291·500	6413·000	33	81	352·000	7744·000
34	49	241·777·	5319·110	34	66	306·000	6732·000	34	83	370·222.	8144·888
35	50	252·777·	5561·110	35	67·5	320·833.	7058·333	35	85	388·888.	8555·554
36	51	264·000	5808·000	36	69	336·000	7392·000	36	87	408·000	8976·000
37	52	275·444·	6059·777	37	70·5	351·500	7733·000	37	89	427·555.	9406·222
38	53	287·111·	6316·444	38	72	367.333.	8081·333	38	91	447·555.	9846·222
39	54	299·000	6578·000	39	73·5	383·500	8437·000	39	93	468·000	10296·000
40	55	311·111·	6844·444	40	75	400·000	8800·000	40	95	488·888.	10755·554
41	56	323·444·	7115·777	41	76·5	416·833.	9170·333	41	97	510·222.	11224·888
42	57	336·000	7392·000	42	78	434·000	9548·000	42	99	532·222.	11704·000
43	58	348·777·	7673·110	43	79·5	431·500	9933·000	43	101	554·222.	12192·888
44	59	361·777·	7959·110	44	81	469·333.	10325·333	44	103	576·888.	12691·554
45	60	375·000	8250·000	45	82·5	487·500	10725·000	45	105	600·000	13200·000
46	61	388·444·	8545·777	46	84	506·000	11132·000	46	107	623·555.	13718·222
47	62	402·111.	8846·444	47	85·5	524·833.	11546·333	47	109	647·555.	14246·222
48	63	416·000	9152·000	48	87	544·000	11968·000	48	111	672·000	14784·000
49	64	430·111.	9462·444	49	88·5	563·500	12397·000	49	113	696·888.	15331·554
50	65	444·444.	9777·777	50	90	583·333.	12833·333	50	115	722·222.	15888·888

Let $a =$ the area in square yards.

$c =$ the content in cubic yards, per chain in length.

$w =$ the width in feet of the cuttings or embankments.

$h =$ the height in feet of the cuttings or embankments.

$m : 1 =$ the ratio of the base of the slopes to their altitude.

Then the rules applicable to every case will be

$$a = \frac{wh + mh^2}{9}$$

$$c = 22a$$

And as 30 feet is a very general width, if we adapt our formula to that, we have with slopes of 1 to 1,

$$a = \frac{30h + h^2}{9}$$

$$c = 22a$$

And with slopes $1\frac{1}{2}$ to 1,

$$a = \frac{20h + h^2}{6}$$

$$c = 22a.$$

And with slopes 2 to 1,

$$a = \frac{30h +}{9}$$

$$c = 22a$$

And for any other widths and slopes the results will be brought out very quickly, by an adaptation of the general formula. By the particular ones given above, the tables on the preceding page were computed, giving the cubic contents per chain in length, at one view, for every foot in height, up to 50. In the column for the area, the decimals are given to three places of figures, but four places were used in calculating the cubical content. Where a dot is placed after the last figure in the column for the area, it denotes that the same figure goes on *in infinitum*. In using the column of cubic contents, increase the last decimal figure by 1 when it is above 5.

The columns of "half-widths," in the preceding tables, will enable the engineer to set out his work from the centre pegs as he proceeds. This is done at once, where the country is level, on the cross section; but in sidelong ground a correction will be required, to obtain which, after the half-width has been staked out, the level should be planted over the centre peg, and the height above and below the cross level taken at the points which mark the half-width. It is evident, that for each foot which these points may be above and below the level of the centre peg, one foot must be added to the half-width on the side which is above the centre, and subtracted from it on the side which is below, where the slopes are 1 to 1, and a corresponding alteration at all other slopes; or if we put

$h' =$ the height above the centre, or depth below it,

$m : 1 =$ the base to the perpendicular,

$c =$ the correction,

$c = \pm mh'$,

where c is + on the high side, and — on the low one. This will give a first approximation, and may be repeated if necessary, by levelling to the half-width thus corrected, and proceeding as before, and the cubic contents must receive a similar correction when necessary, our tables presuming the cross section to be on a level. The average height, however, can in almost every case be taken perfectly near enough for every practical purpose.

It is a great pity that the custom has not been generally introduced of taking all the measures in yards and decimals, surveying staffs being marked to $\frac{1}{100}$ths of a yard. This would reduce the calculations considerably; and the reduction of any of them to feet, for plans and sections required in Parliament, or any other isolated purpose, would be infinitely less troublesome than using feet throughout, and having to divide by 9 or 27 for the area and cubic content.

The column of half-widths, when required for any other slopes or widths than those we have given, may be readily computed by the formula

$$x = \frac{w}{2} + mh$$

where x is the half-width at the top, and w, m, and h as before.

The column of cubic contents, when required for any other width than 30 feet, may be readily found, by using a correction c' to the cubic contents at 30 feet, which correction is + when the width is above 30 feet, and — when below,

$$c' = \pm \frac{w'h66}{27} = w'h \ldots 2{\cdot}4444 \text{ in cubic yards,}$$

where w' is the number of feet above or below 30, and h' is the height in feet. The correction is the same for all slopes, taking care to add or subtract it from the cubic contents for 30 feet at the given slope.

With reference to apportioning the work, so that the cuttings and embankments may be equal, regard must be had to the nature of the soil to be moved. For instance, in the London clay it will be found that any quantity of cutting will not make the same quantity of embankment by about ten per cent., whereas in common earth just the reverse takes place, and the cutting will make an embankment nearly ten per cent. greater.

There is a point, which, in the early stage of laying out a railway is too often lost sight of, that ought to be a subject of the deepest consideration; in fact, it is of vital importance to the whole interest of the line in question, and no pains ought to be spared in most fully and rigidly investigating it; and this is, to what extent cutting and embanking can be advantageously carried, that is to say, a line perfectly level, allowing for the curvature of the earth, from one end to the other, being the point of perfection, how near ought this to be approached, looking on the one hand at the first outlay, and on the other at the future gain, in the cost of locomotive power, and repairs of engines, carriages, &c.

We can calculate the cost, for instance, of making a line having no inclinations in any case greater than 1 in 300. With this line we should have a determinate outlay in locomotive power and repairs. The question to be considered then is simply this: If we make the line, instead of having no inclination, greater than 1 in 300, to have none greater than 1 in 500, or 1 in 1000, do we lay a foundation for a yearly saving, when the railway comes into work, sufficiently great to pay us for the consequent first cost of these reductions in the inclinations?

In order to enter properly into this question, experiments must be made for the purpose of determining the cost of locomotive power on the various inclinations, selecting some railway where different engines can be employed on inclines suitable for the case in hand, there being no data in existence, in this country at least, which can with certainty decide this point. The following table, by the engineer of the New York and Erie railroad, may help us a little:—

Ascent per mile, in feet.	Gross load in tons, 2080 lbs. each, *ex* tender.	Cost of motive power per ton per mile, in cwts.
Level.	75·25	3·50
10, or 1 in 528	49·53	4·20
20, or 1 in 264	37·35	4·90
30, or 1 in 176	27·24	5·95
40, or 1 in 132	20·22	7·28
50, or 1 in 105·6	17·04	8·19
60, or 1 in 88	13·92	9·66
70, or 1 in 75·4	11·31	11·41

This table, giving principally impracticable gradients, will only serve to shew us that the ratio of expense is an increasing one, the first differences being respectively 0·7 : 0·7 : 1·05 : 1·33 : 0·91 : 1·47 : 1·75.

If we admit, till we can obtain better data, that altering our gradients from 1 in 250 to 1 in 500, saves two-tenths of the expense of locomotive power, and that reducing it to a level instead of leaving it at 1 in 500, saves two more tenths, we can easily see what the effect of that would be.

The number of tons carried, as given in the table, is not decreased according to the law of gravity alone, but contains another element, most probably the result of experience on the road in question. Suppose then that on the road we are about to construct we may expect to work seven trains per day each way, with passengers, there being ten carriages in each train, averaging four tons each, and travelling at the rate of twenty miles an hour, and two trains each way with goods, in ten waggons per train, averaging goods and waggons five tons each, and going at the rate of ten miles an hour; also let the railway in question be one hundred miles in length; then at a cost of L.304 per day, the passengers being taken at eighteen in each carriage at $\frac{1}{4}$d. each per mile, and the goods at $\frac{1}{2}$d. per ton per mile, at which price it is known they can be carried, we may presume, that if, instead of having an inclination of 1 in 250, our road was level, we should decrease these expenses four-tenths, or bring them to about L.182 per day, or L.66,430 per annum. Thus presuming the above to be correct, we should be saving money, if our road could be made level at an additional expense of one million.

Each particular railroad must of course form a separate case, but we are persuaded it will generally be found that a large outlay will be justified in approximating to a level as near as possible; and where the line is entirely so, the cuttings can always be cleared of water, by sloping the side draining down each way, from the centre till they arrive at the nearest water course, where as usual they will deliver their contents. Our practical knowledge of this subject of reducing railways to a level is founded on such slight data, that a careful set of experiments in order to shew the way more fully into such a question is very much wanted; and we question whether hydraulic locks will not be found to save a considerable expense in difficult situations, bringing the trains from one level to another, by which means railways may be made through tracts of country which would otherwise never pay for the necessary outlay.

Width and shape of rails.

When the contracts along the line are fairly at work, one of the first knotty points which the directors will have to decide on, is, the width of the rails, their shape, the length of their bearing, and the form of their chair. The width between the rails has only lately become a subject of dispute; nearly all the railways prior to the Great Western, having been laid down 4 feet 8½ inches apart. Mr. Brunel has extended it to seven feet; the Irish railway commission recommend six feet two inches; several of the Scottish railways are laid down at five feet six inches; in fact, the variations run from four and a-half to seven feet.

The question of the stability of the carriages on the railway may be left out of consideration in looking at this matter, because the machinery will always require sufficient space between the wheels to insure this. Now, as four feet eight inches and-a-half are found to be enough for the good performance of an engine, which, with five and a-half feet wheels, will go on a level upwards of 60 miles an hour; as with five-feet wheels, Marshal Soult, on his visit to Liverpool just after the Queen's coronation, was taken over 10¾ miles of favourable ground on the Grand Junction Railway within 10 minutes; and as an engine has gone 60 miles an hour on the London and Birmingham Railway up an inclined plane, is it wise or prudent to make any change at all, and will any additional speed, which may be gained by increasing the width of the rails and the diameter of the wheels, compensate for the greater expense and the outlay which will constantly be required to keep the road in order on account of the increased weight? This will receive light from the experiments on the Great Western, but will not be fully decided until it be tried on the Irish or some other railways, as Mr. Brunel's rails are altogether different from most others in use. The plan recommended by the Irish railway commissioners, of putting the rails farther apart but not widening the carriages, merely making the wheels run outside the bodies, is a good one in some respects; but it would add to the expense of the works considerably, and the result would be exceedingly questionable.

It must not be forgotten, that, where a different width from that in common use is adopted, the railway on which it is used becomes isolated. None but its own carriages can travel on it, and they can travel on no other line. This alone will, in most cases, be a serious objection. For our own parts we should say, let well alone; wait for more experience; we are yet infants amongst railways, and we ought not to innovate on that which has been proved to do well, until we become giants. The majority of opinions, however, are beginning to lean towards some increase in the width, although there is every diversity in the quantity which practical men think necessary. Certainly the machinery under the boiler is compressed into its minimum space, and more room for it would be a great advantage, if it does not induce an incommensurate loss in other ways.

With respect to the form of the rail, it can be proved that a fish belly has greater strength, weight for weight, than any other. A 60lb. fish belly at three-feet bearings, rolled with a lower web, would be the best form of all; and this has been effected, as the original Liverpool and Manchester rails had partially this shape. The question, however, must be looked at in conjunction with the length between the supports. We have given below those forms most approved of in practice, and have added that in use on the Great Western Railway, which is however light, and does not stand well, three feet having been the original distance of the bearings.

Fig. 3 is the old Liverpool and Manchester rail, laid down at three-feet bearings; weight thirty-three lbs. per yard, with square joints. This rail was rolled with a lateral swell at the bottom, which on one side was continued the whole length, but on the other did not quite reach the chair. One side of the chair was cast with a cavity, into which the lateral swell fitted, and the opposite side had a nearly similar opening, in which was driven an iron key, shaped like a wedge, which, entering in a longitudinal direction, not only forced the swell into the cavity which was formed to receive it, but by this means, at the same time, kept the rail down in the chair.

Fig. 3.

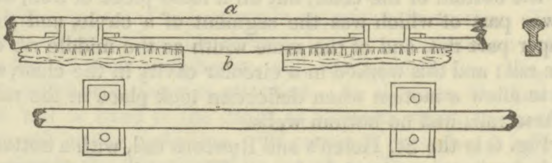


Fig. 4. Losh's patent rail, in which he sought to gain a still more powerful mode of keeping the rail down in the chair, by having his key tapered vertically as well as longitudinally, so as to act as a wedge downwards, as well as in the direction of its length; whilst, at the same time, the necessary expansion and contraction is allowed to take place.

A key on each side has also been used with this form of rail, still, however, the keys were always found to work loose. Losh had also a projection rolled on the bottom of his rail; at the part which lies in the chair, where a corresponding cavity was cast to receive it, so that the effect of expansion or contraction would have a tendency to raise the rail in the chair, and thus wedge it tighter. The upper part of the notch for receiving the key in the chair was also formed with a slight curve, to allow of a small motion in the block, and the rails were made with a half-lap joint, formed not by cutting the middle rib of the rail, but by setting it back, so as to preserve its whole strength. They were laid down at three feet bearings, and weighed forty-four lbs. per yard, but of course were not restricted to that, or to any other weight.

Fig. 4.

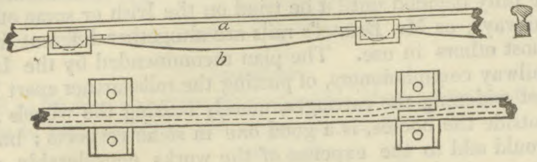


Fig. 5. The London and Birmingham fifty pound fish-bellied rail. This was laid down at three-feet bearings, and the half-lap joint formed by setting back the middle rib instead of cutting it, in the same way as Losh's rail. It was keyed down by a pin going through the side of the chair in a direction sloping downwards. The end of this pin went into a notch in the side of the rail, at its lower parts; the pin was forced tightly in by an iron key acting through the chair, and also through a hole in the pin, by which it was driven both in and downwards; and the end of the key being split, was then opened, to prevent it being shaken loose. Mr. Stephenson has a patent for this chair. The rails did not rest on the bottom of the chair, but on a loose piece of iron, the lower part of which was the segment of a circle, and the upper part flat, and of the same width as the middle rib of the rail; and this worked in a circular cavity in the chair, so as to allow a motion when deflection took place in the rail. These rails had no bottom webs.

Fig. 5.

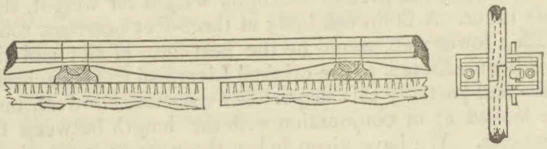


Fig. 6 is the St. Helen's and Runcorn rail, with a bottom web, having a semicircular base. These rails are forty-two lbs. per yard, and were laid down at three-feet bearings. A wedge on both sides is used, which acts downwards as well as sideways, from the opening in the chair to receive it being narrower at the top than at the bottom.

Fig. 6.

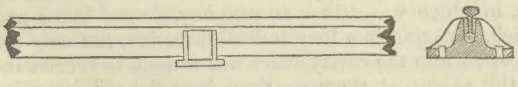


Fig. 7 shews the parallel rails laid down on the Grand Junction, and London and Birmingham railways. The left hand one is sixty-four lbs. per yard on the London and Birmingham, and sixty-two lbs. per yard on the Grand Junction. The right hand one is the London and Birmingham seventy-five pound rail. Rails of this kind are laid on seventy-five miles of that railway, and were intended to be at five feet bearings, but proved a complete failure at that distance, which had to be reduced to three feet nine inches. The left hand one was intended to be at four feet bearings. These rails were both laid down contrary to the opinion of the engineer, Mr. Stephenson, and have entailed a vast expense on that company. They have wooden wedges.

Fig. 7.

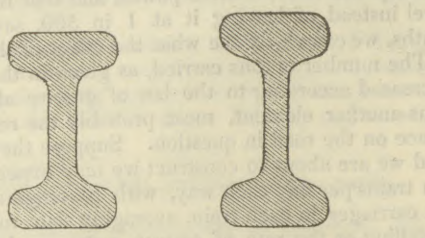


Fig. 8 is the Great Western rail, laid on longitudinal timbers, and forty-four lbs. per yard. Felt is laid between the rail and the timber, and the former is fastened down with screws. It has been found deficient in strength for the heavy engines used upon that railway.

Fig. 8.

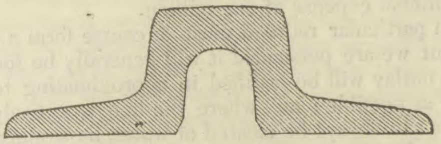
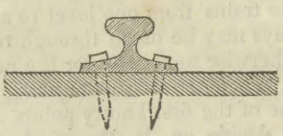


Fig. 9 has been frequently adopted on railways formed with longitudinal bearings. It is spiked down to the timbers, and requires no chair. The weights have varied from thirty-five to sixty lbs. per yard. Sometimes the spikes have not gone through holes in the rail as in the figure, but have been driven in just outside each edge of the rail; in which case they are made with large heads, which come down and clip the rail firmly to the timbers.

Fig. 9.



The London and Birmingham Railway Company, after a long discussion, decided to try four and five feet with a parallel form instead of a fish-belly, which, requiring one-third more height in the chair, had, in addition to other disadvantages, that of being more liable to wring the chair from the block, which is found in practice to take place directly as the height of the chair. The block is also more loosened in the ground by a high chair, and the continual repairs arising from this loosening, amount to one-half the wages expended in repairing the way in general; hence every means of diminishing such a heavy item, which can possibly be devised, should be put in practice. As usual, where all was theory, there were considerable diversities of opinion. Those who wish to enter more at large on this subject, may consult Professor Barlow in favour of lengthening the bearings, and Lieutenant Lecount against it. As the matter has had a fair trial, it is only necessary here to state the results.

On the Primrose Hill contract, which was laid with four-feet bearings, it was found much more troublesome to keep the permanent way in order, than with bearings of three feet. With the four-feet bearings, it was found, that, in a very short time, the rails were put out of gauge, the width continually increasing, until it became absolutely necessary to readjust the whole. This was observed in a very marked manner with a part of the line near Kilburn, which had been recently laid down.

On the Harrow contract, from the crossing of the Harrow road to No. 12 cutting, the permanent road was used for conveying away the material from a side cutting. The traffic was of course considerable, but not by any means such as to account for the absolute difficulty which the contractors had in keeping the railway in guage. They were obliged to put sleepers at the joints in addition to the regular number of blocks, which of course kept the rails in guage at those points; but notwithstanding this, the intermediate blocks moved outwards. When the engineer's attention was first called to this position of the permanent way, he was inclined to think that something might be attributed to the blocks being placed anglewise; but after giving this part of the subject his careful consideration, he felt satisfied that the position of the blocks was at least as firm as the square position; and he felt confirmed in this opinion, by the fact, that, in another portion of the line near Kensal Green, where the road was laid in the ordinary manner with blocks three feet apart, and placed anglewise, and where locomotive engines had been constantly running for eighteen months, there was not found any greater tendency to a motion outwards, than when they were laid square to the direction of the rail, in the old manner. If, therefore, the diagonal position of the blocks had been defective, this was the place to try it; for the quantity of material conveyed over this part of the permanent road in waggons without springs, and with heavy locomotive engines, was very great indeed, and under circumstances well calculated to detect any marked difference in the construction.

On the Berkhampstead contract, where five-feet bearings were in use, and where a locomotive engine was at work, the contractors made heavy complaints of the greater difficulty they had experienced in keeping the rails in gauge than there was with the shorter bearings. In fact, in the eighteen months prior to June 1837, the three-feet rails in some parts of the line, had more work than they now have, where the line is open; yet they stood it well, whilst the five feet have been so put out of gauge by one day's work, that the waggons had to be stopped till one and two additional sleepers for each five feet could be laid down, and even then they were but indifferent; and similar complaints having come in from other quarters, together with the fact that the five-feet bearings on the Liverpool and Manchester railway were found to cost double the sum for keeping the way in repair that was required with three feet nine-inches bearings, the whole question had to be opened again, and the directors resolved to shorten the bearings from five feet to three feet nine inches.

Deflection of rails.

This lateral deflection is of most serious importance, when we recollect that the rails being out of guage will throw the trains off the line. The lateral blows which an engine may give are such, that several chairs in succession have been broken or knocked off the blocks and sleepers; and the absolute weight passing over any one rail may be fairly taken as three times the nominal weight, for the effect from lurching has been experimentally found with engines having three tons' weight on each of the driving wheels to increase that weight to seven tons; besides which, we know that four-wheeled engines, for instance, will, in practice, be frequently running on three wheels, no railroad being a perfect plane; and when these three points are in the act of shifting, the engine during that time is only supported on two wheels.

The flexure produced by this weight perpendicularly has also this bad effect, that the engine and train are constantly ascending an inclined plane in practice, although the railway is considered as level, and of course where the railway has an inclination, that inclination will be proportionally increased. This was first pointed out by Professor Barlow, and is an important fact; for on the short planes between each block or sleeper caused by the deflection of the rail, the gain in descent is so insignificant, that it may be entirely neglected; consequently the engines and carriages are constantly going up an inclined plane between each support of the rails equivalent to the central deflection divided by twice the distance between the supports. This is, from calculation, ascertained to be as follows, viz.:—

Bearing distance.		Deflection.	Equivalent Planes.	Increased Power required per ton.
Ft.	In.	Inches.		
3	0	·024	1 in 3000	·75 lb.
3	9	·037	1 in 2432	·92 lb.
4	0	·041	1 in 2341	·95 lb.
5	0	·064	1 in 1875	1·20 lb.
6	0	·082	1 in 1756	1·30 lb.

Although the deflection of rails will generally be different from the above, and the increase of power required to surmount the consequent planes will also require considerable modification to suit the action of locomotive engines, which depend upon so many other circumstances besides the action of gravity; yet the fact remains the same, namely, that with deflection there is a consequent loss, and the subject deserves much more consideration than it has received, especially as we know that fish-bellied rails do not fail in the middle, but about eight inches from the supports. A rail ought not to act as a spring; but as this to a certain extent must be the case, it should be made to do so as little as possible. A spring should only be used to get over an obstacle where one must be met, but if the rail acts as a spring it creates an obstacle where none existed before. We must also remember that when deflection becomes permanent, fracture begins, as we break a thing we are not strong enough to pull asunder, by bending it backwards and forwards. In fact, the experiments on deflection have hitherto been such that they have merely served to unsettle all opinion, and to place one set of deductions in opposition to another. The mode of estimating this element by two wheels on an axle, loaded at their peripheries, and oscillated on the rails, is one which well deserves attention. In all cases, the firmer the rail is fixed to the chair, as respects rising in it, the less will be the deflection. Of course it must always have a motion in the direction of its length to allow for expansion and contraction, the force of which will vary in good or tolerable iron from nine to six tons per square inch of section. The expansion of a fifteen-feet rail may be taken at ·00126 inches for each degree of Fahrenheit, and as it will not be safe to take less than 90° for the range of our climate, this gives ·1134 inches for the total, or ·0567 at each end of such a rail.

In order to understand the action which takes place in the case of a deflected rail when a heavy weight passes over it, we must know the effect of gravity at the velocities used on railways. For this purpose, if we take three, four, and five-feet bearings as those which seem at present likely to be the limits, the following table will give us the time occupied in going over half the rail in each case; and from this we shall be able to ascertain the effect of gravity during that time.

Velocity in miles per hour.	Velocity in yards per minute.	Velocity in inches per second.	Parts of a second in which 18 inches are passed over.	Parts of a second in which 24 inches are passed over.	Parts of a second in which 30 inches are passed over.
10	293·33	176	$\frac{1}{9\cdot8}$	$\frac{1}{7\cdot33}$	$\frac{1}{5\cdot86}$
20	586·66	352	$\frac{1}{19\cdot6}$	$\frac{1}{14\cdot7}$	$\frac{1}{11\cdot73}$
30	879·99	528	$\frac{1}{29\cdot3}$	$\frac{1}{22}$	$\frac{1}{17\cdot6}$
40	1173·32	704	$\frac{1}{39\cdot1}$	$\frac{1}{29\cdot3}$	$\frac{1}{23\cdot47}$
50	1466·65	880	$\frac{1}{48\cdot9}$	$\frac{1}{36\cdot7}$	$\frac{1}{29\cdot3}$
60	1759·98	1056	$\frac{1}{58\cdot7}$	$\frac{1}{44}$	$\frac{1}{35\cdot2}$
70	2053·31	1232	$\frac{1}{68\cdot4}$	$\frac{1}{51\cdot3}$	$\frac{1}{41\cdot1}$
80	2346·64	1408	$\frac{1}{78\cdot2}$	$\frac{1}{58\cdot7}$	$\frac{1}{46\cdot9}$
90	2639·97	1584	$\frac{1}{88}$	$\frac{1}{66}$	$\frac{1}{52\cdot8}$
100	2933·30	1760	$\frac{1}{97\cdot8}$	$\frac{1}{73\cdot3}$	$\frac{1}{58\cdot7}$

Or putting *a* for the velocity in miles per hour, *v* for the velocity in yards per minute, and *v′* for the velocity in yards per second, we have

$$v=\frac{1760\cdot a}{60}=29\cdot333a$$

$$v'=\frac{1760\cdot a}{3600}=4\cdot888a$$

And in the table, taking either of the three right-hand columns, according to the length of bearing, for instance the eighteen-inch column for a three-feet rail, we have the number of inches through which the engine or any other body would fall by the action of gravity in free space, in the time which it takes to pass over 18 inches at the given velocity, by the formula

$$s=t^2\cdot193,$$

where *t* is the time in seconds, and *s* the space in inches. Thus at 20 miles an hour, with a three-feet rail, where 18 inches are passed over in $\frac{1}{19\cdot6}$ of a second, the engine would fall during that time

$$\left(\frac{1}{19\cdot6}\right)^2\cdot193=\frac{1}{384\cdot16}\cdot193=\frac{193}{384\cdot16}=\cdot5,\text{ or half an inch.}$$

Again at 30 miles an hour, with a 3-feet rail, 18 inches of which are passed over in $\frac{1}{29\cdot3}$ of a second, the engine during that time would fall

$$\left(\frac{1}{29\cdot3}\right)^2\cdot193=\frac{1}{858\cdot49}\cdot193=\frac{193}{858\cdot49}=\cdot225,$$

or not quite a quarter of an inch.

And denoting by *t* and *s* the time and space as above, we have conversely, knowing the space an engine would have to fall, for instance, through a bad joint, the distance the engine would pass over without touching the lower rail, by the formula

$$t=\sqrt{\frac{s}{193}}.$$

Thus when $s=\cdot225$, we have

$$t=\sqrt{\frac{\cdot225}{193}}=\sqrt{\cdot001166}=\cdot0341=\frac{1}{29\cdot3}$$

of a second, in which, at 30 miles an hour, we find by the table the engine would pass over 18 inches of the lower rail without touching it, describing in its fall a parabola modified by the effect of the springs on the engine.

This has been put to the test of experience by bending a rail nearly half an inch, and then painting it. An engine and train of carriages were then run over it, none of the wheels of which touched the paint for 22 inches. This affects a railway in three ways. First, when the engine has to fall, through a bad joint, the rail which it leaves being higher than the rail it is coming upon, the increased momentum from the fall will here occasion a larger deflection than ordinary, and a consequent inclined plane against the engine, from the time it comes on the rail till it passes the next chair. Secondly, when a rail is permanently bent, where the resistance on the second or rising part of the rail will be less than in the first case. And thirdly, when the rail is simply deflected by the weight of the engine, and restores itself to its original level when that weight has passed; here the effect will be least of all, the rail taking the form of a receding wave before the wheel, and a following wave after it.

In the second case, where the rail is permanently bent, the formula for the space the engine would fall will be

$$s=\frac{H}{L}\cdot193\cdot t^2,$$

where H is the height of the plane, and L its length, *s* and *t* being as before. For instance, if the bend is ·1 of an inch in a 3-foot rail, we have $s=\frac{1}{180}\cdot193\frac{1}{858\cdot49}=\cdot00125$ of an inch, at 30 miles an hour, and $s=\frac{1}{180}\cdot193\cdot\frac{1}{384\cdot16}=\cdot00278$ of an inch at 20 miles an hour, or $\frac{1}{380}$ of an inch at 20, and $\frac{1}{800}$ of an inch, at 30 miles an hour, would be descended by the engine by the effect of gravity, in the same time that steam and gravity together take it along 18 inches of the rail.

Let us next suppose we have steam enough to carry the engine along at a velocity so great, that gravity will not bring it down the ·1 of an inch perpendicular, whilst steam carries it along the 18 inches horizontal, we shall find this velocity to be at and above 44 miles an hour, for it takes $\frac{1}{43}$ of a second for a body to fall one-tenth of an inch by the effect of gravity, and $\frac{1}{43}''$: 18 in. $=3600''$: 44 miles; hence at 44 miles an hour, and at all velocities above it, the engine, after arriving on the rail, bent one-tenth of an inch in the middle, and forming two planes, will no longer touch the rail till after it has passed the middle of it, and velocities of 60 miles an hour have been attained.

In the third case, the engine does not go down a plane, as above, but has to make its own curve through its weight, deflecting the rail. The necessity then of knowing the laws of deflection is such, that no idea can be formed of the effects these importants matters will have on the economy of railroads; yet we have up to the present day positively no data to go upon, which will lead us at all near the truth; and railways are constructing, at a cost very little short of seven millions, without the means having been taken to put such essential points as these out of the pale of doubt and uncertainty, which could be done by a few well conducted experiments. We know, for example, that in an iron bar, if $l=$ the half length, $x=$ any variable distance, $y=$ the corresponding depth, and $\Delta=$ the sine of the elementary deflection, the sum of the deflections when $x=l$ is $\int\frac{x^2}{y^3}\delta x\ \Delta$ for a parallel bar, and $\int\frac{x^2\delta x\Delta}{(a+bx)^3}$ for a fish-bellied rail, in which latter expression $a=$ the least depth, and $b=$ the difference of the depths divided by the half length.

In some cases, where we have good experiments, the mode by which they have been calculated, in order to generalize and render available their results, is inaccurate, and the effect may be shewn by the following table, giving the deflection of rails, with three tons' weight on the middle of them, each column deduced from the same set of experiments, differently computed, and varying to an enormous degree.

Length of bearing in inches.	*a*	*b*	*c*	*d*	*e*	*f*	*g*	*h*
33	·024	·026	·03	·02357	·0272	·0286	·072	·0858
42	·037	·050	·06	·047	·0538	·0569	·111	·1707
45	·041	·063	.072	·056	·064	·068	·123	·204
57	·064	·122	·139	·108	·123	·131	·192	·393
60	·074	·150	·171	·1335	·153	·162	·222	·486
69	·082	·210	·241	·188	·216	·228	·246	·684

Column *a* gives the deflections at 3 tons, deduced from the experiments by the experimenter, except for the sixty-inch, which is derived from the fifty-seven inch bearing. Column *b* gives the deflections derived from the formula given by the experimenter as the results of the same experiments. Column *c* gives the deflections from this formula, recomputed by another person. Column *d* gives the deflections computed from another formula given by the experimenter. Column *e* gives the deflections in column *d*, computed by another person. Column *f* gives the mean of columns *c* and *e*, which appears to be the best approximation we have. Column *g* and *h* give the deflections for 9 tons' weight, the first being derived from column *a*, and the second from column *f*, the difference in the longest bearing 69 inches, being nearly 3 to 1.

With this lamentable uncertainty in the data for a deduction of such importance as that of a deflection in the rails causing an engine to be constantly ascending an inclined plane, there is no hope of arriving at any commonly accurate results. For instance, if we take the bearing of 5 feet, which Mr. Barlow gives, as occasioning the ascent of a plane of 1 in 1875, the deflection, with 3 tons' weight, being ·064, and substitute for ·064 the deflections in columns *a* to *f* successively, we have as follows:—

			Deflection.		Consequent Planes.
By column	*a*	...	·074	...	1 in 1621
—	*b*	...	·150	...	1 in 800
—	*c*	...	·171	...	1 in 702
—	*d*	...	·1335	...	1 in 899
—	*e*	...	·153	...	1 in 791
—	*f*	...	·162	...	1 in 741

In which there is more than two and a-half to one difference in the results, all of which are drawn from one set of experiments, whilst at the same time the probability is, that the planes ought to turn out less steep instead of being more so.

From the effects which arise in consequence of deflection, it will be well worth considering what advantages are derived from the use of felt under the chair. If the rail was perfectly stiff, then, when the engine came over a chair, and compressed the felt, it would afterwards have to go up an inclined plane, through the rail being depressed at the block it had just passed over; and this would continue to take place till the engine arrived towards the next block, when it would depress the rail again in a similar way, and thus its course would be continually up a partially rising plane, the assistance downwards being almost insensible.

But as every rail deflects more or less, the inclination produced by this cause acts just exactly in the opposite manner to that which takes place through the depression and spring of the felt; for whilst the wheel, from the effect of deflection in the rail, descends during its passage over the first half of the rail, and ascends while going over the second half, the effect which the compression and springing of the felt has upon it, is to make it ascend a plane during its passage of the first half, and to descend during the time it is going over the second half. The felt acting as a spring, however, is exceedingly questionable, although maintained by some persons. Its use will be found to consist more in giving a steady seat for the chair when the block is composed of hard stone, and offering a defence against the grating of the chair on the block, which will otherwise take place, producing a grinding, a loss of surface, and consequently a looseness, which, when once arrived at, rapidly increases.

From the above observations on the effects of inclined planes, we may see how desirable it is to have the blocks and sleepers placed in the most accurate manner, as respects uniformity of height. For we must recollect, that in a three-feet rail, a difference of one quarter of an inch in the height of two adjacent blocks, or, more properly speaking, in the height of the basis of two adjacent chairs, converts that three feet of rail into an inclined plane, rising 1 in 144.

Placing of blocks.

With respect to placing the blocks diagonally, this is a less stable position in the line of rails than when they are placed square, for the resistance of the ground to the sinking of the block, whether conceived to be similar to a collection of springs acting under the block, or a collection of weights acting above it, must in either case be referred to the centre of gravity of each half of the block, considering it as moved by the passing weights about a line drawn through its middle at right angles to the line of the rails; that is to say, in a block two feet square, and one foot thick, there are 12 inches in the direction of the rails, 24 inches across them, and 12 inches in depth, acting on each side the axis of motion when the block is laid square, the surface of each half being 288 inches. Now, any uniform effect on these 288 square inches drawn into the distance of their centre of gravity from the axis of motion, gives for the stability of each half 1728. Any uniform effect on the 288 inches of a diagonal half block will give a less number; for the distance of the centre of gravity from the axis of motion was 6 inches in the square block, but it will be only 5·65682 in the diagonal, being 1-3d the altitude of the triangle, and hence we have only 1629·16416 for the stability in the direction of the rails. The diagonal block will consequently have its maximum resistance to sinking at 45° from the line of the rails, or in the position where stability is least required. Circular blocks have been proposed in order to get equal resistance in all directions, but the gain would not be equal to the extra expense, and the stability, although a trifle more than that of the diagonal block in the line of the rails, is less than that of the square one; for the area, as before, being 567 square inches, $=\cdot785398d^2$, and d being the diameter, we have $d=\sqrt{733\cdot386}=27\cdot0811$, and the radius $=13\cdot5405$, and as the arc is to the chord, so is $\frac{2}{3}$ radius to the distance of the centre of gravity from the centre, or $3\cdot14159\times13\cdot5405 : 27\cdot0811=9\cdot02703 : 5\cdot74678$ inches, and $5\cdot74678\times288=1655\cdot=07264$ for the resistance.

We have experimented on the two positions of the blocks, and found that when placed diagonally, there was rather more resistance to lateral motion than when placed square, and they are more conveniently got at to repack in the former position than they are in the latter; but when placed as close as they ought to be, in order to form an economical road, the diagonal position is inadmissible.

It will be seen from the following tables which we have computed, that instead of increasing the bearings from three feet, if we study economy, we should reduce it; and as we have in these tables taken into account all ordinary variations in the elements of expenditure, we must consider it proved that except under very extraordinary circumstances, the nearer the supports are brought together up to the limits here given, the cheaper will the railway be made, whilst of course it will possess more stability, in proportion to the number of resisting bodies which have to be moved, before it can be thrown out of its proper position.

Table I.

Comparative Cost of Long and Short Rails.

Length of rail in feet.	lb. per yard.	lb. per rail.	Cost of block.	Price per rail.		Price per block.		Total price.		Price of one yard.	
				s.	d.	s.	d.	s.	d.	s.	d.
2	40	26·66	·4	3	4	8	0	11	4	17	0
2¼	45	33·75	·425	4	2½	8	6	12	8½	16	11·50
2½	50	41·66	·45	5	2½	9	0	14	2½	17	0½
2¾	55	50·42	·475	6	3½	9	6	15	9½	17	2½
3	60	60·00	·5	7	6	10	0	17	6	17	6
3¼	65	70·42	·525	8	9½	10	6	19	3½	17	9¾
3½	70	81·66	·55	10	2½	11	0	21	2½	18	2
3¾	75	93·75	·575	11	8½	11	6	23	2½	18	6¾
4	80	106·66	·6	13	4	12	0	25	4	19	0
4¼	85	120·42	·625	15	0½	12	6	27	6½	19	4¼
4½	90	135·00	·65	16	10½	13	0	29	10½	19	11
4¾	95	150·42	·675	18	9	13	6	32	3½	20	4¾
5	100	166·66	·7	20	10	14	0	34	10	20	10¾

Table II.

Weight of Rail when the Prices per Yard are equal.

Length of rail in feet.	Price per yard.		Price of block per yard.		Price of rail per yard.		Weight of rail which costs that price.
	s.	d.	s.	d.	s.	d.	
2	17	0	12	0	5	0	40
2¼	17	0	11	4	5	8	45·33
2½	17	0	10	9·6	6	2·4	49·6
2¾	17	0	10	4·36	6	7·64	53·09
3	17	0	10	0	7	0	56
3¼	17	0	9	8·31	7	3·69	58·46
3½	17	0	9	5·14	7	6·86	60·57
3¾	17	0	9	2·4	7	9·6	62·4
4	17	0	9	0	8	0	64
4¼	17	0	8	9·88	8	2·12	65·41
4½	17	0	8	8	8	4	66·66
4¾	17	0	8	6·32	8	5·68	67·786
5	17	0	8	4·8	8	7·2	68·8

Table III.

Effects of one-sixth decrease in the price of iron on the comparative cost of long and short rails.

Length of rail in feet.	Price per rail.		Price per block.		Total price.		Price of 1 yard.	
	s.	d.	s.	d.	s.	d.	s.	d.
2	2	9¼	8	0	10	9¼	16	1·875
2¼	3	6¼	8	6	12	0¼	16	0·33
2½	4	4	9	0	13	4	16	0·1
2¾	5	3	9	6	14	9	16	1·1
3	6	3	10	0	16	3	16	3
3¼	7	4	10	6	17	10	16	5½
3½	8	6	11	0	19	6	16	8½
3¾	9	9¼	11	6	21	3¼	17	0¼
4	11	1¼	12	0	23	1¼	17	4
4¼	12	6½	12	6	25	0½	17	8½
4½	14	0¾	13	0	27	0¾	18	0½
4¾	15	8	13	6	29	2	18	5
5	17	4¼	14	0	31	4¼	18	9¾

Table IV.

Effect of a decrease of one-eighth in the price of a block complete on the comparative cost of long and short rails.

Length of rail in feet.	Price per rail.		Price per block.		Total price.		Price per yard.	
	s.	d.	s.	d.	s.	d.	s.	d.
2	3	4	7	0	10	4	15	6
2¼	4	2½	7	5¼	11	7¾	15	6·33
2½	5	2½	7	10½	13	1	15	8½
2¾	6	3½	8	3¾	14	7¼	15	11¼
3	7	6	8	9	16	3	16	3
3¼	8	9½	9	2¼	17	11¾	16	7¼
3½	10	2½	9	7½	19	10	17	0
3¾	11	8½	10	0¾	21	9¼	17	5
4	13	4	10	6	23	10	17	10½
4¼	15	0½	10	11¼	25	11¾	18	4
4½	16	10½	11	4½	28	3	18	10
4¾	18	9½	11	9¾	30	7¼	19	4
5	20	10	12	3	33	1	19	10¼

Table V.

Effect of a decrease of one-sixth in the price of the rail, and one-eighth in the price of the block, on the comparative cost of long and short rails.

Length of rail in feet.	Price per rail.		Price per block.		Total price.		Price per yard.	
	s.	d.	s.	d.	s.	d.	s.	d.
2	2	9¼	7	0	9	9¼	14	7·875
2¼	3	6¼	7	5¼	10	11½	14	7·333
2½	4	4	7	10½	12	2½	14	7·8
2¾	5	3	8	3¾	13	6¾	14	9½
3	6	3	8	9	15	0	15	0
3¼	7	4	9	2¼	16	6¼	15	3
3½	8	6	9	7½	18	1½	15	6½
3¾	9	9¼	10	0¾	19	10	15	10½
4	11	1¼	10	6	21	7¼	16	2½
4¼	12	6¼	10	11¼	23	5¾	16	6¾
4½	14	0¾	11	4½	25	5¼	16	11½
4¾	15	8	11	9¾	27	5¾	17	4¼
5	17	4¼	12	3	29	7¼	17	9¼

Table VI.

Effect of a decrease of one-sixth in the price of the rail, and of one-fourth in the price of the block, on the comparative cost of long and short rails.

Length of rail in feet.	Price per rail.		Price per block.		Total price.		Price of 1 yard.	
	s.	d.	s.	d.	s.	d.	s.	d.
2	2	9¼	6	0	8	9¼	13	1·875
2¼	3	6¼	6	4½	9	10¾	13	2·33
2½	4	4	6	9	11	1	13	3½
2¾	5	3	7	1½	12	4½	13	6
3	6	3	7	6	13	9	13	9
3¼	7	4	7	10½	15	2½	14	0½
3½	8	6	8	3	16	9	14	4¼
3¾	9	9¼	8	7½	18	4¾	14	8½
4	11	1¼	9	0	20	1¼	15	1
4¼	12	6½	9	4½	21	11	15	5½
4½	14	0¾	9	9	23	9¾	15	10½
4¾	15	8	10	1½	25	9½	16	3½
5	17	4¼	10	6	27	10¼	16	8½

Table VII.

Effect of an increase of one-sixth in the price of the rail, and a decrease of one-sixth in the price of the block, on the comparative distance of long and short rails.

Length of rail in feet.	Price per rail.		Price per block.		Total price.		Price per yard.	
	s.	d.	s.	d.	s.	d.	s.	d.
2	3	10·666	6	8	10	6·666	15	10
2¼	4	11·0625	7	1	12	0·0625	16	0·833
2½	6	0·915	7	6	13	6·915	16	3½
2¾	7	4¼	7	11	15	3¼	16	8
3	8	9	8	4	17	1	17	1
3¼	10	3¼	8	9	19	0¼	17	6¾
3½	11	11	9	2	21	1	18	0
3¾	13	8	9	7	23	3	18	7¼
4	15	6½	10	0	25	6½	19	2
4¼	17	6¾	10	5	27	11¾	19	9
4½	19	8¼	10	10	30	6¼	20	4¼
4¾	21	11¼	11	3	33	2¼	20	11¾
5	24	3½	11	8	35	11½	21	7

Table VIII.

Effect of a decrease of one-sixth in the price of the rail, and an increase of one-sixth in the price of the block, on the comparative cost of long and short rails.

Length of rail in feet.	Price per rail.		Price per block.		Total price.		Price of 1 yard.	
	s.	d.	s.	d.	s.	d.	s.	d.
2	2	9½	9	4	12	1½	18	2¼
2¼	3	6¼	9	11	13	5¼	17	11·0
2½	4	4	10	6	14	10	17	9·6
2¾	5	3	11	1	16	4	17	9·8181
3	6	3	11	8	17	11	17	11
3¼	7	4	12	3	19	7	18	1
3½	8	6	12	10	21	4	18	3½
3¾	9	9¼	13	5	23	2¼	18	6½
4	11	1¼	14	0	25	1¼	18	10
4¼	12	6½	14	7	27	1½	19	1½
4½	14	0¾	15	2	29	2¾	19	5¾
4¾	15	8	15	9	31	5	19	10
5	17	4¼	16	4	33	8¼	20	2½

From these tables, it will be evident that the prices of the materials comprising the permanent way, will very rarely be greater or less than the rates at which they are given; and that consequently it is no longer a question, as far as expense is concerned, which is the best mode of laying a railway.

In these tables we have exhibited each item separately, in order that the component parts of the expense may be seen, as well as the gross sum. The right-hand column in each table shews the price of one yard of single rail, or one-fourth the price of two lines of rails. In Table I. the rails are taken at L.14 per ton, to include freight and carriage, and 10s. as the price of a block, containing five square feet of stone, with its chair, &c., complete, including carriage; but in each table the cost of laying the way is excluded. This price for the block will give 8s. for a two-feet rail, which may be thus divided:—

	s.	d.	
2 treenails at L.4 per 1000,............	0	0½	Including all charges to the place of delivery.
2 spikes, at L.19 per ton, 2400 to the ton,............................	0	3¾	
1 piece of felt,...........	0	0¼	
1 wedge,................................ .	0	1¼	
1 chair, at L.9 per ton, weight 20 lb.,	1	7	
1 block, 1 foot thick, and 1 foot 10 inches each side,.................	5	11¼	
	8	0	

In calculating for any intermediate lengths not in the table, for every tenth of a foot increase in the length of bearing, add 2 lbs. to the weight per yard, and 2·4d. to the price per block, in each case to the tabular number, in a line with that length to which the addition is made. Thus, for 2·2 feet say 44 lbs. per yard, and 8s. 4·8d. for the block; and when a different price is taken for the block, increase it $\frac{1}{20}$th for each 3 inches of increase in the length of the rail, and proportionally for all other lengths.

The minimum price in Table I. is when the length of bearing is 2·2 feet, being then 16s. 11·45d. per yard single rail.

Table II. is computed to shew that if we take the same proportion for the blocks as in Table I., and at the same time keep the total expense per yard the same at all lengths, we shall have too little money left to get an efficient rail; it is calculated, by turning the price of the blocks in Table I. into the price per yard, and subtracting this from 17s., the remainder will be the price of the rail per yard, which, at 1½d. per lb., will shew how heavy a rail can be got for that price. Thus, we see that we can only have 8lbs. more in a five-feet rail than we ought to have in a three-feet; besides which, we cannot get up to our standard, namely, 60 lb. at three-feet bearings.

Table III. shews the comparative cost with the rails at 1¼d. per lb., or L.11, 13s. 4d. per ton, and the minimum laying between 2¼ and 2¾ feet of bearing, we shall shew how to ascertain where it exactly is, which method answers for the other similar tables. Let us first take 2·6 feet for the length of bearing, and adding, as before directed, 2 lbs. for this additional tenth of a foot, to the weight for 2·5 feet, we get 52 lbs. per yard, as the weight at 2·6 feet, and 3 feet : 52 lbs. = 2·6 feet : 45·066 lbs. for the weight per rail, which at 1¾d. per lb. is 56·332d. The price of a block for a 2·5 feet length is 108d., and adding 2·4, we get 110·4d. for the block at 2·6 feet; and this added to the price per rail, gives 166·732d. for the total price per rail, or nearly 13s. 10¾d. Thus, as 2·6 feet : 166·732d. = 3 feet : 16s. 0·38d. for the price per yard complete of single rail, whereas at 2·5 feet it is 16s. 0·1d.; hence the minimum lies between 2·25 and 2·5 feet, and not between 2·5 and 2·75 feet.

Resuming our trial with 2·4 feet, we have 45 + 3 = 48 lbs. for the weight per yard at 2·4 feet, and 3 feet : 48 lbs. = 2·4 feet : 38·4 lbs. per rail, which at 1¼d. per yard, costs 4s. The price of the block at 2·25 feet is 102d., and adding 3·6d. we get 105·6d. for the block at 2·4 feet; that added to the price of the rail, gives a total of 12s. 9·6d., and as 2·4 feet : 153·6d. = 3 feet : 192d. or 16s. 0d., whereas the price at 2·5 feet is 16s. 0·1d. In the same way we may repeat the calculation till we arrive at what extent of accuracy we choose.

Having seen the effect which lowering the price of iron has, we know that by raising it, we should find it cheaper to put the blocks close together than our first table indicated; thus, if iron is 1¾d. per lb., we have for 2-feet rails 3s. 10·666d. as the price of the rail, and 11s. 10·666d. as the price of the rail and block complete, which gives us 17s. 10d. as the price per yard, whereas with 2·25 feet rails it would be 4s. 11·0625d. the rail, and 13s. 5·0625d. for the rail and block, or 17s. 10¾d. per yard.

Table IV. shews the effect of cheaper blocks on the total cost at each length of bearing; it begins at 7s. per block, and increases $5\frac{1}{4}$d. or $\frac{1}{26}$th, for each 3 inches of increase in the length of the rail. The price of rails will never materially differ in any part of England, the freight being the principal variable quantity, but the price of blocks will alter in a very great degree, and the effect of this may be shewn; take, for example, 2s. 8d. as the price of one for a two-feet bearing, and we know they have been procured cheaper; adding to this, as we have done before, 2s. for the other items connected with the block, we get 4s. 8d. as the price of a block complete, and the price of the rail being 3s. 4d., the total price is 8s. per rail, or 12s. per yard. In the same way we have 12s. 6d. per yard at $2\frac{1}{4}$-feet bearings; 13s. 1d. at $2\frac{1}{2}$ feet; 13s. 7d. at $2\frac{3}{4}$ feet; 14s. 2d. at 3 feet; and 18s. 11d. at 5 feet; hence in a railway 31 miles long, we shall find the saving, by having the blocks at two feet apart, L.75,293, viz.

31 miles at 5 feet,.............L.206,237
„ „ 2 feet,...............130,944
L.75,293

And as an useful approximation to this calculation, we may take each farthing per yard increase of cost in the total price per yard of single rail, to give L.7·3333 per mile of double line, or in the above instance, there being 332 farthings between 12s. and 18s. 11d., we have $7{\cdot}3333 \times 332 \times 31 =$ L.75,474.

As we are obliged to place our supports close together, to get a minimum cost when the blocks are less in price than the cost we first assumed, so we shall find that when greater, we must increase their distance. For instance, if a block for a two-feet bearing costs 9s., the cost per yard of block and rail complete will be 18s. 6d.; at $2\frac{1}{4}$ feet, 18s. $4\frac{1}{2}$d. and at $2\frac{1}{2}$ feet, 18s. $4\frac{3}{4}$d., the minimum being between $2\frac{1}{4}$ and $2\frac{1}{2}$ feet.

We have next to see what will be the effect when the rail and block are both either greater or less than in Table I. This divides itself into three branches; first, when they decrease or increase in an equal ratio; secondly, when the rail decreases or increases in a greater ratio than the block; and, thirdly, when the block decreases and increases in a greater ratio than the rail.

In the first case, the ratio of the price per yard will remain evidently the same as in Table I. Thus, if both rail and block are reduced in price $\frac{1}{6}$th, we shall have at 2 feet, the price per yard, 14s. 1·875d.; at $2\frac{1}{4}$ feet, 14s. 1·66d. per yard; and at $2\frac{1}{2}$ feet, 14s. 2·4d.; hence the minimum is as before at about 2 feet 2 inches, and the same will hold under any other increase or decrease, the ratio in rail and block being equal.

For the second case, when the rail decreases in price in a greater ratio than the block, Table V. shews the corresponding effect, and the minimum will be found again at about 2 feet 2 inches, for at that distance we have 44 lbs. for the weight of the rail per yard, or 32·267 lbs. for the weight per rail, which at $1\frac{1}{4}$d. per lb. is 40·334d.; for the block, if ·25 of a foot, increases the price $5\frac{1}{4}$d., then ·2 of a foot will increase it 4·2d., which added to 84d., the price at 2 feet, gives 88·2d. for 2·2 feet. Hence the total price of rail and block is 10s. $8\frac{1}{2}$d., or 14s. 7·27d. per yard, which is rather less than at $2\frac{1}{4}$ feet.

It will be found, in like manner, that the effect of an increase of price in the same ratio will not affect the minimum; for example, with an increase of $\frac{1}{6}$th in the price of the rail, and $\frac{1}{8}$th in the price of the block, we have at 2 feet the rail 3s. 10·666d., the block 9s.; total, 12s. 10·666d., or 19s. 4d. per yard. With $2\frac{1}{4}$ feet, the rail will be 59·065d., the block 114·75d.; total, 14s. 5·815d., or per yard, 19s. $3\frac{3}{4}$d. With $2\frac{1}{2}$ feet the rail will be 72·915d., the block 121·5d.; total, 16s. $2\frac{1}{2}$d., or per yard 19s. 5·299d.; and with 2·2 feet, we have the rail 56·466d., the block 113·376d.; total 14s. 1·842d., or per yard, 19s. 3·6d., or rather less than at $2\frac{1}{4}$ feet.

For the case where the rail increases or decreases in a less ratio than the block, Table VI. shews the comparative effect on the minimum, which is here at about 2 feet, with a decrease in the prices; for trying 2·2 feet, we get for the rail 40·334d., the block 75·6d.; total, 115.934d., or per yard, 13s. 2·09d.; and at 2·1 feet, we have for the rail 36·75d., the block, 73·8d.; total, 110·55d., or per yard 13s. 1·93d.

When there is an increase of $\frac{1}{6}$th in the price of the rail, and $\frac{1}{4}$th in the price of the block, we have for 2-feet bearings, the rail, 46·66d., the block, 120d.; total, 166·66d., or per yard, 20s. 10d.; for $2\frac{1}{4}$ feet, we have, rail, 59·0625d., block, 127.5d.; total, 186·5625d., or per yard 20s. 8.75d.; for $2\frac{1}{2}$ feet, the rail is 72·915d., the block, 135d.; total, 207·915d., or per yard, 20s. 9·498d. Hence the minimum is at $2\frac{1}{4}$ feet, for at 2·3 feet the rail is 61·7165d., the block 129d.; total, 190·7168d., and the price per yard, 20s. 8·76d.; and at 2.2 feet, the rail is 56·4665d., the block, 126d.; total, 182·4665d., and the price per yard, 20s. 8·81d.

We have now only left the cases where the price of the rail increases, while that of the block decreases; the effect of this is shewn in Table VII.; and when the price of the rail decreases, while that of the block increases, this is given in Table VIII. In Table VII. the minimum expense is at the distance of 2 feet, and in Table VIII. at $2\frac{3}{4}$ feet, this being the greatest distance yet obtained; hence cheap rails and very dear blocks are the only conditions which will warrant a distance at all approaching to those now in use; $2\frac{3}{4}$ feet appearing to be the limits under any ordinary prices, and in general only $2\frac{1}{4}$, while in some instances 2 feet only should be taken, in order to lay down a railroad at the minimum expense, as far as the cost of the permanent way is concerned.

In Table VIII. we do not know on which side of $2\frac{1}{2}$ feet the minimum expense will be; we shall therefore, in order to complete the inquiry, investigate this as we have done in the other cases. Taking, then, 2·6 feet, we get 52 lbs. per yard for the weight, or 45·065 lbs. per rail, costing at $1\frac{1}{4}$d. per lb. 56·332d.; for the block we have as ·25 feet : 7d. = ·1 foot : 2·8d., or 10s. 8·8d.; total, 185·132d., or per yard, 17s. 9·1d., being rather more than the price at 2·5 feet. Trying now 2·4 feet, we have 48 lbs. per yard, or 38·4 lbs. per rail, costing 48d., and for the block 119d., the price at $2\frac{1}{4}$ feet plus 4·2d., the proportion for ·15 feet, or 123·2d.; total, 171·2d., or per yard, 17s. 10d. which is more again than at 2·5 feet; the minimum price will therefore be very near 2·5 feet, but rather more if any thing.

It now remains for us to shew, why the particular rate of increase and decrease in the size of the rail and block, which we have given in the tables, has here been assumed. And, first, of the blocks. Every person, when calculating this effect of prices for any particular railway, will of course take into consideration the cost of rails, blocks, and sleepers for the railway in question; and as the rate of increase we have given, viz. one-fourth in the price of the block chair, and all appurtenances complete for each foot increase in the length of the rail, is more than what is necessary rather than less, and as a decrease in the price of the blocks will lead to shortening the rails still more, it will be seen that any error will be on the safe side. It will most probably be found in practice, that whatever the distance between the supports may be, the same absolute surface should be preserved in every case; for although it has been said that each block, be its distance what it may, has but to support a certain weight passing over it, yet this is not a correct mode of reasoning, because it has to support that weight for a longer time, when the distance between each is increased, which is the same thing as having to support a greater weight. For instance, with blocks five feet apart, if we only took them at four square feet each for the intermediate ones, and five square feet for the joints, we should have 183040 square feet, supporting the train for one hour, at a velocity of twenty miles per hour, whilst the same sized blocks at three-feet bearings would afford 281600 square feet to support the train for the same time at the same speed, being a difference in favour of the short bearings of 98560 square feet, or more than one-third. Our increase in the tables is rather less than would be required to preserve the same absolute surface.

Weight of rails.

With respect to the increase in the weight of the rails which we have taken, viz. sixty lbs. per yard at three-feet bearings, as a standard, and adding or subtracting five lbs. for every three inches of increase or decrease, we can only state that we have taken this from an attentive consideration for some years of the practical effects exhibited by the rails now in use on various lines. A mathematician will say, this is following no known law. It is not, and we firmly believe that to attempt to lay down mathematical laws for the dimensions of rails would be perfectly premature, in the present state of our ignorance on this subject. Before this can be done, a complete and satisfactory set of experiments must be made, to settle the many points now in dispute; and so much depends on the form of the rail, and the quality of the iron, that the weight and dimensions must be left to the judgment of the engineers of the respective lines, who, having their characters for ability at stake, will be influenced in every possible way to take all the necessary steps for coming to a right conclusion, and when in doubt, they will of course resort to experiment, every penny spent in which will in all probability save many pounds.

To assist in computing similar cases to those which we have above given, we may observe, that each farthing per lb. in the price of iron gives L.2, 6s. 8d. per ton, and each pound per ton gives ·428571, &c. of a farthing for the price per lb.; hence, multiplying the number of pounds and decimals of a pound in the price per ton by ·428571, will give the price per lb. in farthings and decimals.

In computing the relative strength, &c. of the various rails, the following table will be useful:—

Length of rail; inches.	Square.	Cube.	Depth of rail; inches.	Square.	Cube.
30	900	27000	3½	12·25	42·875
33	1089	35937	3¾	14·0625	52·734375
36	1296	46656	4	16·	64·
42	1764	74088	4¼	18·0625	76·765625
45	2025	91125	4½	20·25	91·125
48	2304	110592	4¾	22·5625	107·171875
57	3249	185193	5	25·	125·
60	3600	216000	5¼	27·5625	144·703125
69	4761	328509	5½	30·25	166·375
72	5184	373248	5¾	33·0625	190·10937

Our experience is yet so small, that various opinions exist even amongst those best informed, as to the proper form and weight of the rail and chair, and the size of the blocks and sleepers; and there is no doubt that in a few years a material alteration will take place in all these things. Until the present time, however, there has been nothing but change both in rails, chairs, and keys, and in the distance between the supports. Every rail should be tested before it is received from the contractor, and it should be always remembered that too much care cannot be taken with the permanent way materials. All the expense incurred in earthwork and masonry is only a means to an end, viz. the permanent road. We recommend the fish-bellied rail as possessing, weight for weight, the most strength; and this would be increased by rolling them with a lower web. How much depends on the manufacture will be apparent, when it is stated that no less than thirty rails broke on the Liverpool and Manchester railway, in the fortnight ending on the 21st January 1837.

The question of expense, as far as the present mode is concerned, is a simple problem of maximum and minimum; and it has been so treated in the preceding tables, algebraic formulæ having been omitted, to make them more generally useful. But there seems to be little doubt that with a 60-pound rail on three-feet bearings, and a block one foot thick, containing five cubic feet of stone, the increase we have given for longer bearings will not be considered as too much, when we recollect that the block has not only to support the rail, but has to sustain it against lateral deflection. When the blocks merely sink, the unusual motion of the engine and the carriages will at once detect it, and the proper remedy must be resorted to; but it might easily happen that the rails would be laterally deflected without its being observed until the train was thrown off altogether, particularly when it is taken into consideration that the carriages are still matter of experiment, and that the play of the wheels between the rails and upon the axles is not by any means a fixed quantity, and also that the whole weight of the engine acts laterally, whereas vertically that weight is divided.

A breadth of from 2 to 2½ inches for the top of the rail, seems admitted by nearly all parties to be sufficient; less would induce considerable wear on the engine and carriage wheels. The wear of rails on the top surface may be taken at one-thirtieth of a pound per yard per annum, and the total loss of weight at one-ninth of a pound per yard per annum; but more accurate experiments are yet required on this head, particularly as to the top surface wear; and the curious fact is yet unaccounted for, that rails laid on the ground, or keyed into chairs on blocks, but not run over by engines or carriages, oxidize considerably more than those which are used.

Width of rails.

Six feet between each line of rails, seems also generally adopted as a convenient width; but this, of course, depends in some measure on the width between the rails, and the construction of the carriages. Should the plan of placing the wheels outside the carriages be generally adopted, a less width between the lines may suffice, but the distance would not bear to be much decreased. The width of embankments outside the rails should at least equal the width between the rails, so that, when the engines or carriages get off the line, their wheels will be so confined between the rails, that the outer one will not get off the embankment. The mode of action when an accident of this kind happens, appears not to be well understood. We frequently hear of engines being expected to drag their trains off the embankments; but this is a thing unlikely to occur often; for when an engine gets off the rails, it will generally strike so hard against the blocks and sleepers, that its velocity, independently of the shutting off the steam, or reversing the motion, will very quickly be lessened. When this takes place, the train, by its momentum, either forces the engine farther along, or, if it strike it at an angle, which is generally the case, throws it over on its side; and it is from this momentum of the train that the damage proceeds. Intermediate carriages getting off are the cause of much less danger. From the weakness of the present axle-guards, however, these generally break when the wheels strike the blocks or sleepers; and there is a great want of strength in the second and third-class carriages. We have known four of these, fortunately empty, crushed into toothpicks when a collision took place.

The following formula will enable manufacturers of fish-bellied rails to fit their rolls to any required size of rail. Thus, for three-feet lengths of bearing. In figure 10

Let r=CD=the radius of the rolls EF and mn.
d=maximum depth of rail.
d'=minimum depth.
e=CB=distance of real and false centres$=\frac{d+d'}{2}$.

z=the angle LCD.
$g=2re$.
$k=r^2+e^2$.
x=the abscissa in inches, y=the ordinate in inches } of the rail.
h=BI.

We then have $h=\frac{2r+d+d'}{2}$,

and $y=h-\sqrt{k+g.\cos z}$ in the first quadrant of the roller, or from 0° to 90°, or from 1 to 9 inches in a three-feet rail, and $y=h-\sqrt{k-g.\cos z}$ in the second quadrant, or from 9 to 18 inches;

but $z=\frac{2r.3,14159}{360}.10x=1°.10x$;

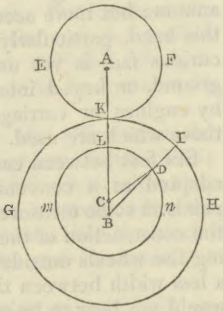
hence $y=\sqrt{k\pm g\cos\left(\frac{22.3,14159}{360}.10x\right)}$ for every inch of x,

or $y=h-\sqrt{k\pm g\cos\left(\frac{r.6,2831852}{360}.10x\right)}$,

or $y=h-\sqrt{k\pm g\cos(r.,0174533.10x)}$.

The rolls EF and mn should be both equal, and likewise equal to the required length of the rail between the bearings, which, as the above formula stands, is 3 feet, but having the length, breadth, and depth of any required rail given, the size of the rolls may be determined; for their circumference will always be equal to the given length of rail between the bearings, viz. 3, 4, or 5 feet, as the case may be, and all the rest is got from the above equation, which is general for all sizes, by merely noting, that when the length is any other than 3 feet, $\frac{180}{a}.x$, must be substituted for $10x$; where a equals the number of inches of half the length of the rail between the supports. Thus, for instance, for a five-feet rail the part in the final equation within the brackets will be $(r.,017453.6x)$. The natural cosines are to be used, and g is to be applied although the cosine may $=0$.

Fig. 10.



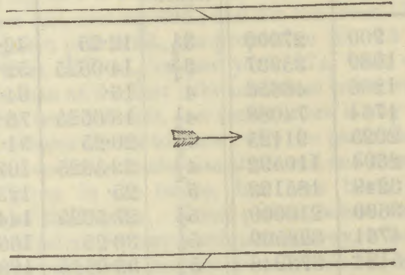
A fish-bellied rail, 50 lbs. to the yard, and with depths of 5 inches maximum and 3·8 inches minimum, compared with a parallel rail of the same weight, and the depth due to that weight, namely, 4·4 inches, each laid at three feet bearings, and having the thickness of their ribs and the form of their heads exactly similar, will be deflected, as the numbers 1881 for the fish-belly, and 2282 for the equivalent parallel; that is to say, a thickness of iron of about 3-10ths of an inch, must be added to the parallel rail in order to make it equal to the fish-belly. This proposition will nearly shew the gain obtained by the use of fish-bellies for all the usual lengths of bearing, and may be taken at 11 to 9, since, in all cases, it is stiffness which is so essentially required. Mere strength will always be had with the sizes now generally adopted; and it is consequently against deflection which we have to guard, at the same time looking to economy, and not expending immense sums of money unnecessarily, as has been done in purchasing rails much heavier than are required. So much, however, depends on the quality of the iron, that we would strongly recommend every rail to be thoroughly tested when received from the manufacturer, and the results in each case registered. This would soon enable such a valuable collection of facts to be made, as that all hypothesis would cease; whereas, hitherto, there have been such discrepancies between experiments made by persons of the first eminence, that, practically, the subject is involved in as much uncertainty as ever.

Wooden sleepers, which should be laid on all embankments till they are thoroughly consolidated, ought to be wide and long, and it will not be found too much to give them ten feet in length and one foot in width for a three-feet bearing, having a proportional increase and decrease at any other bearing. The cheapest way will be to buy the sleepers in the round, and have them ripped in two by circular saws of about three feet in diameter, or even more, and with all the teeth broken off except every third or fourth. This will prevent the saw from choaking, and, in a great measure, from heating, which occasions the instrument to buckle, as it is termed. The boring of the blocks should also be done by machinery before they are delivered to the contractor, and a proportional decrease be made in his charge for laying the permanent way; and if the company do not perform this part of the work, the contractor will find it much to his interest to set up a machine for himself, if his contract exceed half a mile in length.

Joints of rails.

Various have been the opinions respecting the kind of joint by which the rails are connected, or, more properly speaking, respecting the shape of their ends; but this diversity of opinion ought not to have existed, and has only been a consequence of our want of experience on the subject. It stands to reason, and has been found to be a fact, that butt joints, that is to say, when the ends of the rails are at right angles to their length, will always occasion a shock in passing over them, even if ever so well fitted; and if, as is too generally the case, no regard is had to the temperature in laying the way, wide gaps will be found at each joining, particularly in winter. Half-lap joints are much preferable to butts, and greatly diminish the shock, but are still liable to objection; in the first place, through their weakening the rail; and, in the second, for still giving a very unpleasant jar to the carriages, although in a less degree than the butts. If they are laid right and left, as shewn below, it will improve them for diagonal joints. The form of joint we should recommend is given in fig. 11, in which the arrow shews the direction of the train. The slope of the joint must be placed exactly contrary upon the other line of rails, so that the wheels never meet the pointed end of the rail, but always run off. It then needs no other care, than that the point should of the two be the most prominent towards the wheel, and, if it is not so, the joining rail should be taken down a little with a file.

Fig. 11.

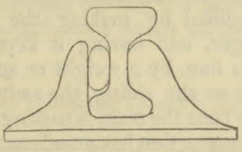


Treenails should be made of good heart of oak, well seasoned, until thoroughly dry, or of African teak, straight-grained; and each treenail should be cylindrical, one inch and a half in diameter, and six inches in length, having a circular hole, half an inch in diameter, and six inches in length, bored through the centre for the insertion of the iron spike to fix the chair. They are sometimes made by being turned in a lathe, and are also done by being passed through a cutting knife; but by whatever process they are brought to the required shape, regard should in all cases be had to the grain of the wood, which should in every instance be completely followed. The most usual way of contracting for these is, at so much per thousand, stating the place of delivery; but if a steam-engine be used to make wooden keys, it can also work lathes for the treenails, which, in that case, will be no cost, except for labour, as, in cutting up planks for the wedges, plenty of waste pieces will be found to make the treenails A plan has grown into use on some railways, of dropping the treenails loose into the hole of the block, and then driving the spike in and splitting them; but this is not so good as driving them in tight. Oak spikes have formerly been much used, and have been known to last twenty years; we should not, however, recommend them, with the rate of speed that has now been attained.

Form of chairs.

The best form of chair is a subject requiring deep consideration, and on which engineers of eminence are by no means decided; we have, therefore, given several drawings of those which are most approved. The leading distinctions are, whether the rails have been keyed in by iron or by wood. The latter method, indeed, is almost indispensable when the rails have lower webs; for, as it would by no means do to have the chair following the shape of the rail, as in that case it must always be detached from the block whenever it is required to take the rail out of it, this consequence ensues, namely, that the opening in the chair must be as large as the lower web of the rail. A chair of this kind, with its wooden key, is shewn in fig. 12.

Fig. 12.



In every mode of keying it must always be remembered, that the intention is merely to keep the rail down in the chair, and not to attempt to confine it from longitudinal motion. The right way of making these wedges is an essential thing, and should be done by the company. The original mode was to purchase oak plank, thoroughly seasoned, and of the thickness required. If it be not seasoned in the most complete manner, it will not answer; but this process may be hastened by steaming it in a tank, with a pressure of about 12 lbs. on the square inch. When it is thoroughly seasoned it should be removed into a drying-house, having hot air flues under the floor, made of iron pipes, where all moisture must be extracted; and when thoroughly dry, it is cut into the proper scantling, and into thirteen-inch lengths, each of which when complete is cut into two for joint chairs, or three for intermediate chairs. They are first prepared by joiners to the right shape for going through the cutters; a joiner will prepare about 100 in a day. The cutters are composed of four blocks of iron, fixed one over the other, with openings between each of about one inch, sloping downwards. In the centre of the three lower blocks are steel cutters, the lower one being exactly the shape of the key, and the others above gradually larger. The key is put in at the top, and forced through by a lever about seventeen feet in length, brought down by a chain and crab winch, with eighty teeth in the wheel and ten in the pinion. Three men will work this, and in ten hours will cut 500 pieces, thirteen inches long, to the required shape. The shavings come through the spaces between the iron blocks, and by the gradual cutting, each one taking off a part, the knots in the wood go through without breaking, and the key comes out perfectly smooth.

The next process is compressing them, which is done by forcing them through an iron block, ten inches thick, with twelve holes in it, 3-16ths of an inch smaller than the key at the lower part, and tapering to the top to admit the key. They are forced through by the ram of an hydraulic press, worked by two pumps, one of an inch and-a-half in diameter, the other of one inch, the diameter of the ram being nine inches, and the safety valve loaded to about nine hundred tons. Four men work the large pump, and two the small. They will get through 900 per day. A little rough grease is first rubbed over them. They are then cut into two or three, or more, in the proper proportion, according to the relative number of joints to intermediate chairs, and packed up in bags, care being taken to keep them in a dry place.

This method of manufacture has been much improved by the erection of an engine on the London and Birmingham railway, by which circular saws, running from 900 to 1100 revolutions per minute, rip the plank into scantling, and afterwards cross-cut the thirteen-inch lengths. Two more cutters were adapted on the top of the other four, but gradually larger. These took in the thirteen-inch lengths without their going into the hands of the joiner; and the key was forced through by a plunger working up and down, by a guide and parallel motion on the end of an iron beam. A similar plunger force them through the compressing box; and 1100 were completed in ten hours. A part of the power may also be applied to drill the stone blocks for the permanent way. The cost of the whole, with the necessary shops, amounted to about L.1500; but the keys may be made for L.8 per thousand, if a cheap pattern be adopted. The circular saws also cut up the waste wood into treenails, which were bored by a lathe adapted to that purpose, the whole being worked by steam. It is found to save the labour of fifteen men. When this sort of chair is used, it will occasion a great saving of time and trouble, if all the chairs are either made by one contractor, or every one gaged before it is received; for if there be the least difference in the size, it requires a different set of cutters, and a different compresssing block for each sort, besides giving a great deal of trouble to the men employed in laying the way. The same remark applies to the rails. The best way is to take plenty of time, by beginning early. Find a respectable man, and let him have the whole job, at a sum varying with the price of iron.

In iron keys there are many more ways of shaping them. The accompanying drawing (fig. 13.) shews a very good one, where the rail has a web on one side of the bottom only, and the other side of the chair is notched to receive an iron pin. The only objection ever urged against iron pins is, that they are apt to get loose. This might be obviated by splitting the end which enters first, and opening it when driven home. If this be done, the other end should have a head, so that a clawed crowbar could be applied in order to draw it out.

Fig. 13.

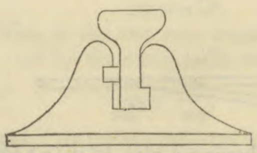
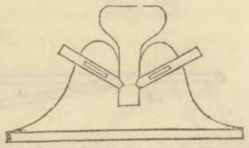


Fig. 14.



The annexed drawing (fig. 14.) shews another good form, invented by Mr. Robert Stephenson, where the rail is confined by two bolts having angular ends, which enter a small score in the rail, and are keyed home by iron keys with split ends; the key hole in the chair, and that in the bolts, being so proportioned, that the effect of keying up is to press the end of the bolt against the rail. In these chairs there is a moveable piece of iron, the bottom of which is circular, and the top flat, laid in a properly-formed receptacle in the bottom of the chair; and on this the rails rest, so as to give perfect ease to any motion produced by flexure.

Mr. Buck's chairs (fig. 15.) are well spoken of. The wedge is driven against the rail by a vertical key. The accompanying drawing (fig. 16.) shews another good form, in which an iron ball takes against the rail, and is keyed close up to it by a longitudinal key. The joint chair is laid down, not at right angles with the rails, but diagonally, and is cast with a split end, rather smaller than the rail. It has therefore to be chipped to get the rail in.

Fig. 15.

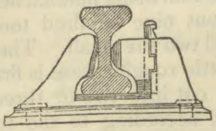
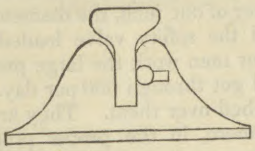


Fig. 16.



There is however a great loss on all these chairs, through their being made of cast iron. This occasions numbers to be broken in fixing and keying. To prevent this, wrought iron chairs may be made, by rolling the iron into the required form in lengths, and then cutting up the lengths into chairs by shears; after which they may be drilled and completed.

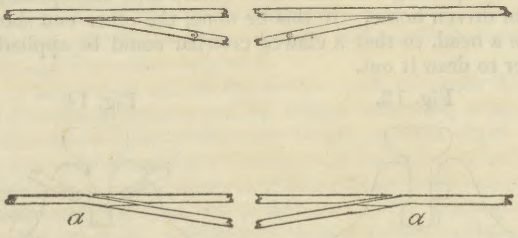
A chair upon a universal joint has been patented, so as to allow the rail to accommodate itself to the sinking of the block; but it has not been adopted on any railway that we are aware of. The inquiries necessary under these and other heads, as the works increase in their number and magnitude, will be best met by the directors dividing themselves into sub-committees under the various necessary branches, which is always advantageous, as long as there is one managing head to bring all the parts to bear upon a common focus.

Points and crossings.

Points and crossings are things which require considerable attention; and great care should be taken that they are laid down on a plan which combines simplicity with safety. Where one line intersects another, and the crossing is a fixture, or as it is called, a through-crossing, no more will be necessary than to bolt the sleepers well together, and pay rigid attention to the adjustment of the rails; but where it is requisite to have the power of going either on one line or the other, as at a siding, the matter becomes more difficult, and the mode of doing so may be considered as far from settled, opinions being still very various.

The oldest form is the common switch, where, upon one side of the line of rails, is a bar, moveable on a hinge, capable of being laid into either the main line, or the line of sidings. (Fig. 17.) Abreast of this is a fixed check rail, the main rail being bent, and having a nick in it (*a*) for allowing the flange to pass when the carriage is not to shift its line. The left hand half of the figure exhibits the same thing for the opposite line of rails. A check rail must also be placed at each point, so as to ensure the train going upon the required line when the switch is placed in the proper position. The switch is generally moved by a horizontal bar or rod of iron connected with it, which is drawn in and out the required distance by an eccentric, at the opposite end to that which is connected with the switch. This eccentric is attached to a vertical rod, coming up about three feet inside an iron standard, and it is turned at the top by means of a lever key which can be taken off at pleasure, and which no person should be allowed to touch except the switchman. This form, although the oldest, is a very good one, and is very easily understood and managed. There is, however, a very cheap and good plan of moving them, instead of an eccentric. This is a vertical lever, which draws them backwards and forwards, the handle springing against an arc with notches to receive it in each position. This might be placed inside the switchman's sentry-box, where it could be locked up if he was unavoidably absent, and no one could touch it.

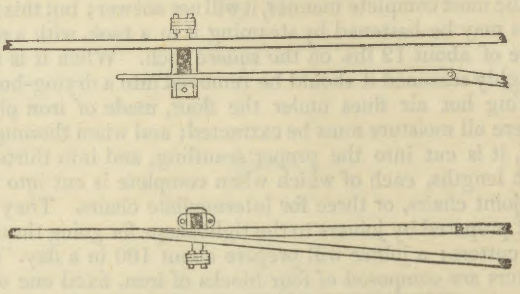
Fig. 17.



Another form, also much approved of, is what is called the check-rail, to distinguish it from the former, which is called the switch-rail. In the check-rail there is a moveable bar to both sides of the line of rails. These are moved simultaneously, by the eccentric being connected to each of them by a cross bolt. The action of the check-rail and the switch-rail has this difference, that it takes place on different sides of the flange, the check-rail acting on the outside of the flange, and the switch-rail on the inside. The check-rail is not so good as the switch, nor is it so easily understood. It is shewn with its eccentric in Plate CCCCXX. Fig. 1 is the slide rail in plan, fig. 2 the elevation, fig. 3 the elevation of the eccentric, fig. 4 the point, and fig. 5 the general arrangement.

Another form which has been much adopted, is Curtis's slide rail. This has a double bar upon each side of the line of rails, is moved by an eccentric like the others, and is very effective, but expensive. In fact, they all answer the purpose, but the slide rails require signals, which we shall hereafter describe. But this is not the case with the others. Opinion seems now coming back to the old switch rail, modified by making the switch part of it considerably longer, and having it kept in the right position for the main line, by a weight or spring, so that when the train is to go on the siding, the switchman has to hold the switch all the time the train is passing. This is objectionable. But the construction has an advantage which overbalances any thing which can be said against it; namely, that it will be opened by the wheel of the engine, if purposely put wrong, so that the train can by no possibility get off the line of rails, unless it is actually wedged immoveably in the improper position. This is susceptible of further improvement. As it stands, it is the subject of a patent, but we question whether it could be sustained.

Fig. 18.



We have seen a very cheap, simple, and effective switch on the Great Western Railway, adapted for peculiar situations, where fixed crossings would be disadvantageous. This consists of a switch moveable at the middle by a pivot, instead of at the end. This connects two lines in either direction, but is not to transfer trains from one to the other. Whichever plan may be adopted, we should recommend one set to be made rigidly accurate, and then that templates should be formed from these as a guide for all the others. No method but this will ensure the correctness of the whole; and crossings being always dangerous, they should never be used if it can be helped, except on a station.

There is still a difference of opinion amongst engineers whether the rail should be inclined or not. The gain and loss may be thus stated. The advantages consist principally in preventing so much wear both on the tire of the wheel and the rail, but chiefly the former, for when the rail is upright, the wheel, theoretically speaking, is only in contact with it on a line having hardly any breadth This is found to wear away the wheel very fast, and the rail likewise suffers a loss on the side where the contact takes place; besides which, the wear approximates the tire of the wheel more and more to the shape of a cylinder instead of a cone; and the rail also partially adapts itself to this action, in each case, through the abrasion of the working lines. In addition to the increase in repairs, through these causes, the wear is to a certain extent unequal, and an irregularity is produced which consequently leads to an unsatisfactory performance between the engine and the rails. But this is avoided by inclining the rail so that it receives the wheel on nearly the whole of its bearing surface; and 3-8ths of an inch in 11 inches is the inclination of the blocks on the London and Birmingham railway.

The disadvantage consists mainly in this, that if the wheels do bear on the whole of the surface, say two inches, there must be a constant rubbing action going on, arising from the unequal velocities with which the outer and inner tire of coned wheels revolve, and this will of course be equivalent to dragging the whole train for a certain distance with every one of the wheels locked. Let us see what this dragging will amount to.

Let d be the greater diameter of the coned wheel, and d' its lesser, each in inches; taking the bearing surface at two inches, and supposing that in this breadth the two diameters differ half an inch, both which suppositions are in excess, we then have

$$\frac{d-d'}{2}.\ 3{,}141593, \text{ or } (d-d').\ 1{,}570796$$

for the rubbing at a mean in each revolution of the wheel, and the length of this revolution will be

$$\frac{d+d'}{2}.\ 3{,}141593, \text{ or } (d+d').\ 1{,}570796.$$

If we take $d=60\frac{1}{4}$ inches, and $d'=59\frac{3}{4}$ inches we get $(d-d')\ .\ 1{\cdot}570796=,5\ .\ 1{\cdot}570796={\cdot}785398$ inches, which is the quantity of dragging for each revolution, the length of which will be $(d+d').\ 1{\cdot}570796=120\ .\ 1{\cdot}570796=188{\cdot}49552$ inches, we then have this proportion,

Yards.		Inches.		Yards.		Inches.
5,235986	:	785398	=	1760	:	264

Hence, the dragging of the whole train will be 264 inches per mile, or 733 yards in 100 miles for each wheel. This, at first sight, appears considerable, but in practice it will be much less. The data have been taken large to shew the limit of this action, and the whole bearing surface is not practically in contact with the tire of the wheel, arising from the various imperfections inseparable from the manufacture of both wheels and rails, particularly the latter, although it must be allowed that the better they are made, the more dragging will take place; and likewise the more the surfaces come into contact, the greater will be the effect of shocks from bad joints and other imperfections. Still our opinion tends to inclining the rail.

It appears absolutely necessary in railroad engines and carriages, that the wheels should be keyed to the axles, the wheel and axles both turning round together; several attempts have been tried to introduce fixed axles, but although the greatest care has been taken in the manufacture, both in boring the hole in the nave, and turning the axle, yet a lateral shaking has always been found to take place, throwing the carriages off the rail on very moderate curves.

The quantity of inclination which the cone of the wheels should have, will, strictly speaking, depend on the radius of the curve. But, as half an inch on $3\frac{1}{2}$ in width, or 1-7th of the width is found to be practically advantageous, in keeping the flanges of the wheels from rubbing against the rails in straight lines; and, as by raising the outer rail, the effect of gravity may at any given velocity be made to neutralize the centrifugal force, that inclination of the tire of the wheel may be adopted, except in very extraordinary cases. With this slope, and a wheel of three feet in diameter running on a line of rails 4 feet $8\frac{1}{2}$ inches in width, with a play of one inch, Mr. Pambour gives the following table of the elevation necessary in the outside rail:

Radus of the curve in feet.	Surplus elevation of the outside rail.		
	At 10 miles an hour.	At 20 miles an hour.	At 30 miles an hour.
	Inches.	Inches.	Inches.
250	1·14	5·60	12·99
500	0·57	2·83	6·56
1000	0·29	1·43	3·30
2000	0·15	0·71	1·65
3000	0·10	0·47	1·10
4000	0·07	0·36	0·83
5000	0·06	0·28	0·66

To enable this calculation to be made for any other inclination, or suitable curves to be made where the inclination is determined, we shall explain the method of investigating the subject.

The resistance on curves is of two kinds, one from the carriage having to turn on the rail without any corresponding play on the axle, thus producing a dragging of the wheel, which takes place on that which is going over the inner part of the curve; and, secondly, that which arises from the centrifugal force, and which causes a friction to take place between the flange of the wheel and the rail. To correct these, the inclination of the coned wheel, the radius of the curve, the velocity and the elevation of one side of the line of rails, must have definite relations, and the wheels must have sufficient play between the two rails to admit the centrifugal force without being able to induce the second resistance, yet under given conditions to correct the first.

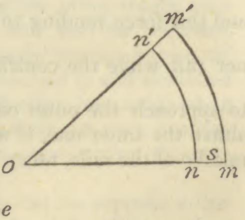
To arrive at this result, whilst the outside wheel of the carriage describes the arc mm', (fig. 22.) the inside one must describe the arc nn' terminating at the same radius; the working circumference of the wheels must therefore be represented by these arcs, and putting

D=diameter of the outside wheel,
D'=diameter of the inside wheel,
π=the ratio of the circumference to the diameter,

we have

$$mm'=\pi D$$
$$nn'=\pi D',$$

Fig. 22.



Also, as the two arcs are terminated by the same radii, we have

$$\frac{mm'}{nn'}=\frac{mo}{no},$$

and if we put the radius of curvature $(os)=r$ and the half breadth of the road $=e$, the above proportion will become

$$\frac{mm'}{nn'}=\frac{r+e}{r-e},$$

or

$$\frac{D}{D'}=\frac{r+e}{r-e},$$

and

$$D-D'=D\left(1-\frac{r-e}{r+e}\right)=\frac{2eD}{r+e},$$

which gives the difference necessary in the diameters of the wheels, in order to produce the required effect; and in order to know what lateral play must be had, if we take the inclination of the tire at $\frac{1}{a}$, we find this to be

$$\tfrac{1}{4}\,a\,(\mathrm{D}-\mathrm{D}')$$

and substituting for D—D′, its value found above, we have the lateral motion equal to

$$\frac{ae\mathrm{D}}{2(r+e)}.$$

We have now to obtain the necessary displacement by means of the centrifugal force, and for this purpose putting

r=radius of curvature,
V=velocity,
m=mass of the moving body,
$g=32\frac{1}{6}$, or the accelerating force of gravitation in 1 second,
f=the centrifugal force produced on the curve,

we have $f=m\frac{\mathrm{V}^2}{r}$,

but P=the weight of the same body, we have

$$\mathrm{P}=gm,$$

$$\text{or}\qquad m=\frac{\mathrm{P}}{g},$$

$$\text{and}\qquad f=\frac{\mathrm{PV}^2}{gr};$$

making a foot in each case for the unit of space, and a second for the unit of time, we get the measure of the centrifugal force represented by its proportion to the weight P. Thus on a curve of 500 feet radius, at a velocity of 20 miles an hour, or 29·25 feet per second, we have

$$f=\mathrm{P}\,.\,\frac{\overline{29{\cdot}25})^2}{32\frac{1}{6}\,.\,500}.$$

or about $\frac{1}{19}$. P, the effect of which force in the direction of the radius, will of course be to press the carriages against the outside rail till the flange of the wheel stops them; and the elevation of the outer rail must be such that the centrifugal force is so balanced by the natural tendency from gravitation, by which the carriages would slide towards the inner rail, that the coned wheel corrects the effect of curvature without producing a friction on the flange,

calling y=the elevation of the outside rail,
$2e$=the breadth of the way,

the inclination of the plane on which the carriage wheels are placed, will be

$$\frac{y}{2e},$$

and the gravity of a body weighing P, will be

$$\frac{\mathrm{P}y}{2e},$$

and this force tending to bring the carriages towards the inner rail while the centrifugal force $\left(\frac{\mathrm{PV}^2}{gr}\right)$ occasion them to approach the outer one, the height y of the outer rail above the inner one, if we wish the carriages to run in the middle of the rails, must evidently be taken, so that

$$\frac{\mathrm{P}y}{2e}=\frac{\mathrm{P}v^2}{gr},$$

in which case we have an equilibrium between the two forces. But we require a tendency outwards to correct for the curvature, putting this=μ, we get

$$\mu=\frac{ae\mathrm{D}}{2(r+e)}.$$

If we suppose this lateral displacement to have taken place, the inclination of the plane on which the carriages will be, is

$$\frac{y}{2e-\mu},$$

whilst, at the same time, from the coned form of the wheels, the tire having an inclination $\frac{1}{a}$, this lateral deviation to the extent μ, has produced a difference of height in both wheels amounting to $\pm\frac{\mu}{a}$, that is to say, the outer wheel will be raised $\frac{\mu}{a}$, and the inner wheel lowered $\frac{\mu}{a}$, and the result or total inclination $\frac{2\mu}{a}$ will have to be added to that which has been produced by the difference between the height of the rails, hence, the outer wheel will be raised

$$y+\frac{2\mu}{a};$$

and as the base between the bearing points is $2e-\mu$, the carriage will be on a plane equal to

$$\frac{y+\frac{2\mu}{a}}{2e-\mu}$$

consequently to establish the equilibrium between gravitation and the centrifugal force required in practice, we must have

$$\mathrm{P}.\frac{y+\frac{2\mu}{a}}{2e-\mu}=\frac{\mathrm{PV}^2}{gr},$$

$$\text{whence } y=\frac{2\mathrm{V}^2ea+\mathrm{V}^2a\mu-2\mu gr}{agr}$$

$$=\frac{2\mathrm{V}^2e}{gr}+\frac{\mathrm{V}^2\mu}{gr}-\frac{2\mu}{a}$$

$$=\frac{e\mathrm{V}^2}{gr}.\left(2-\frac{a\mathrm{D}}{2(r+e)}\right)-\frac{e\mathrm{D}}{r+e},$$

by which formula the table of surplus elevation for the outer rail has been computed, and of course the value of the radius of curvature, or any other element may be found, the others being given. As an example of the calculation, let us take the inclination of the wheel, or $\frac{1}{a}=\frac{1}{7}$; the velocity = 29·25 feet per second; the breadth of the way = 4 feet $8\frac{1}{2}$ inches, or e=2·3542 feet, D =3 feet, when properly situated on the rail, and r=500 feet, we then have with $g=\frac{193}{6}$,

$$y=\frac{2{\cdot}3542\,.\,\overline{29{\cdot}25})^2}{\frac{193}{6}\,.\,500}.\left(2-\frac{7\,.\,3}{2(500+2{\cdot}3542)}\right)-\frac{2{\cdot}3542\,.\,3}{500+2{\cdot}3542}$$

$$=\frac{2{\cdot}3542\,.\,855{\cdot}5625}{\frac{96500}{6}}.\left(2-\frac{21}{1004{\cdot}7084}\right)-\frac{7{\cdot}0626}{502{\cdot}3542}$$

$$=\frac{2{\cdot}3542\,.\,855{\cdot}5625\,.\,6}{96500}\;(2-{\cdot}0209006)-{\cdot}014059$$

$$=\frac{2{\cdot}3542\,.\,5133{\cdot}375}{96500}.\;1{\cdot}9790994-{\cdot}014059$$

$$=\frac{12084{\cdot}991425}{96500}.\;1{\cdot}9790994-{\cdot}014059$$

$$=0{\cdot}125233.\;1{\cdot}9790994-{\cdot}014059$$

$$=0{\cdot}247848-{\cdot}014059$$

$=0{\cdot}233789$ feet, or 2·8 inches.

We have here supposed $a = 7$, or the inclination of the tire of the wheel to $= \frac{1}{7}$; but it is evident this must be such, that no rubbing of the flange will be produced on any curve on the line. We obtain this from the equation

$$\mu = \frac{aeD}{2(r - e)}.$$

We first establish the play between the rails. Allow this to be two inches, or that the flanges of the wheels in their regular position are 1 inch from the rails; then μ must never be quite equal to 1 inch, and if we give to r in the last equation above, its numerical value for the worst curve on the line, and to μ its limit, a small quantity less than half the play of the wheels, we obtain the value of a, which we must use on that line, as follows:

$$a = \frac{2\mu(r + e)}{eD}.$$

For instance, with half the play $= 1$ inch, or ·0833 feet and $\mu = 0{\cdot}9$ inches, or, 075 feet, we have $a = \frac{75{\cdot}3525}{7{\cdot}0626} = 10{\cdot}669$ or the inclination of the cone $= \frac{1}{10{\cdot}67}$ of a foot; observing that if we have only one or two bad curves, we must examine whether we may not admit a little rubbing on them for a corresponding gain on the good ones. This investigation will shew how necessary it is that the play of the axles on the carriages should be as small as can possibly be, or the effect of the coned wheels will be completely deranged. This is a matter which is much too little attended to in practice.

Railway stations.

There is nothing in a railway which demands such serious attention as the stations, both as to their numbers, position, and the mode of constructing them. The number and situation will of course be mainly determined by the nature and extent of the surrounding population; and the first step should be to get a good map of all the places within the sphere of the railway, and to mark upon it the population of each place from the last parliamentary census; bearing in mind, that taking, for the present, railway-travelling to be twice as fast at half the cost of coach travelling, that a very wide portion of country will receive the benefit of a long line. We have explained this before; but that it may be perfectly understood, we shall shortly advert to it in a different shape.

For instance, suppose a line 100 miles long, and a person 50 miles at right angles to one end of it, who wants to go to the other end. If he travelled in a stage-coach along the hypothenuse of the triangle, he would go about 112 miles, say at 4d. per mile, his total cost would be L.1, 17s. 4d., and his time expended about $11\frac{1}{4}$ hours. On the contrary, if he came first to the terminus of the railway nearest him, and then went along the railway to the other terminus, he would have first 50 miles in a stage-coach at 4d., or 16s. 8d., with an expenditure of time equal to 5 hours, and then 100 miles by the railway at 2d., or 16s. 8d. more in 5 hours, the total time being 10 hours, and the total expense L.1, 13s. 4d., consequently he would save 4s. in money, and $1\frac{1}{4}$ hours in time, by taking the longest road.

There is no doubt but that the greater the number of stations, the more the travelling will increase; for it has always been hitherto found that the quick and cheap transit by a railway has not only increased the already existing traffic, but has actually created it where no traces could be found of it before. The nature of the produce, and the state of trade should also be taken into account in determining both the number and the situation of the stations.

The minor stations along the line may be divided into two classes. The first might consist of merely one room, serving for office and waiting-room, where nothing but passengers and small parcels are sent either up or down. Such stations would do for small villages or points where only a limited traffic is expected. We do not, however, recommend these, although they are used on several railways. All passengers pay alike, and they are therefore entitled to the same accommodation. The other class should be a house containing an office, waiting-room in common, or which is better, one for each class of passengers, ladies' waiting-room, and two rooms for the inspector of police to reside in, a small office for the police, and a porter's room. To this would have to be added, if water was required to be pumped, a steam-engine, and the requisite room for the engineer, a locomotive engine-house when necessary, and a covered space for holding spare carriages, trucks, horse-boxes, &c., together with the requisite sheds, and an office for the goods department.

The entrance to the station should be protected from the weather, so that when carriages drive up, the passengers can alight under shelter, and there should be a platform next the railway, about the same height as the carriage floors, so that the passengers can walk into the railway-carriages without having to climb up the steps. Arrangements should be made, for the passengers who are going into the carriages to go all in upon one side, and those going out should get out from the other side; for which purpose the entrance should be on one side of the railway, and the exit on the other side. A light roof should be thrown over both lines of rails and their stages; in fact, the passengers should be entirely under cover from the time of leaving the vehicles which bring them to the station, till the time the train takes them away. This occasions very little expense, and is a great addition both to health and to comfort.

For such a station two clerks would be required, one for passengers, parcels, and private carriages, the other for goods. The mode of conducting the business we shall advert to in its proper place. An inspector, and about four policemen, with porters, according to the extent of the traffic, would probably be sufficient; the whole should be well lighted up with gas, if it can be conveniently got; and it would much conduce to the comfort of the passengers, particularly ladies, if a decent female attended in the waiting-room, and had for sale pastry, biscuits, or sandwiches, with lemonade and ginger beer.

Great care should be taken at each out-station, that the following things can all be simultaneously performed, viz. First, that the train can be setting down passengers on the one side who are going to remain; secondly, taking up passengers on the other side who are going on, and this on both lines; thirdly, that the engine can be taking in coke and water, and also raking her fire, for which purpose, a small coke store should be built close to the water crane, and an ash pit properly excavated in the requisite position; and, lastly, that horses and private carriages can be in a situation to enable them to be attached to and detached from the train, at the same time as the other things enumerated above are being done. It will also be requisite, that the same care be taken at the goods' station, but goods' waggons should also be able to be attached to and detached from passengers' trains, as they will often be useful, when the traffic in passengers runs a good deal one way, in completing the load of the engine, and economising the outlay in locomotive power.

To explain how this is to be done, let us suppose a line of railway running north and south, and that the east line of rails is that by which the trains arrive when going from north to south, and the west line of rails is that by which they arrive when going from south to north. For the east line of rails, the water crane should be so far to the south of the station, that with an average number of carriages in the train, when the tender is under the crane, the middle of the train is opposite the station house. The position of the crane fixes that of the ash pit and coke store. The passengers alighting get down from the west side of the carriages, and go out from the west side of the railway. The passengers who are getting up, do so on the east side of the carriages, and come to the carriages from the east side of the railway.

The horses and carriages which are to leave the train, must, of course, be at the end of it. These, when detached, are to be run back, or to the northward, where a turnplate should be fixed to take them up by the cross line, to the spot where they are to be landed. This spot, which should be a third line of rails farther east, should be so far to the northward of the station house, that a siding can be run from the third or extra line of rails into the main east line, so as to be clear of the end of the train; and on this siding should be the embarked carriages which are to join the train. On the west side of the railway, there should be another additional line of rails, with a cross line from it to the place where the carriages are embarked. Along this line the goods may be brought. It will be readily seen that all the required objects will be effected by this arrangement.

For the western line, the water crane should be sufficiently to the north of the station, to allow the centre of an average train to be opposite the station-house, when the tender is under the crane. The ash-pit and coke-store are, as in the previous case, regulated by the position of the crane. The passengers who are leaving the train, get out on the eastern side of the carriages, and leave the railway also on the eastern side. The passengers who are to join the train are waiting on the western side, and get into the carriages on that side. The horses and carriages which are to leave the train, are run back to the southward, past the siding from the west additional line by which those come on which are joining it, and are brought back to that siding, when clear of the carriages joining the train. By the siding they get on to the west additional line, and going to the northward, are taken across as soon as the train has left, and are disembarked at the proper spot.

Goods joining or leaving the train are managed exactly in the same way. Those which are to leave it being run back on the main line, till past the siding by which those come into the main line which are to join the train; and when these are clear, those which left the train are to be brought to the siding, and run into the goods' station. Proper waiting rooms for the passengers should, of course, be provided on each side of the railway, and their exit and entrance will be by stairs, either up or down, as the station is situated on an embarkment or in a cutting. A foot-bridge may sometimes be thrown across with advantage.

There is such a decided convenience in having all stations on a level, that we should strongly recommend them to be placed so wherever it is at all practicable, even if there is some little sacrificed in another point of view; but this is a matter which will, in general, be so completely governed by the localities, that it may not be possible, in many cases, to attain it. When this happens, however, great care must be taken to make the approaches wide, and of a gentle slope.

As the works proceed towards completion, so many causes will arise to engage the engineers and directors, even without the occurrence of any particularly great accidents, that on all the leading questions time should be taken by the forelock. Springs of water, rock, and quicksands, will be met with where least expected perhaps, and the constant exertion of every talent will be required towards the close of the works. Good drainage will be most wanted when least at command; and work done with wet materials will be always slipping. Many times have embankments made of wet clayey earth slipped at all kinds of slopes; and although hundreds of cubic yards of dry material have been tipped on to them, they have been swallowed up and totally disappeared, whilst, at last, the only remedy to be found was weighting the slip itself with a sufficient quantity of earth to enable it to bear the embankment above.

When rock occurs at any height up the sides of an excavation, advantage may sometimes be taken of it to decrease the expense, by cutting only a sufficient width for the railway, and having no slope to the earth below the rock, but building up retaining walls from the railway below when bottomed out to the rock above, or what is called undersetting, an example of which may be seen at the great Blisworth cutting on the London and Birmingham railway. (See Plate CCCCXXVI. figs. 2, 3, 4.)

It will often happen that many parts of the permanent way are laid prior to its being possible to open either end of the line for traffic. These had better be kept in repair by the contractor; but when the line is once opened, or any part of it, for the purpose of travelling, it will be much the best way for the company themselves to keep it in order, taking especial care that the contractor repays them a proper price for so doing. The consequences of any accident by the engine or carriages getting thrown off the rails are so frightful, that no attention and expense can be thought too great which can prevent such an occurrence. We have seen instances in which carriages have undergone so complete a smash, that not a square foot of plank could be picked up anywhere.

A set of plate-layers consists of nine men for turnplates; twelve for laying rails; five for repairing the way; and six for laying in points and crossings.

To each set, the following tools will be required :—

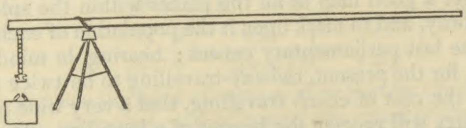
2 chissel-ended crowbars for drawing spikes.

1 point-ended crowbar for moving rails, the point being put in the ground.

1 claw-ended crowbar.

1 cuddy or three-legged stand for the levers, so called from the name of the inventor. (Fig. 19.)

Fig. 19.



2 guages for the distance between the rails. (Fig. 20.)

1 spirit level. (Fig. 21.)

Fig. 20.

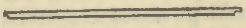
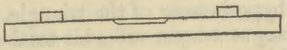


Fig. 21.



1 beetle, 6 inches diameter and 20 inches long, for drawing down sleepers. (Fig. 22.)

4 punning rammers. (Fig. 23.)

Fig. 22.

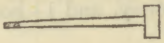
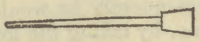


Fig. 23.



2 adzes for trimming the sleepers to receive the chairs. (Fig. 24.)

2 levers. (Fig. 25.)

Fig. 24.

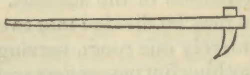
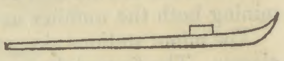


Fig. 25.



Railway
ools.

2 sets of sights. (Fig. 26.)

4 beaters or wooden picks for ramming ballast under the sleepers. (Fig. 27.)

Fig. 26.

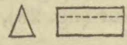
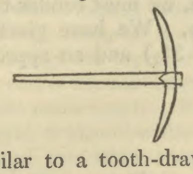


Fig. 27.



2 swivel or cramp crowbars, similar to a tooth-drawer, for drawing spikes without heads, 4 pick axes, 2 files to file the joints, 2 shifting wrenches for screwing up seats, 1 turnplate to trim the sleepers to, 12 block drills, 4 hammers to ditto, 4 keying hammers, 2 chipping hammers, 1 sledge hammer, 4 cast-steel chisels for cutting joints, 12 $\frac{5}{8}$-inch augurs, 1 handsaw, 1 axe, 1 hand-drill for drilling turnplates, 4 sets of chisels with wood-rods for handles, similar to blacksmiths'.

The foregoing tools will enable them to fit in points and crossings, switches or turnplates, as well as to lay the line. Of course when there are sets of plate-layers wholly working at blocks, and other sets wholly working at sleepers, the tools which do not relate to the work they are engaged in, may be kept back. The above list has reference to chairs having wooden keys; for any other kind of chair, if necessary, an adequate alteration must be made. One standard guage should be kept in the engineer's office for the width of the rails, and another for the width between the lines, and all others constructed from it; and they ought to be made of iron.

Duties of
the engine
man.

The engine-man should always stand by his hand-gear whilst the engine is running, and keep a most vigilant look out before him, passing all out-stations or stopping places slowly, and upon discovering any train at a stand still, he should approach and pass it at no greater speed than three miles an hour. Should any train require the assistance of a ballast-engine, it should be immediately given on an application to that effect from the upper guard, the engine-man first placing his waggons on a siding; but the ballast-engine should not draw the train any farther than is necessary to place it under the charge of a regular passenger or goods' engine; and it should then return to its waggons in such a manner as not to interfere with the next train coming along the line. Every ballast-engine should be provided with proper spanners, and other requisite tools, for the safe custody of which the engine-man should be responsible. During a fog the engine should be moved slowly, and the whistle be blown at not greater intervals than a quarter of a mile. Fogs, however, will always be dangerous on railways till two whistles totally different in sound are used, one for each line, blowing by machinery at every eighth part of a mile. When the ballast-engines stop in a fog on the line, the fireman should be sent at least 400 yards a-head to look out.

It is the duty of the engine-men to take care that the engines are in a proper state of cleanliness and efficiency before they quit the engine-house, that every part is in proper and complete working order, and that the regular supply of coke and water is in both the engine and the tender, together with the requisite quantity of oil and waste; and he should personally inspect his tool-box, and ascertain that every thing is in it which by rights should be so, and that his shovels, rakes, &c. are in readiness. He should carefully examine all his oil cups and syphon wicks, his water guage, and every other part of the engine, and when he sets her a-going, try his pumps on both sides, and also his hand-gear. According to the distance the engine-house is from the point where he hooks on the train, time must be allowed him before the minute of departure sufficient to let him arrive at the required spot about one minute before he is wanted, and no more.

He should be very careful in bringing his engine down to the head of the train, where the connection should be made by a man specially appointed for the purpose. He should leave his condensed steam cock open as long as he can, being very cautious that it is shut just before the time of departure. During the journey he, in conjunction with his fireman, should keep a vigilant look-out for all signals of danger, watching each policeman as he approaches him till he has made his notification that all is in security along his part of the line. He must be attentive to stopping the train at the places ordered, and that he does not exceed the regulated speed, considering correctness of arrival his greatest aim, and consequently making up as far as he can in one part of his journey for any unavoidable detentions which may have arisen in other parts.

He should be very attentive to his water-guage, and test it, whenever he thinks it necessary, by his guage-cock. This, however, should be done as little as possible if he have confidence in the water-gauge. He should never use his pumps without turning his pet-cocks, and ascertaining by them that every thing is working properly for the injection of the water; particularly when one pump has got out of order, that if any thing should happen to the other he may instantly stop the engine and examine both of them, the necessary tools for which should be in his tool-box. He should always when practicable take the opportunity of pumping in water when going down inclinations, or at other favourable times. He should attend well to his rakings, and should be careful not to put on too much coke at once, unless he is very strong in steam; he should be constantly alert to the signals from the guard of the train, and ready to stop it in the shortest possible time when ordered to do so. The guard should have a check-string to the arm of the engine-man, and a flexible hollow tube should be fixed from the guard's carriage to the engine, through which the men can converse, which the noise of the engine and train will otherwise render difficult.

After completing his journey, and placing his engine near the engine-house over the ash pit, he should see the fire carefully raked out, and if his engine requires blowing off, he should take it to the proper place for doing so, and then apply for the necessary assistance to place it afterwards in the engine-house. But if it should not require to be blown off, he must of course proceed to the engine-house as soon as his fire is out, and having placed his engine in security, he should make his report to the foreman of all circumstances relative to the journey, and of any defects in the line, or in the engine, that he may have noticed, and the correct cause of all detentions which may have taken place. The engine should be examined and cleaned by proper persons appointed for that purpose; but this should not supersede the necessity of the engine-man personally investigating, before he starts on a journey, that every thing is in correct order. A great deal of expense in cleaning engines, as well as in their wear, would be saved by using a tarpaulin covering down each side from the boiler, to protect the machinery from rain. The engine-man should also have a fencing from the wet over the place where he stands.

The resident engineer who takes charge of the line when opened, should draw every thing by requisition from the storekeeper. The overseer should, in the first place, make out his weekly pay-bill, which should be checked by the time-book of the respective timekeepers; and when signed by the engineer, it should be forwarded to the audit-office, and the pay sent down to the booking-clerks of the adjacent stations, who should pay the men in the presence of the overseer, each man signing his name to attest the reception of the money. The necessary clerks and draftsmen for this part of the engineering department should also be paid weekly in the same way.

Mile marks

We have never yet seen a good mile mark on a railway, the object apparently being merely to comply with the act of Parliament, certainly not to let the passengers see the miles, for the marks are generally so short, that all persons in the middle seats of the carriages have no chance whatever of seeing them. What we should recommend would be light iron posts having a box on the top. The box may be made triangular in its ground-plan, (Plate CCCCXXV. fig. 5,) and be about one foot in height, the apex of the most obtuse angle facing the railway. This angle should be so obtuse as merely to allow room in the box to hang a small lamp, and the two sides which form this angle being made of glass, should be painted or ground, except the figures, which are left clear. These shew the miles by day, and the nearest policeman lighting the lamp, they are also shewn at night. Or the planes forming the sides of the triangle next the railway may be of sheet iron, with the figures cut out of it, and merely that portion covered with glass; in either case the head must have a lid moving on a hinge. The height of these should be just half way up the carriage windows. In the cuttings, the post should be very short, and the mile mark set back on the slope. On the embankments it will be proportionally longer. It may have holes, or other ornaments, cast in its base, serving for steps to get up to light the lamp; or this may be done with projecting rings, and a slide may be made to receive coloured glass as a signal of any accident.

When such mile marks as these are not adopted, and it is desired to know the velocity of a train at night, this may be readily done whenever the blast pipe of the engine sounds sufficiently loud to be heard, which is generally the case in most engines. The way to ascertain the speed at which the train is going, will be to count every fourth puff from the blast pipe in ten seconds, this giving one revolution of the driving wheels, and the speed will be had by the following table:

Blast pipe.	Velocity—miles.	Velocity—miles.
Number of fourth puffs in ten seconds.	Wheels, 5 feet diameter.	Wheels, 5½ feet diameter.
15	16·06	17·67
16	17·14	18·85
17	18·21	20·03
18	19·28	21·21
19	20·35	22·38
20	21·42	23·56
21	22.49	24·74
22	23·56	25·92
23	24·63	27·10
24	25·70	28·27
25	26·77	29·45
26	27·85	30·63
27	28·92	31·81
28	29·99	32·99
29	31·06	34·16
30	32.13	35·34

The rapidity with which the cylinders of steam are expelled through the blast pipe, would at any common velocity prevent every puff being counted; but a very little practice will render the counting of every fourth one exceedingly easy, and the rate of going may always be found to the nearest half mile, by those who have only tried this method three or four times. A still easier method, although it will not generally be quite so accurate, is as follows: For five-feet wheels, count the number of fourth puffs in ten seconds and three quarters, and these will be the number of miles per hour the engine is going; and for five feet six wheels, count the number of fourth puffs in eleven seconds and three quarters. The exact number of seconds is 10·7 and 11·78. The method by the tables however is the best.

Paved crossings. Paved crossings on a level with the railway are things to be avoided by all means whenever it is practicable to do so; but as some cases will arise where they cannot be done away with, we must render them as little liable to danger as possible. We have given drawings of these, (figs. 29, 30, and 31,) and an approved form of chair (fig. 28), which holds the rail, and also the two protecting irons, which should be laid next to the rails, in order that the wheels of those vehicles which cross the railway may not impinge upon the rails and injure them any more than can be helped. The whole crossing should be well paved with the usual road stones, and there must be strong gates on each side. These gates must be constructed so that when shut they may close up the road on either hand, and when open, may form a barrier across the railway.

Fig. 28.

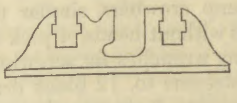


Fig. 29.

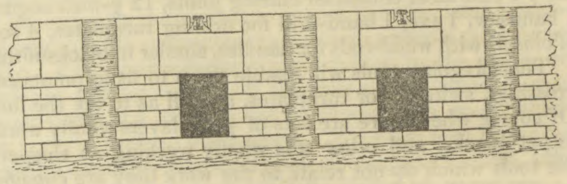


Fig. 30.

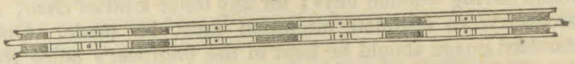
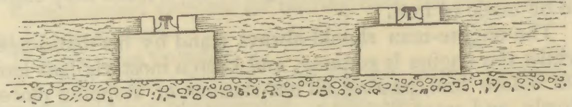


Fig. 31.



Lamps. The subject of lamps forms one to which attention is required, and we should recommend all railways to make a red light at night and a red flag by day, the symbols of danger. A green light should be placed at each station at the spot where the engine-man should slacken his speed, and a red light at the point where he is to stop. The police should have hand lanthorns, with a white glass and a red one, which latter can be turned round in an instant, whenever any thing obstructs the passage of the railway; and the light held up at any train approaching, on seeing which the train is immediately to stop. A green glass may also be added, the signification of which would be, proceed with caution; the train should then come slowly on and ascertain the reason for the signal.

For lighting the insides of the carriages, the roof lamps, contrived by the writer of this article, and patented, are the best. The frame is circular, about six inches in diameter, and about nine inches in height; the bottom is formed of a ground glass saucer, which is let through the roof of the coach, the top being protected by a box; on the inside is a small fountain lamp, on an improved principle, which is very nearly shadowless; the whole of the lamp body being above the frame, and the connection between them consisting of a tube $\frac{5}{16}$ths of an inch in thickness, which tube should always be turned towards the carriage door. These give a soft mellow light, by which the passengers may easily read.

Point signals should be made in the following manner.

The sliding rail, which forms the communication from one line of rails to the other, and which is moved by an eccentric, turned by a lever handle, should have, on the other side of the line, an iron rod from the rail, going into a box at its end with a pinion on it. This pinioned end of the rod turns a rack when the sliding rail is moved, which rack is contained in the box, and is fixed to a vertical rod, moveable in an upright post, similar to a lamp post, through the top of which, about four feet in height, the upper end of the rod comes out for about six inches, and is in this part made square. On this square part there is put a lamp by night, to shew a white light when the points are right, and a red one when they are wrong; so that whenever the sliding rail is moved, it of necessity turns the light round, and cannot fail to place the different colours in front of the line of rails to which the signal is meant to apply.

In the day time the lamp is removed from the square, which, however, is not necessary, and the same signal is made visible by two circular hoops covered with canvass, one being painted red and the other white, and one being fixed on the top of the other at right angles to it; or the hoops may be one inside the other, at the same height and at right angles, nothing more being necessary than that the signal should be such that when combined in this way, the sliding rail can never move without the signal also moving, which should shew white when the points are right, and red when they are wrong. These things, however, will never be properly correct till the engine itself is made to turn the points, which has often been tried, and is considered as having failed, but may certainly be done with ease and effect.

Alarms.

Self-acting alarms, with gong-shaped bells standing upright and fixed about twelve feet high to a wall, should be supplied to each station, and they should be wound up by men stationed at them, who may also act as policemen. These alarms are for the purpose of giving notice to the station-people of the arrival of a train. Two minutes are sufficient time in ordinary cases, and, with active men, one would suffice, and proper regulations must be established to ensure this space of time. On the train arriving at the proper spot, the man stationed at the alarm pulls a trigger, which allows a weight to descend. This turns a wheel, and this wheel works a pinion, to which is attached an eccentric, which gives motion to the clapper from side to side, and the alarm is struck by the hammer in the usual way, the man stationed at it being at liberty to attend to any other business the instant he has pulled the string. A large station-bell is also useful to summon all the persons to their posts at unusual times, in order to receive any unexpected trains, and for many other reasons. A bell should also run from the station office at the out-stations, to summon one or more porters inside the office.

A good means of preventing accidents would be, to have the engine-man in the front of the engine. If any thing could ensure care, this would, the generality of engine-men being quite foolhardy; a defect which will never be remedied till we have a distinct class of men educated and brought up for engine-men from their youth, to whom should be given such a salary as would bring in young men of respectability.

Invalid carriages.

In Plate CCCCXXV, fig. 3, we have given a plan of an invalid carriage, capable of containing four invalids and their four attendants. (*a, a*) are the seats for the passengers, one on each side of the first and second bodies of the carriage being for the invalid, and the opposite one, lengthways of the carriage, being for the attendantt. When the invalid wishes for the use of the closet, he comes out by the door (*b*) into the middle part of the coach (*d*), which is a gallery with a raised roof, as in fig. 2. There are three portable water-closets (*c*) in this carriage, or the middle one, if thought more desirable, may be merely an urinal; the centre one, to whatever purpose it may be converted, is arrived at from the gallery by the door (*e*), and the right and left-hand closets by the doors (*fg*) (*fg*) respectively. The ventilation here would be very perfect, and no inconvenience whatever could arise to any one of the passengers. An attendant belonging to the railway company could attend on all the passengers remaining in the gallery (*d*) till his assistance was required, for which purpose a bell might be hung with pulls in each compartment. By this arrangement double the number of invalids could in each case be accommodated with a passage.

Description of engines.

The following are the engines in use on the London and Birmingham railway, and which were made by Mr. Bury of Liverpool. The description here given applies to both the passenger and goods' engines, except when otherwise stated.

The two cylinders are to have an 18-inch stroke, those of the passenger engines being 12 inches, and the goods' engines 13 inches in diameter, with single slide valves, brass spring pistons, and cast iron packing; the cover of each cylinder having one oil.cup. The boilers are made of the best Yorkshire plates, either Bowling or Lowmoor. The fire-boxes are of the same material, and are welded so as not to have the rivets or lap exposed immediately to the action of the fire. They are 3-8ths of an inch thick, the back plates half an inch, the outside of the fire-box and the backplate 3-8ths of an inch, and the rest of the boiler $\frac{5}{16}$ths of an inch. Full-sized drawings are furnished to shew how the plates are to be worked; the plate for the tubes at the smoke-box end is half an inch thick, and a lead plug, 5-8ths of an inch in diameter, is riveted in the crown of the fire-box.

The tubes are two inches in diameter inside, and are secured with steel hoops at the fire-box end, and iron hoops at the chimney end. These hoops are made to a given guage; and the tubes are of the best rolled brass, No. 14 wire guage thick; the arrangement as well as the exact size of the tubes being regulated by a template.

The engines have four wheels; those for the passengers are 5½ and 4 feet in diameter, and those for the goods are each pair 5 feet in diameter. Each wheel has a cast iron centre; and the spokes are of wrought iron, accurately fitted into the nave. The tire consists of two thicknesses, the inner being 3-4ths of an inch when finished, of the best Staffordshire iron, well secured to the end of the spokes by riveting, the ends of the spokes having been previously turned in their exact position. The outside tire is made of the very best Bowling or Lowmoor iron 1$\frac{5}{8}$ths inches thick when finished. When the outside of the inner tire has been well riveted to the spokes it is turned; and the inside of the outer tire having been accurately bored, so as to secure a perfect fit, it is then shrunk on, and the outside turned and finished. The naves are bored out, and the axles turned to fit; they are secured on by two steel keys, one inch square, at right angles with each other. The goods' engine wheels are connected on the outside by a rod, with a ball pin at one end, and a parallel pin at the other. These engines have also a damper to their blast pipe.

The crank axles are made from Backbarrow iron, cut out of solid blocks, and finished according to full-sized drawings. The straight axles are made of the very best scrap iron. The framing of the engine is of wrought iron accurately fitted. There is one pump attached to each cross-head, and made of good tough brass, the suction pieces being connected by Macintosh hose pipes, with screw coupling joints next the engine. The eccentrics are fixed on the crank axles in the mode shewn by drawings. The steam and exhausting pipes are of copper, No. 12 wire guage in thickness. When these engines are made by other persons, templates and full-sized working drawings are given out, from which no deviation whatever is allowed without Mr. Bury's approbation, so as to secure all parts of the engines matching each other.

The top of the fire-box has a copper cover, No. 16 wire guage thick, secured to the wooden covering on the lower part of the fire-box and body of the boiler, by screws two inches apart. The wooden covering on the fire-box is finished to $\frac{5}{8}$ $\frac{1}{16}$ thick, and is made fast to the boiler by two hoops; and round the fire door it is lined with thin sheet iron under the hoops; the sheets being 6 feet long, and 2 feet 3 inches broad, with a hole cut out for the furnace, and secured at the ends by screw nails 2 inches apart, to prevent the fire from burning the wood casing on the boiler. The casing on the barrel of the boiler is secured by four hoops, with a strip of brass under the fore-end hoop, about $2\frac{1}{2}$ inches in breadth, to cover the ends of the lining and the rivet heads at the junction of the barrel of the boiler, and the smoke-box. The boiler is wrapped in at least three thicknesses of flannel all over.

The lagging on the boiler is put together with iron feathers $\frac{5}{8}$ by $\frac{1}{8}$; the boiler is covered over the lagging with thin sheet lead, about $3\frac{1}{2}$ feet broad along the top of the barrel. The smoke-box is No. 7 wire guage thick, and the chimney is No. 13 wire guage. The cover on the lock-up safety valve is of brass, secured to the boiler; there is a brass frame round the door of the smoke-box, and a brass handle to the small door in the middle of the large one.

All the pins of the joints are of steel, and hardened when practicable, but if not, they are steeled and hardened, and the working parts of the engine, which are of iron, are case-hardened. In making the boilers, the sharp edges of the rivet holes are taken off on both sides, and the rivets and rivet heads made to correspond. The engines are furnished with a wooden guard, and two leather buffers stuffed with cotton flock; and there are a draw-bar, draw-pin, and loop in the centre of the wooden guard, to connect them to the tender. They have three water guage cocks, and a glass water guage, with a lamp stand; also a whistle, and a number plate on each side of the boiler; and they are furnished with a complete set of screw-keys.

All the screws in all the engines correspond, for which purpose, either master taps, or sets of stocks and dies, at the option of other makers, are furnished them by Mr. Bury. They receive two coats of paint, and are finished with two coats of the best varnish. They are guaranteed for one month, or 1000 miles, during which trial, no other work is allowed but the tightening of cotters, and the very best workmanship and materials that can be produced, are in all cases rigidly insisted on.

The framing of the tenders is of well-seasoned oak, or ash timber, thoroughly secured with iron knees and bolts, having an iron box, No. 7 wire guage thick, underneath, to carry the coke, which box is secured to the wooden frame. The tank contains 700 gallons of water. The wheels are of cast-iron, turned to receive a tire of either Bowling or Lowmoor iron, bored out to secure a perfect fit, and finished to $1\frac{1}{4}$ inches thick. The axles are $3\frac{1}{4}$ inches in thickness, of the best hammered scrap iron; and the journals are $2\frac{1}{4}$ inches in diameter, case-hardened, with brass bushes and oil box.

The steadiment for the axles consists of two plates, one outside, and the other inside the framing; both of them being bolted through the framing, and secured together below, by a piece of iron between the plates for steadying the axle bushes. These are made completely parallel, and the bushes fitted into these so as to move up and down, but in no other direction. The tenders have buffers, a spring to which the load is attached, and also four springs by which they are supported, one over each oil box.

The tank is No. 10 wire guage thick, having two brass cocks or valves, and rod handles with bushes for the top of the rods; also two copper pipes, $1\frac{3}{4}$ inches in diameter, for carrying water from the tender to the engine. The tender frame and tank have two coats of paint inside and out, and two coats of varnish. They are fitted up with a brake, and furnished with a complete tool box; a wire sieve in the main hole of the tank to prevent dirt or water from getting into the tank; and two Macintosh hose pipes, one to each suction piece, with the necessary connexion to attach them to the engine.

When water requires to be pumped from the tender into the boiler of the engine, previous to the starting of the train, it is the usual practice to run the engine backwards and forwards for a short distance, in order to work the force pumps. This increases the wear and tear both of the engine and the road, besides inducing a liability in a crowded station of running foul of something, if great care be not taken. The following contrivance will obviate the necessity of this inconvenient method of filling the boiler. A square pit should be sunk in some convenient part of the line, selected with reference to its intended use. This pit should be large enough to admit a pair of three-feet wheels fixed on an axle similar to the carriage wheels. There should be no flanges, and a part of the circumference of these wheels should come up through the rails, which must be cut so as to admit them, additional chairs being put in to support the ends of the rails. This part of the circumference of the wheels thus becomes a part of the railway, the wheels being made to lock at pleasure; but when the engine requires to pump water into the boiler, it must be brought with its driving wheels directly on those in the pit, and these latter being then unlocked, the steam is let gradually on, and the pumps worked as long as is found necessary to fill the boiler, without the engine advancing from the exact spot in which it was first placed, the only effect produced by the driving wheels of the engine, being to turn round the wheels fixed in the pit. When the boiler is filled, the pit wheels are locked, and the engine proceeds to the performance of her assigned duty. How much more advantageous this mode of filling the boiler is, will be readily seen, particularly when it is remembered that if engine-men are not looked well after, they will oil the driving wheels and the rails when in the engine-house, and then letting on the steam, fill their boiler by means of the wheels slipping round on the rails. We have often seen this carried to such an extent, that streams of sparks have been struck out by the attrition. When no better plan can be obtained, the engine should have one end lifted by screw-jacks, till the driving wheels are off the rails, and the steam may then be let on without any damage being done.

The Caliban engine, made by Sharp, Roberts, and Company, of Manchester, drew 80 tons up an inclination of 1 in 180, on the Grand Junction Railway, for $3\frac{1}{4}$ miles, at $13\frac{1}{4}$ miles per hour, at a steam pressure of 50 lbs. per square inch, and with a consumption of coke of 480 lbs. The average of 14 trips of three quarters of a mile each, up 1 in 90, from Euston Square to Camden Town, on the London and Birmingham railway, with the great engine made by Robert Stephenson and Company to work the trains up the inclination till the fixed engine was ready, amounted to 15 miles an hour, with 70 tons, viz. 14 carriages and 148 passengers, at a steam pressure of 50 lbs. per square inch. The average of 12 trips of $24\frac{3}{4}$ miles, up 1 in 440, on the Grand Junction Railway, with six engines, three made by Robert Stephenson and Company, and three by Sharp, Roberts, and Company, was $23\frac{3}{4}$ miles per hour, with a weight of 58 tons. The coke consumed was 864 lbs., and the steam power 48 lbs. per square inch; this coke, however, was very bad. The average of 14 trips of 23 miles, up 1 in 440, on the London and Birmingham line, with No. 16 engine, built by Mr. Hawthorn of Newcastle, was 22 miles an hour, with a gross weight, including the tender, of 70 tons. The coke consumed was 486 lbs., and the steam pressure 48. The engine No. 7, on the London and Birmingham line, built by Mr. Bury of Liverpool, went 10 miles in ten minutes, 3d October 1838, with only one cylinder working, namely, from Hampton to Birmingham, being for $4\frac{1}{3}$ miles, up 1 in 660, $3\frac{1}{3}$ miles, up 1 in 1370; the rest of the way was level, and the time included the getting up and slacking down the speed.

Whilst such machines as these can be turned out of hand, we may rest satisfied, although considerable improvements will doubtless be yet made, great difference of opinion still existing respecting the proper size of the driving wheels, which may either be made larger to give an increased speed, or keeping the speed the same, the piston may move with less velocity, either of which is a desideratum. The crank axle may also be done away with, as Dr. Church has exemplified in his engine, or by other means, or it may be cut out of solid iron. At present, too, the steam whistle, which can be heard several miles in a still day, is only made use of to warn persons of the time when the engine is approaching them. How much better would it be to have two of these with totally distinct sounds, one to be used on the arrival line, and the other on the departure line? Each would then not only perform its present office as an alarm, but would form the most complete fog and night signal that could be desired, and would at all times, in the densest fog or the darkest night, give perfect notice whenever two engines approached each other, on which line each was travelling, and thus prevent almost the possibility of a collision.

Bursting of boilers.

There has so seldom been an instance of a locomotive engine boiler bursting, that it is perhaps hardly necessary to advert to such an accident. We know only of two amongst the tubular boilers. One happened lately on the Liverpool and Manchester Railway, apparently from the boiler being used till the rivets got so worn, that they were weaker than the tubes. The fire-box end of the boiler was blown out, and the above is the only way of accounting for it, as tubes must always bear a steam of 50 lbs. on the square inch. Of course when new, they bear considerably more, and their form gives every advantage to their strength, the pressure on them being inwards, whilst on the boiler it is outwards. It is also known that the safety valve was held down. The second instance occurred on the Brussels railroad. In this case, the lock-up safety valve was found to be loaded to 105 lbs. upon the square inch; and it had also been screwed down more on one side than on the other. These valves are held down by a series of elliptical springs, which move on a guide rod passing through their centres. When they are not screwed down equally on both sides, their position becomes diagonal, and they jamb on the guide road instead of working easily, as they do when rightly managed. Safety, in all the usual cases, is insured by having a fusible plug on the top of the fire-box, composed of four parts lead and one part tin. This will melt before any danger can arise, and the steam will rush into the furnace. The late American experiments on this head may be consulted with advantage; but the mystery has not yet been unravelled. We have had an open vat burst in Meux's brewery; and in two instances boilers have been suffered to get quite cold. The man-hole has then been opened, and a person has gone inside, but soon afterwards, in each instance, upon their introducing a lighted candle, explosions took place, and they were in both cases killed. Gas generated by boilers getting red hot, and absorbing the oxygen, has been supposed to be a leading cause; this, however, is exceedingly doubtful. If such be the case, it might be well to try protecting them by means of another metal. It would also be a good thing to rotate the safety valve, which is locked up from the engine-man, by machinery, to prevent any improper adhesion, and by using a mercurial steam guage, nearly all blowing-off at the safety valve might be avoided, which now often amounts to one-fourth of the generated steam. The boiler tubes, as now made, are capable of running 30,000 miles. The want of adhesion so much talked of, is found to be nonsense, and if there had been any, it would only be necessary, as the writer of this article suggested several years ago, to connect a galvanic magnet with one or more of the axles, to act on the rails, by which means, with the addition of only a few pounds, an adhesion equivalent to the weight of two tons could be produced at each axle, being capable also of acting or not at a moment's notice. But there is always found to be sufficient adhesion, except sometimes in foggy weather, at first starting; when once in motion, the train acts as a fly-wheel. We have no hesitation in saying, that electro-magnetism will at no distant day compete with steam as a motive power, and successfully.

Steam.

We are yet, however, very ignorant not only of the powers but even of the nature of steam. No one can satisfactorily prove whether it is a mechanical division of water, or a chemical decomposition. The currents which take place in water whilst it is heating, and which are reversed when it cools, are not yet taken sufficient advantage of, and there are many other facts which require examination. It is well known, that if we put on our bare hand, an iron kettle of water boiling rapidly we feel no sensation of heat, but the moment the ebulition ceases, we feel a gradually increasing warmth, which is greatest at the edge of the bottom. When the bottom, well cleaned, is placed almost in contact with the bulb of a thermometer, it will only raise it 8° or 10° in thirty seconds, or about 40° in five or six minutes, although the water, at the expiration of that time, will be at 90° higher. With an earthenware pot, the difference is very great, the thermometer rising 100° in thirty seconds, instead of 8° or 10°. A drop of water placed in a metal vessel, at a white heat, is very slowly converted into steam, whilst at a lower temperature its conversion is so rapid, as almost to resemble an explosion. At the high temperature, it will spin round, and will take nearly a minute to evaporate, during which time, if it be turned into the hand, it will barely feel warm.

The experiments made by the committee of the Franklin Institute of Pennsylvannia, are well worth consulting on these subjects. It is there shown, that a drop of water on polished copper, at the temperature of 445°, took 210 seconds before it was converted into vapour. It was evaporated in the smallest time, at a temperature of 292°, at which it took three seconds. But when the copper, instead of being highly polished, was highly oxidated, the temperature of maximum evaporation was at 348°, and the time required to convert the drop into steam only one-fourth of a second, or as 12 to 1; whilst in iron the temperature suffered but little variation, whatever was the condition of the metal, except it was very highly oxidated, the iron having its highest evaporating points in this case about 35° above copper in the same condition. The time varied nearly in the ratio of the conducting power of the metals, or about 2½ to 1, the copper requiring the least.

At 20° to 40° above the point of maximum vaporisation there is a perfect repulsion between the drop of water and the heated metal, the former rotating in all directions, without wetting the metal. When larger quantities of water were used, the point of maximum vaporisation was much higher; which renders it evident that locomotive engines have yet to be considerably altered, before they can work at the greatest advantage. The same experiments shew, that water injected, either hot or cold, into an engine boiler, heated to bright redness, produced no hydrogen, but that the resulting gas was nothing more than atmospherical air, deprived by the heated metal of more or less of its oxygen; that is to say, nitrogen more or less pure, according to the quantity of oxygen which has been absorbed.

Fusible plugs

The nature of the most advantageous alloys for the fusible plugs of locomotive or other high-pressure boilers, has been carefully examined by the same committee, and the following table is deduced from their observations, the stationary point being that of congelation.

The proportions are by weight throughout. The stationary points are not given for the ten latter alloys, but the decrease in temperature by which they became "hard solid," on the surface we presume, was as follows, viz. 25°, 24°, 20½°, 22½°, 30½°, 32½°, 48½°, 50½°, 49½°, 46°. The arrangement of the table is in the order in which the alloy begins to solidify. A correct knowledge of the nature and properties of steam is of such importance at the present day, that the matter ought to be taken up by government. Private individuals are not able to incur the expense necessary in conducting a complete course of the experiments which are required to fully develope such an intricate and voluminous subject.

Table of the Fusing Points of Alloys for High-pressure Engine Plugs.

Fusing points of the metals used in the alloys, of Lead, 612°; of Bismuth, 506°; of Tin, 442°.

Lead.	Tin.	Bismuth.	Alloy begins to solidify. Fahrenheit.	Stationary point. Fahrenheit.
26	8	...	529	353
23	...	...	521	353½
20	...	...	492	354
48	...	8	481	280½
16	...	...	475	354
44	...	8	474¾	280½
40	...	8	466½	280¼
10	...	...	430½	355
12	...	...	415	354
8	...	...	393	355
...	...	0·2	387	351
...	...	0·4	375	349
...	...	0·6	369	345¼
...	9	...	368½	352½
8	10	...	366½	353
...	8	...	364½	353
...	...	1	362	339¾
22	...	8	358	280¾
20	...	...	352	279
8	...	1·4	347	335
...	...	1·8	343	331
...	...	2·2	331	326
8	...	2·6	326	...
...	...	3·0	321	...
...	...	3·4	316	...
...	...	3·8	311	...
...	...	4·6	301	...
...	...	5·4	296½	...
...	...	6·2	294½	...
...	...	7·0	288½	...
...	...	7·6	283½	...
...	...	8·0	272	...

The practice of putting two engines to a train is not considered so good as dividing the train into two, and putting one engine to each. Whatever may be the objections to the latter plan, those who argue in this way assert that no two engines will have their wheels mathematically accurate as to size, and if they had, still their rate of working, depending as it does on so many elements, would always prevent their velocity being precisely the same, except for a short time, by mere chance; and when this is not the case, a most destructive rubbing immediately takes place. When two are working together, for instance, with driving wheels 5 feet 6 inches in diameter, the circumferenec will be 17·2787 feet, and at a speed of 40 miles an hour, which is 211200 feet, or 3520 feet per minute, equal to 58·66 feet per second, these wheels must revolve 12223 times in an hour, or 203·71 times per minute, equal to 3·395 times per second.

Now, if we only take half this velocity, or 20 miles an hour, or 105600 feet for the one engine, and 19 or 21 miles, or 100320 and 110880 feet respectively for the other, we have at once a rubbing motion of no less than 5280 feet per hour, or one mile in twenty, with a rubbing instead of a rolling motion. In fact, the rubbing will always be equivalent to the difference between the velocities of the two engines, and the loss of power, the wear and tear; and the injury to the machinery by the extra steam which must be brought on all the working parts, if the above be true, may readily be imagined. A self-registering counter, fixed to ascertain the number of strokes, would easily settle this point; to do which, it must trace the work of each engine on paper, similarly to the self-acting anemometer of Mr. Osler of Birmingham. But for our own parts no proof is required. We are certain it is not the case, and that the speed of both engines becomes equalized almost immediately after they start; that engine which would travel the fastest, doing the largest proportion of the work, and thus relieving the pistons of the other, by drawing her along at her own rate, as she would, in fact, if the steam were shut off altogether. A strong man and a weak man working at a winch is an exactly similar ease.

Signals.

Before long there is no doubt that signals will be established along all considerable lines of railway. The use of them is sufficiently obvious, and they might be turned to profit also, by conveying messages of all kinds, at the rate of so much per word; they would thus, instead of being a cost to the railway company, become a source of emolument. Communications throughout a length of 100 miles, when they can be made at one signal from each station, would be transmitted in about a minute and a quarter, and any ordinary message out of the usual course in about half an hour; a telegraph would be prevented from working by the weather, about two months a-year in the aggregate.

Telegraph book.

There is nothing so easy as to make a telegraph book; in fact, it is only numbering a dictionary, and the thing is done. In fact, hundreds of messages may be sent on the usual address of a newspaper, without the possibility of the post-office being at all aware of anything of the kind being carried on. In the case of a railway, each head of the different departments should send in lists of the various messages most likely to be wanted, and these could be added to, as time developes what is required.

The original expense of such a thing would probably be about L.260 each station, and the annual expense about L.77 per station; to which would have to be added the salary of the superintendent, clerks, and a few supernumerary men. Their great use renders them most desirable things. For instance, an accident happens to an engine ten miles from an engine station. The telegraph would send out another engine in a minute, with any commonly good look-out; whereas, to send on foot would require two hours, thus deranging the time of all the succeeding trains. As another instance, a train starting from one end to the other of the line, perhaps leaves 50 passengers at some intermediate town; the telegraph might immediately make this known to the clerk of that station, who, if he had few passengers ready for the train, could prepare goods' waggons to put on, so that the engine should not go with half a load; a matter of great importance, for the power absorbed by an engine before it can put itself in motion, being one-third of its whole power, it follows that the relative expenditure of power per ton per mile, is nearly six times greater with a load of 10 tons than it would be with a load of 100 tons.

When accidents do happen upon railways, they may generally be expected to be extremely serious, and no means should be left unprovided, for immediate assistance being dispatched; even an advice carriage, which might be worked at 20 miles an hour, would be but a slow method, compared with a telegraph, for instance, if medical assistance, or what is more likely, surgical assistance, was wanted. In many cases, it will be highly advantageous, particularly in a pecuniary point of view, to run trains at different velocities, passing each other by means of sidings, the expense of locomotive transport increasing so much with an increased velocity. This desirable method will no doubt eventually be much practised. It would be almost impossible without a telegraph.

ffect of gh wind.

The effects of high wind upon a train, especially a side-wind, which binds the flanges of the wheels against the rails, and very much impedes the velocity, as well as increasing the wear and tear, renders it a desirable thing to have its force measured at all the principal stations, so that whenever it exceeds a certain standard, to be determined by experiment, a second engine may be sent out to assist the train. The most complete instrument for this purpose is the anemometer, invented by Mr. Osler of Birmingham, now used at the Philosophical institution of that town, at Plymouth, and in other places. This also combines so many other arrangements, as well as that for measuring the force of the wind, each of which it transfers by machinery to paper, that it is in fact the heavens registering themselves, and for a cost of about L.50 leaves nothing to desire.

For railway purposes merely, a more simple contrivance will be sufficient, although the cost will not be very materially decreased, if it be fitted up with the requisite attention to convenience as well as accuracy. For instance, if a vane with a long tail, high above the top of the engine-house, and having at its pointing end a board one foot square, be fitted up in the following manner, it will be sufficient for all the wants of the locomotive department. The vane should be fixed on a hollow pole, which should turn with it and descend thruogh a tube down to about five feet of the floor of the engine-house, where there should be a horizontal dial-plate, on which should traverse a pointer fixed to the vane-pole. This pointer would always indicate the direction of the wind; and in order to ascertain its force, the board, one foot square, on the pointing end of the vane, should act on a spiral spring, and work a drum by a wheel and pinion, communicating by a cord, with a similar drum at the bottom of the vane-pole, where a vertical dial-plate should be fixed, on the outside, and opposite to the lower drum, on which a hand traversing round the vertical dial-plate would shew the force of the wind.

According to the power of the engine, and the nature of the usual traffic, experience will soon point out when a second engine ought to be dispatched; and a table being formed for each point of the compass for this, should then be invariably acted on at all times, unless other local circumstances occasioned any alterations in the general average of the loads.

To estimate the force of the wind, we have, by the experiments of Dr. Hutton, a plane surface of one square foot, at a velocity of 20 feet per second, suffering a resistance of 12 ounces; and as it varies very nearly as the square of the velocity, we have in pounds, calling f any other force, and v the velocity,

$$\sqrt{\frac{3}{4}} : \sqrt{f} = 20 \text{ feet} : v \text{ feet},$$

and as the number of feet per second, multiplied by ·6818, produces the number of miles per hour, the above becomes, for miles,

$$\sqrt{\frac{3}{4}} : \sqrt{f} = 13{\cdot}636 : v \text{ miles}.$$

$$\text{or } \frac{1{\cdot}732}{2} : \sqrt{f} = 13{\cdot}636 : v$$

$$\text{or } {\cdot}866 : \sqrt{f} = 13{\cdot}636 : v,$$

whence the velocity in miles per hour is

$$v = \frac{13{\cdot}636}{{\cdot}866} \sqrt{f}, \text{ or } 15{\cdot}746\sqrt{f} = v,$$

and we have also sufficiently near

$$f = \frac{v^2}{248}.$$

Hence we obtain the results given in the following table;

Velocity in miles per hour.	Force of wind in avoirdupois pounds.	Velocity in miles per hour.	Force of wind in avoirdupois pounds.
10	0·4	50	10.1
15	0·9	55	12·2
20	1·6	60	14·5
25	2·5	70	19·7
30	3·6	80	25·8
35	4·9	90	32·7
40	6·5	100	40·3
45	8·2		

and for every useful purpose, the force may be had within $\frac{1}{248}$th of the above by using this simple formula,

$$f = {\cdot}004v^2.$$

Tunnels.

So much has been said about the inconvenience and danger of tunnels, that it is necessary, whilst there are yet so many railways to be called into existence, to state that there is positively no inconvenience whatever in them, except the change from day-light to lamp-light. This matter was clearly investigated and proved upon the London and Birmingham railway, a special inspection having been there made in the Primrose-hill tunnel by Dr. Paris and Dr. Watson, Messrs. Lawrence and Lucas, surgeons, and Mr. Phillips, lecturer on chemistry, who reported as follows:—

"We, the undersigned, visited together, on the 20th of February 1837, the tunnel now in progress under Primrose-hill, with the view of ascertaining the probable effect of such tunnels upon the health and feelings of those who may traverse them. The tunnel is carried through clay, and is laid with brick-work. Its dimensions, as described to us, are as follows: height, 22 feet; length, 3750 feet; width, 22 feet. It is ventilated by five shafts, from 6 to 8 feet in diameter, their depth being 35 to 55 feet.

"The experiment was made under unfavourable circumstances; the western extremity being only partially open, the ventilation is less perfect than it will be when the work is completed; the steam of the locomotive engine was also suffered to escape for twenty minutes, while the carriages were stationary, near the end of the tunnel; even during our stay near the unfinished end of the tunnel, where the engine remained stationary, although the cloud caused by the steam was visible near the roof, the air for many feet above our heads remained clear, and apparently unaffected by steam or effluvia of any kind; neither was there any damp or cold perceptible.

"We found the atmosphere of the tunnel dry, and of an agreeable temperature, and free from smell; the lamps of the carriages were lighted; and in our transit inwards and back again to the mouth of the tunnel, the sensation experienced was precisely that of travelling in a coach by night between the walls of a narrow street; the noise did not prevent easy conversation, nor appear to be much greater in the tunnel than in the open air.

"Judging from this experiment, and knowing the ease and certainty with which thorough ventilation may be effected, we are decidedly of opinion' that the dangers incurred in passing through well-constructed tunnels are no greater than those incurred in ordinary travelling upon an open railway, or upon a turnpike road, and that the apprehensions which have been expressed, that such tunnels are likely to prove detrimental to the health, or inconvenient to the feelings of those who may go through them, are perfectly futile and groundless."

The above will, of course, set the question at rest, especially as the Leeds and Selby tunnel, only 17 feet in height, and 700 feet in length, is found to produce no inconvenience; and as any persons may now try the experiment themselves on longer tunnels than even that at Primrose-hill. We may instance the tunnel near Kilsby, on the London and Birmingham railway, which is 2425 yards long, and traversed without the slightest inconvenience or sensation of cold or damp; the change experienced being merely that from sunshine to shade, and from daylight to lamplight, and this latter only in those seasons of the year when the days are considerably longer than the nights.

Friction. The quantity of friction in well-formed carriages we consider as certainly not more than 8 lbs. per ton; but as about 9·3 lbs., or $\frac{1}{240}$th of the weight, will perhaps be a more general average, we here give a table for the total resistance arising from gravity and friction, calculated from the following formula.

$$G+F=\sin I+\frac{1}{240}=\frac{H}{L}+\frac{1}{240},$$

where G is the effect of gravity, the weight being taken as unity, I the inclination of the plane, H its height, L its length, and F the friction, the numbers in the table being the values of the right-hand member of the equation.

Inclination of the plane equal to 1 *in*

	0	100	200	300	400	500	600	700	800	900
0	·004167	·0141667	·0091667	·0075	·0066667	·0061667	·0058333	·0055953	·0054167	·0052778
10	·1041667	·0132575	·0089285	·0073925	·0066057	·0061275	·005806	·0055752	.0054013	·0052656
20	·054167	·0125	·008712	0072917	·0065477	·0060898	·0057796	·0055555	·0053862	·0052537
30	·0375	·01213	·0085144	·007197	·0064923	·006 535	·005754	·0055316	·0053715	·005242
40	·029167	·0113095	.0083333	·0071079	·0064394	·0060185	·0057292	·005518	·0053572	·0052305
50	·024167	·010833	·0081667	·0070238	·0063889	·0059848	·0057052	·0055	·0053432	·0052193
60	·020833	·010417	·0080129	·0069444	·0063406	·0059224	·0056818	·0054825	·0053295	·0053083
70	·018452	·01001467	·0078704	·0068694	·0062944	·0059211	·0056592	·0054654	·0053161	·0051976
80	·016667	·009722	·0077381	·0067983	·00625	·0058908	·0056373	·0054488	·005303	·0051871
90	·0152778	·0094298	·007615	·0067308	·0062075	·0058616	·005616	·0054325	·0052903	·0051768

For any lesser inclination, divide 1 by the length of the plane to a height of unity, or find $\frac{H}{L}$, and add to the quotient in either case ·004167.

To use the table, look along the upper column for the hundreds, and down the left-hand column for the tens of the rate of inclination; and at the point of intersection will be found a number which is to be multiplied by the total weight of the carriage and its load in lbs. for the total resistance. Thus for a carriage weighing 8000 lbs., at an inclination of 1 in 560, we have 8000. ·0059524=52·6192.

Calling W the weight of the carriage, the friction alone will vary from $\frac{W}{550}$ to $\frac{W}{200}$, according to the care with which it is constructed, and this may be divided into that arising from the wheels on the rails, or the rolling friction, which is a constant quantity, more or less, according to the strength, or the stiffness of the rails, $=\frac{W}{850}$, the remainder being due to the rubbing of axles on their bearings. A great deal depends upon the unguent used, both as it respects quantity and quality. A wheel loaded with from 1 to 4000 lbs., and turned on its axle on a half bearing by a weight and rope, which detached itself after falling 30 feet, leaving the wheel to revolve till its own friction brought it to rest, made 36 revolutions, when nearly deprived of oil, and 278 revolutions when the oil was heaped on that side of the bearing which the circumference of the axle approached as it turned round. The ratio of bearing surface of the axles has also a considerable effect. This should not exceed 90 lbs. per square inch, and the length of bearing should not be much less than twice the diameter of the axles. Under these circumstances, friction on railways will be uniform at all velocities with well made carriages, and will be in the ratio of the weight.

The friction of engines, without any load, and exclusive of the tenders, will be in the average ratio of the diameter of the wheels, and nearly as their weight; 8½ tons, with five-feet wheels, being 15 lb. per ton; with a load, 1 lb. per ton must be added.

The friction of edge-rails to that of plate rails, is as 17·5 to 27·8. The wear and tear of ropes on inclined planes is about $\frac{1}{4}$d. per ton per mile; and their friction, either self-acting or with fixed engines, will vary from $\frac{1}{25}$ to $\frac{1}{3}$ of the weight of rope wheel and sheaves in action *plus* the pressure of the rope on the wheel. This quotient will have to be divided by the difference in diameter between the sheave and its pin, and an allowance must be made for any curves in the line of direction.

Adhesion of engines. The adhesion of engines may be taken as at least equal to $\frac{1}{10}$th part of the weight on the driving wheels. This will enable them to draw in the following proportions for each ton of the weight under the most unfavourable circumstances, and may be much increased when the weather and all other circumstances are in the most advantageous state.

Inclination.	Load in tons for each ton adhesion.	Inclination.	Load in tons for each ton adhesion.
Level.		Level.	
1 in 4480	26·25	1 in 500	17·25
... 3360	24·21	... 448	16·59
... 2240	23·58	... 400	15·88
... 1680	22·40	... 350	15·03
... 1120	21·33	... 300	14·03
... 1000	20·86	... 250	12·83
... 900	20·37	... 200	11·37
... 800	19·82	... 150	9·56
... 700	19·14	... 100	7·25
... 600	18.31		

In the common steam engine, the power is as the area of the piston, and the pressure of the steam on it. But in the locomotive engines this is not the case; for the power of raising steam in any quantity, which may always be had in a stationary engine by increasing either the size or the number of the boilers, has a limit in the locomotive, determined by the weight to which the engine must be restricted. The power in this case resides in the capability of the engine to generate a given number of cylinders of steam in a certain time, and not in the diameter of the piston.

Evaporation.

The evaporation is produced partly by radiant heat communicated to the water surrounding the fire-box, and partly from that which is transmitted by the hot air passing through the tubes, the effect of the former being to the latter as 3 to 1. At a velocity of 18·88 miles per hour, M. Pambour found that 55·82 cubic feet of water were evaporated per hour, with a heating surface exposed to radiation of 43·12 square feet, and a surface exposed to the heated air of 288·35 feet, equal together to 139·24 square feet of radiating surface; and calling a the former surface, and b the latter, we shall have the evaporating power of different engines at the above velocity, $e = a + \frac{b}{3}$, and reducing the communicative to the equivalent radiant heat as above, we get 0·4 cubic feet evaporated per hour for each square foot of radiating surface, of which, from blowing off, loss from the steam ports, and half an inch at each end of the cylinders, the effective steam is only 0·3 cubic feet for each square foot of radiating surface. The piston must move about 300 feet per minute to work the blast properly, which generally requires 6 lb. per square inch, at 25 miles per hour, and at the highest velocities, will take one-third the power of the engine.

The coke consumed in the best kind of engines, will be about one-fourth of a pound per ton per mile, gross load, and one-fourth of a gallon of water, provided the load is proportioned to the capability of the engine. A great deal also depends on the quality of the coke; and as the power of an engine consists so much in the quantity of water it can evaporate, we subjoin a Table giving the load to the nearest ton and velocity on different inclinations, when sixty cubic feet of water per hour can be converted into steam, that being the capability of the best modern engines.

Evaporation 1 *cubic foot per minute. Gross Load exclusive of Tender.*

Plane.	10 miles per hour.	12½ miles per hour.	15 miles per hour.	17½ miles per hour.	20 miles per hour.	22½ miles per hour.	25 miles per hour.	27½ miles per hour.	30 miles per hour.
Level.	346	251	188	143	109	82	61	44	30
1 in 4480	326	236	176	134	102	77	57	41	27
... 2240	308	223	166	126	95	72	53	37	25
... 1120	276	200	148	112	84	63	46	32	20
... 1000	270	195	145	109	82	61	45	31	19½
... 900	265	191	142	107	80	60	43	30	19
... 800	256	184	137	102	77	57	41	28	18
... 700	246	177	131	98	74	55	39	27	16
... 600	235	169	125	93	70	51	37	25	15
... 500	220	158	116	87	65	47	34	22	13
... 400	201	144	106	78	58	42	29	19	10
... 300	175	125	91	67	49	35	24	15	7
... 200	138	98	70	51	36	25	16	8	2
... 100	84	55	38	25	16	9	3	...	...

Annual expense of railroads.

The expenses of railroads are not yet well understood, and are very variable. For instance, in America, the Boston and Worcester costs L.157 per mile, and the Utica and Shenectady, L.363 per mile; whilst in England the Liverpool and Manchester costs L.1000. Again, the latter costs L.444 per mile, for maintenance of the way, whilst the Leicester and Swannington, a coal line, was let for four or five years, at L.70 per mile, and is now let for less, the company finding engines and ballast, at which price the contractor is supposed to have made L.500 a-year, besides interest upon the cost of his waggons. About 180,000 tons yearly pass on this line. The engines weigh from three to twelve tons, and the waggons thirty-eight cwt. carrying four tons nett. The locomotive power is rather more than one-fourth of a penny per ton per mile.

The maintenance of the way upon the Grand Junction railway, for eighty-two miles to Newton, has been let at L.244 per mile, including rails, chairs, bridges, and every thing. We have no doubt this is amply sufficient. They pay L.20,000 a-year to the Liverpool and Manchester company for the use of their line and offices. The Great Western railway, under unfavourable circumstances, has been let at L.416 per mile; and the repairs to the London and Southampton line are divided, the company finding all materials, and contracting for their labour only, for which they pay L.140 per mile, including the use of tools. But the best data to found any calculation on this varying expenditure, are those contained in the reports published by the Directors of the Liverpool and Manchester railway, for the five half years ending the 30th of June 1834. We shall endeavour to set this calculation in its true light, which has not yet been done. The following are the various items of expenditure, exclusive of interest, with which we have nothing to do.

Liverpool and Manchester Railway expenditure for five half years ending June 1834, exclusive of interest:—

Locomotive power, including new engines.........	L.67552
Maintenance of way, including new rails............	38306
Coaching, including compensation for lost goods, repairs, and office expenses.........................	32628
Carrying, including waggon repairs, carting, and compensation..	63279
Stationary engine expenses, including ropes, &c...	4728
Police disbursements...	5285
Engineering department....................................	2084
Direction, office expenses, rent, taxes, bad debts, and sundries..	23842
Total, exclusive of interest.............	L.237,704

We have included the cost of new engines in the locomotive power expenditure, as otherwise we should have had to allow an uncertain amount for depreciation. For the same reason we have included the cost of new rails in the disbursements for the maintenance of way; whereas former computers have only included the cost of new blocks and sleepers. In the coaching and carrying departments are included the following items, which we shall afterwards use.

Coach repairs......................	L.7957
Waggon repairs..	6436

Let us now see what duty has been performed for these several amounts of expenditure:—

944,113 *passengers conveyed in* 15,831 *trips, or* 59.63 *per trip* = 34½ *miles on a level.*

For power, Goods, nett, 440229 tons, viz. goods 345463 $+$ coals $\frac{189533}{2}$

... Goods, gross, 676065 tons, viz. 440229 + waggons 188669 + empty do. at ¼ = 47167.

For way, Goods, nett, 489614 tons, viz. 440229 + $\frac{7411+91358}{2}$ = Bolton tonnage

... Goods, gross, 751914 tons, viz. 489614 + waggons 209840 + empty do 52460.

For power, Goods, trips, 11702 at 37·63 tons per trip,

For way, ... 13014 ...

The distinction shewn here between the power and the way arises from a small portion of the coals and the Bolton tonnage not being drawn by the company's engines; and hence these have to be omitted in any calculations on the cost of locomotive power, but are retained in the expenses of keeping in repair the permanent way. The number of trips has also to be augmented by an average allowance for the above tonnage. For computing the expense of the way, we must likewise include the weight of the engines and tenders, say 15 tons each. We then have

Goods	751914	
Engines 13014, at 15 tons	195210	
Total weight of goods' trains		947124
Passengers, at 15 to a ton	62941	
Luggage, at 28 lbs. each	11801	
Trains, 15831· 16.3655	259082	
	333824	
Engines, 15831 at 15 tons	237465	
Total weight of passenger trains		571289
Total load passing on the way		1518413

In the above, we have allowed coach room for 64 passengers per trip, and have taken the weight of a first-class train at 21 tons, and a second class at 12·6 tons; the relative numbers of each being at the time we speak of, 13 to 16; hence the average weight of a train is $\frac{21.13+12,6.16}{13+16}$ $=$ 16·3655 tons, and more on longer lines from the luggage being heavier.

We have now to deduce the drawn and the passing weight over 1 mile upon a level, calling the Liverpool and Manchester railway equal to 34½ miles on a level, when due allowance is made for the gradients.

Drawn weight, 1 *mile on a level.*

		Tons.
11702 trips	Goods, nett	440229·34½=15187900
	Goods, gross	676065·34½=23324242
15831 trips	Passengers nett, including luggage,	74742·34½= 2578599
	Passengers, gross,	333824·34½=11516928

Passing weight, 1 *mile on a level.*

		Tons.
13014 trips	Goods, nett	489614·34½=16891183
	Goods, gross	947124·34½=32675778
15831 trips	Passengers, nett	74742·34½= 2578599
	Passengers, gross	571289·34½=19709470

We now require the ratio of expenditure for passengers and goods, for locomotive power and maintenance of the way. This has generally been taken in proportion to the number of trips with each, which is clearly wrong. Both the weight and the velocity are evidently functions of the expenditure, taking the drawn weight in estimating the cost of the power and the passing weight for that of the way; and as the cost of passengers and that of goods is not separated, which indeed could hardly be done for the way, we have no guide, and can only make an approximation, by taking the cost directly as the weight and velocity. We have then

For locomotive power

23324242·15 : 11516928.25 or 349863630 : 287923200,
or as 1·215 to 1.

This gives us in money,

Goods	L.37054.5
Passengers	30497.5
Total	L.67552

A similar result drawn from the number of trips only, would give for the goods, L.28710, and the passengers L.38842, which is clearly inadmissible; unless we are prepared to say that the locomotive power is used in a most disadvantageous manner, of which we have no evidence. Hence, if we multiply the number of passengers by 0·353585, or, which will be sufficiently accurate, by 0·3536, it will give us the total weight drawn in trains, averaging as those did on the Liverpool and Manchester line at the time in question; or, in other words, there are 2·8282 passengers to a ton gross weight.

In order to apportion the expense of maintaining the way between the goods and passengers, we have,

For maintenance of the way,

32675778·15 : 19709470·25 or 490136670 : 492736750,
or as 1 : 1·005.

This gives us in money such a small difference from equal proportions, that we may safely venture to place half the expense on each; always premising, as we have before explained, that the workmanship in the waggon springs, wheels, and axles, is to be considered as of the best description, without which the expense may be almost anything.

The result deduced from the number of trips would have given us the goods' expense to the passengers, nearly as 16 : 22, an additional proof that this method is very erroneous. We are aware of the difficulties which envelope the whole question, especially in first working a railway, when the embankments settle down and render very expensive repairs necessary, without a single vehicle passing over the road, whilst the more it is used, the sooner it will get in perfect order. Nor are there any data to guide us correctly, as respects the effect of velocity; but from an attentive consideration of the subject, combined with a comparison on many lines, we believe the foregoing method to be that which agrees best with practical results, and with this we must rest satisfied till more experimental knowledge is acquired.

For the locomotive power, the cost of new engines and repairs must now be separated from that of the working expenditure in coke, oil, grease, waste, wages, &c. We shall find this to stand as follows:

Repairs, &c.	L.42376
Working expenses	25176
Total	L.67552

This again will divide itself into,

Repairs, &c., Passengers	L.19131
... ... Goods	23245
Total	L.42376
Working expenses, Passengers	L.11366
... ... Goods	13810
Total	L.25176

In the same manner we may divide the expense of maintaining the permanent way into

Wages	L.19216
Materials	19090
Total	L.38306

This comes so very near a half, that we may safely estimate it at that quantity, or at one-fourth of the total, as follows:—

Wages, Passengers	L.9576.5
... Goods	9576.5
Total	L.19153
Materials, Passengers	L.9576.5
... Goods	9576.5
Total	L.19153

Expense of railways.

Reducing the whole of the preceding items, we get, as in the following Table, the expenditure per ton per mile.

Cost of the following items on the Liverpool and Manchester railway reduced to a level.	Passengers per mile per ton. Gross.	Passengers per mile per ton. Nett.	Goods per mile per ton. Gross.	Goods per mile per ton. Nett.	Total goods and passengers per ton per mile. Gross.
	d	d.	d.	d.	d.
Locomotive power,					
Total	·6355	2·8385	0·3813	0·5855	0·4563
Repairs	·3987	1·7806	0·2392	0·3673	0·2919
Expenses	·2368	1·0579	0·1421	0·2182	0·1734
Maintenance of way,					
Total	·2332	1·7826	0·1407	0·2721	0·1755
Wages	·1166	0·8913	0·0704	0·1366	0·0878
Materials	·1166	0·8913	0·0703	0·1365	0·0877
Coach repairs	...	0·7406	...	...	...
Waggon repairs	...	...	...	0·1017	...

The police expenses are about L.75 per mile, including gatekeepers and switchmen ; and this would of course be doubled for a night and day line. The porterage of the goods at the termini, costs 8¼d. per ton, and has been for some time paid at that rate by contract.

As an example of the mode of estimating per ton, and per passenger per mile, the following accounts for the Stockton and Darlington railway will be useful. The traffic on this line consists of coals carried on an average 20 miles per trip, with 63 tons 12 cwt. nett. Goods averaging 12 miles, and passengers the same distance, are conveyed indiscriminately in the same train.

The following statement is for the half year ending the 31st December 1834 :—

			Trips.
No. of trips with coals equivalent to 20 miles per trip			3682·5
The expenses of locomotive power, including the repairs, working, fuel, wages, &c., and interest on capital	L.8310	14	9
Which gives per trip	2	5	1·61
This gives per ton per mile	0	0	0·4258

In the above is is included

Water stations	L.126	12	1
Agencies	81	18	4
Miscellaneous	294	8	4
Total	L.502	18	9

No. of trips of 12 miles, with goods and passengers,			2261¾
No. of passengers conveyed one mile			398244
No. of passengers conveyed one trip of 12 miles			33187
Expense per trip of 12 miles	L.0	12	3·35
Expense per passenger per trip	0	0	10·04
Receipts per trip of 12 miles	0	18	0·61
Receipts per passenger per trip	0	0	1·276
Total cost of locomotive power for the half year	L.1388	12	10
Total receipts from passengers for ditto,	2041	7	4

The cost for goods and passengers is as follows :

Working the engines	L.1207	5	1
Guards and clerks' salaries	187	2	10
Repairs of coaches	34	16	3
Miscellaneous	337	12	2
Total	L.1766	16	4

Brought over—Total				L.1766	16	4
Deduct proportion of expense for some coals drawn by passenger engines	L.79	1	6			
Deduct for goods 7185 tons, 12 miles at $\frac{6}{10}$ths of a penny per ton per mile	215	10	11			
Expenses in the goods' department	83	11	1			
				378	3	6
Expense for passengers only				L.1388	12	10
				as above.		

Hence 7185 tons of goods cost per ton per mile	L.0	0	0·8337
Being L.215, 10s. 11d. + L.83, 11s. 1d. total cost on	299	2	0

Locomotive power.

The performance and cost in locomotive power for five of the principal passengers' and goods' engines during the six months, is as follows :

Engines.	12 mile trips.	Wages, coal, oil, tallow, hemp, &c.			Repairs.			Total.		
		L.	s.	d.	L.	s.	d.	L.	s	d.
North Star.	370$\frac{15}{24}$	74	7	8	112	8	3	186	15	11
Planet	263$\frac{10}{24}$	44	1	2	34	18	1	78	19	3
Globe	286$\frac{8}{24}$	27	16	6	207	7	9	235	4	3
Shildon	193$\frac{8}{24}$	15	8	0	136	11	7	151	19	7
Wilberforce	836	170	0	1	310	14	10	481	0	11
Average	389$\frac{8}{24}$	66	7	10½	160	8	1¼	226	15	11¾

The performance of eleven of the principal coal engines is as follows, the trips being equivalent to 20 miles each, with 63 tons, 12 cwt.

Engines.	No. of 20-mile trips.
Royal George,	293·01
Locomotive,	222·93
Coronation,	262·82
Director,	286·11
Lord Brougham,	236·07
Adelaide,	237·56
Earl Grey,	278·03
Lord Durham,	249·89
Experiment,	227·78
William,	212·46
Rocket,	217·85
Average,	247·11

The estimated expenditure per trip of 20 miles with coals, when this railway company worked their own engines, was, for the years 1833–4:

Locomotive power, total,	L.2	2	7·344			
Interest of capital, rent of shops, &c.	0	3	1·187			
				L.2	5	8·531
The same expense when the power was let to contractors in the years 1834–5,	2	2	4·8			
Water engines, agency, and superintendence,	0	1	5·25			
				2	3	10·05
Saving per trip of 20 miles, with 63 tons, 12 cwt. nett, in 24 waggons,				L 0	1	10·481

The cost of L.2, 2s. 4·8d. to the contractor may be divided as follows:

Engine-man's wages,	L.0	6	1½
Fireman's do.	0	3	0
Engine bars,	0	0	8
Coals,	0	4	9¾
Oil, tallow, and white lead,	0	3	7¼
Hemp and spun yarn,	0	0	4
	L.0	18	6·5
Interest of capital,	0	1	11·386
Rent of shops,	0	1	1·801
Repairs and profit,	1	0	9·113
Per trip of 20 miles,	L.2	2	4·8
Or, per mile:			
Wages and consumable articles,	L.0	0	11·125
Interest and rent of shops,	0	0	1·85935
Repairs and profit,	0	1	0·45569
	L.0	2	1·44

Repairs of engines.

The following is the amount of repairs for two years, 1835 and 1836, to seven engines on the Stanhope and Tyne Railway:

The work performed by these engines in the two years, was as follows:

	Tons, 1 mile. Gross load.	Tons, 1 mile. Nett load.
Two years,	10322616	4825309
Per annum,	5161308	2412654
Per engine, per annum,	737330	344665

The comparative cost of the different modes of transit is, under all circumstances, strongly in favour of railways. For instance, in waggons travelling 2½ miles an hour, the cost of each ton, per mile, for goods, is about 7¾d., of which nearly 3d. is the cost of horsing. In vans travelling at 4 miles an hour with lighter goods, the expense is nearly 1s. per ton, per mile, the horsing costing rather above 4d. of this sum. The expenses of four-horse stage coaches, vary from L.4 to L.5 per lunar month, per double mile, according as their rate of travelling varies from 8 to 10 miles an hour; their hire and repairs cost 2½d. per double mile; the duty is 3d. per double mile; and the horsing is 2s. The coachman and guard are seldom paid except by the passengers, say 10s. 6d. per week for them at the outside; and for tolls and incidental charges 6d. per mile; being a large allowance. The tolls on the Holyhead road, one of the best in England, are not quite 4d. per mile, for a four-horse coach. This gives 1s. 9d. expenses per single mile, while the returns will be 2s. 6d. per mile. From this calculation we have excluded the charge for parcels, &c., leaving it to go, with the allowance for incidentals, to the support of the office establishments. The coaches which ran between Birmingham and London, prior to the opening of the railway, charged L.2, 10s. inside, and L.1, 10s. outside, the distance being 108 miles, and after the opening, L.1, 10s. inside, and 17s. out. Our computation of coach profits we know is under the mark. The cost of this mode of travelling is about 3d. per passenger per mile, or 3s. per ton, taking 12 passengers and their luggage to a ton. In canal carriage, the cost varies from 3d. to 5d. per ton per mile, in the fly boats going at the rate of 4 miles an hour; and by slow boats, from 1¼d. to 2d. per ton per mile, at the rate of 2½ miles an hour. The passenger boats, going 10 miles an hour, charge from 1d. to 1¼d. per passenger, per mile, or from 1s. to 1s. 3d. per ton of passengers, per mile.

	Materials.			Labour.			Total.		
	£	s.	d.	£	s.	d.	£	s.	d.
Preparing engine, cleaning do., adjusting pistons and slides, packing glands, and putting on man-hole doors,	4	9	0	73	2	9	77	11	9
Lifting, stripping, and putting together,	...			196	16	8½	196	16	8½
Carriage, and axle-rod brasses,	21	7	5¾	20	17	6	42	4	11¾
New wheels, and taking off and keying on,	380	1	5½	68	4	6¾	448	6	0¼
Connecting rods, straps, keys, brasses, and liners,	2	1	3	9	13	2¼	11	14	5¼
Steam pipe regulator,	6	10	11	19	13	2½	26	4	1½
Cross heads, cross bars, parallel blocks and bars,	0	18	7½	8	1	1¼	8	19	8¾
Pistons,	29	17	6	52	9	3	82	6	9
Weigh shafts, slide spindles and shafts,	24	0	8½	43	15	10¼	67	16	6¾
Pumps, plungers, glands, gland bolts, clack seats, union pipes, suction pipes, and hose,	103	13	9¼	79	13	7¼	183	7	4½
Lifting apparatus, with eccentric rods, straps, sheeves, forked lever, clutch ring, and reversing lever,	14	4	3¾	53	13	11¼	67	18	3
Side rods, keys, liners, brasses, straps, turning crank pins, and keying-on cranks,	8	7	8	32	4	3¼	40	11	11¼
Frame with hand railing, spring, spring pins, links, frame ends, buffers, and foot board,	30	18	2	76	0	9¼	106	18	11¼
Coupling bar, drag bolt, drag plates, cotters and ferrules,	16	14	7	17	6	2¾	34	0	9¾
Fire box,	46	14	4	105	18	5¼	152	12	9¾
Tubes, taking out and putting in do., and putting in hoops,	246	17	6	47	1	5¾	293	18	11¾
Smoke box, blast pipe, and chimney,	34	10	5¾	98	11	8¼	133	2	2
Fire frames and bars,	71	3	8	17	9	10¼	88	13	6¼
Cleaning boiler,	0	1	6	19	7	5¾	19	8	11¾
Water guages,	0	15	11	0	18	1	1	13	0
Guage cocks,	1	13	7	11	16	1	13	9	8
Tools,	11	9	4¼	13	18	4¼	25	7	9
Painting engine,	...			18	5	2	18	5	2
Tender,	115	2	11	108	13	2¾	223	16	1¾
Total,	1166	3	0¾	1194	2	8¼	2360	5	10
Total, per annum,	583	1	6½	597	1	4½	1180	2	11
Total per engine, per annum,	83	5	11¼	85	5	11	168	11	10¼

Cost when worked by horses.

The cost of carriage by railways worked with horses, is from 1½d. to 2d. per ton, per mile, for heavy, and 3d. to 3½d. for light goods, and from 1d. to 1½d. per passenger, per mile, or from 1s. to 1s. 6d. per ton of passengers, per mile. Those worked by locomotives charge about the same for goods, and rather more for passengers, or from 1½d. to 2½d. per mile on an average. These latter charges however are too high. The resistance by the several modes of transit, is for railways, 8 lbs. per ton; canals, 2¾ lbs. per ton, at 2½ miles velocity, 7 lbs. at 4 miles, 40 lbs. at 9 miles, and 60 lbs. at 11 miles, which is the greatest hitherto attained. Turnpike roads' waggons, 76 lbs.; vans, 71 lbs. at the before mentioned velocities; and coaches, 80 to 88 lbs. at from 8 to 10 miles an hour.

In whatever light we view the question, no other mode of transit can be put in competition with railroads, except the very slow carriage of heavy goods on canals. But this is not a fair comparison, as speed must be taken into account as well as price; and we have no hesitation in saying that upon well managed and economically-conducted railroads, goods of every kind can be carried, with proper precautions, quite as cheap as by any canal, and with three times the speed at least. A great deal remains yet to be done in this department of locomotive transit, and the question cannot be decided on any railway with certainty, till it has been some time in operation, and the mode of working and maintaining it, and of economising the locomotive power expenses, are reduced to a well regulated system.

Effect of snow.

Many doubts were entertained, at an early period of the railway system, as to the performance of engines when snow lay on the rails to a depth which on the common roads interrupted the ordinary communications of the country; they have however completely triumphed over this difficulty; a striking proof of which took place on the Newcastle and Carlisle Railway; where the possibility of working the engines, under the above unfavourable circumstances, was put to the test on December 20, 1836, in the deep cutting through the Cowran hills, where the snow had accumulated to the depth of four or five feet, when the Hercules engine came down on the morning of the above day. Numbers of the country people assembled to see how it would act in such an emergency, and to render any assistance which might be necessary. On arriving at the spot, however, the engine dashed right into the drift, clearing its way through, apparently without any difficulty; the snow at the same time flying over the top of the engine chimney, like foam from the broken waves of a violent sea; and notwithstanding this and other similar obstructions, the train came down from Greenhead, twenty miles, in one hour and a quarter, and their times of arrival were properly kept up, whilst all the communications by the ordinary roads were more or less seriously obstructed, if not entirely cut off.

Hence any of the so often proposed plans for sweeping or scraping the rails will rarely be found necessary, much less the plan seriously proposed and patented so late as 1831, of making the rails hollow and filling them with hot water in winter. In the extreme case of rain succeeded by frost, thus forming a coat of ice upon the rails, it will generally be found sufficient to place a waggon, or any other empty light vehicle in front of the engine, which will break up the ice sufficiently to allow of the necessary adhesion. The effect of severe frosts on the road itself will be found of infinitely more consequence, and is an additional reason why drainage should be scrupulously attended to in countries where much cold is experienced. The manner in which frosts acts on common roads, is sufficient evidence of what may be expected on a railroad, if the water is not most carefully carried off from the ballasting.

In America, for instance, where railways were first laid down on blocks, similar to the way they are constructed in England, it was found that their severe winters completely disorganised them; splitting the blocks, throwing the rails out of guage, and even twisting them so as to render them unfit for the passage of the engines, and obliging the trains to travel at a reduced speed. From these causes, and as it was found necessary to relay the road after each winter, blocks have in a great measure been abandoned, longitudinal and cross sleepers being generally substituted, and laid on broken stones filled into trenches; but the evil is yet only partially remedied. It may, however, in all cases, be set down as a general rule, that where timber can be obtained cheap, it should be used in preference to blocks.

The difference, however, is necessarily so great between the railroads in that country and this, as very much to preclude comparison. Some of theirs are constructed of plate rails $2\frac{1}{2}$ inches wide, by half an inch thick, and weighing from 10 to 17 lbs. per yard; their curves and inclinations are such, from the nature of the country, as to render cross ties more frequently required than they are in English railroads. Continuous stone bearings have also been tried in America; also piles at three feet distance, as supports to the rails, which are spiked down to them without the intervention of any chairs.

Several of their railroads are carried across valleys by means of wooden trestles, well braced together, and assisted by piles; the lower ends of which in soft ground are often left square instead of being pointed, as a means of affording additional stability. These sort of roads are in several cases carried over valleys of such a depth, as to occasion no small surprise to those only acquainted with the substantial embankments of England and most other parts of Europe. It must be confessed, however, that the Americans, in the expense of their railways, beat the old country hollow; and there are many things which we should be glad to see copied from them; we may instance their guards in the front of the engine to remove obstacles from the road, and their long and high carriages.

Some of their lines are worked by horses at the rate of 15 miles per hour; and on the locomotive lines, where the curves are bad, the driving wheels are placed next the fire box, and the front part of the engine is supported on a four-wheeled truck, to which it is attached by a vertical pivot, while the weight rests on friction rollers; this management admits of a motion by which the wheels are in a great measure assisted in their passage round the curves, which in some cases have not more than 300 feet radius, whilst in others they have gradients of 1 in 110, and inclined planes rising 1 in 10.

Another striking departure from the method of constructing these works commonly adopted in England, has been introduced by Mr. J. K. Brunel on the Great Western Railway, with a view to an increase in speed, and also to obtain a more solid road, on embankments particularly. Instead of resting the supports of the rails, that is to say, the stone or wood bearings, whether longitudinal or transverse, on the ballasting, where the repairs to the railroad consist in continually packing more ballast under the bearings, as they subside through the weights passing over them, or from the various other causes which affect them, Mr. Brunel has fixed his bearings at certain points, so that they cannot rise up nor go down, whereas in the usual mode of construction, it has only been attempted to prevent them from going down.

Construction of the Great Western.

The guage of the Great Western Railway is 7 feet $2\frac{1}{2}$ inches from centre to centre of the rails, and the width between the two lines is 6 feet. The mode of construction is as follows. (See Plate CCCCXX.) At every 15 feet in length along the railway, beech piles are driven into the ground, at 15 feet distance apart, transversely; they are driven from 8 to 10 feet in cuttings, and in embankments, they are in general sufficiently long to go about the same depth into the original ground on which the embankment stands. These piles are formed to the proper length, and driven in, without any being cut off their heads, which are nearly level with the top of the ballasting, and when this cannot be effected, they are drawn and redriven. They do not stand in the middle of each line of rails, as will be seen by referring to the above measures and the plate, but are nearer each outside rail of the two lines.

To these piles double and single transverse ties, or sleepers, sometimes called transoms, are attached as follows: A square shoulder is cut, $1\frac{1}{2}$ inches into the pile, on one side for the single ties, and on both sides for the double ones; the single ties are 6 inches broad, and 9 inches deep; the double ties are 6 inches broad, and 7 inches deep. They are made of American pine, and when let into the shoulders of the piles, they are securely bolted to them; the double ties are 13 inches, and the single ones 9 inches below the line of rails. On these are laid longitudinal timbers, 15 inches broad, and

7 inches thick; these are also of American pine, and are bolted to the cross ties with screw bolts and washers, the heads of which are countersunk into the longitudinal timbers.

The entire transverse section is horizontal where the railway is straight, and inclined according to the radius in curves; and when the whole is bolted together, it forms what is in fact a road at fifteen-feet bearings. The line is then ballasted, and the longitudinal bearings are packed in the usual manner with fine sand or gravel, till they are raised in the middle from a half to one-third of an inch; they are then planed to a uniform surface, and a plank of elm, oak, or ash, $1\frac{1}{2}$ inches thick, and 8 inches broad, is laid on them, with a copious intervening bed of tar, and nailed down; the heads of the nails being punched in, to allow the plank to be planed; the upper surface of the plank slopes inwards 1 in 20.

The rails are screwed down to the plank and longitudinal bearer, after the former has been planed; with felt underneath them. The whole of the timber is kyanized, and the joints, butts, bolts, washers, keys, spikes, and nails, also the whole of the longitudinal bearers, are tarred. In fixing the rails, square-headed screws are used outside the rails, and countersunk ones inside, to be clear of the flange of the wheels; the outside screw is first completely tightened and then the inner one, a roller weighing about 10 tons being previously drawn several times along the rail, and followed up closely by the screwing.

The principle on which the railway is intended to be constructed chiefly consists in the piles being a constant retaining power, holding the road down against the packing, which would otherwise force it up; so that this latter can be driven much harder in than by the ordinary mode. Mr. Brunel is said to calculate that he throws an upward pressure against the base of each longitundinal timber, equal to one ton per foot forward, or about one ton per square foot. He thus obtains 3 tons for every 3 feet length of rail, while a stone block containing 4 cubic feet, only weighs about a quarter of a ton, which is therefore the pressure with each 3 feet of rail laid in the usual way; neglecting the impact with which the stone block is forced into its seat by the cuddy and lever, a very uncertain quantity, but which perhaps never amounts to, on the whole, less than as 3 : 2 in favour of the longitudinal bearings. The timber used in a mile of this railway, is about 420 loads of pine, and 40 loads of hard-wood; these require 6 tons of iron bolts, and 30,000 wood screws. The rails are about 44 lbs. per yard, and the cost of the first portion, laid from London to Maidenhead, including laying, ballasting, sidings, draining, and all other work, is stated at L.9200 per mile.

Such is the mode of construction on this railroad, which has so much agitated the minds, not only of the shareholders, but of the whole railway public. This, however, ought not to have been the case, for the matter lies in a very small compass, and a short experiment should have determined it; it is merely a question of expense. The first outlay must, of course, be great, and it is only necessary to know whether the future saving will be commensurate with it. A desire for a greater width of guage seems now gradually gaining ground among those best entitled to judge on the subject, and the public will not long rest satisfied with a velocity of twenty miles an hour. Whether Mr. Brunel has taken the right measures to compass these desirable objects, will require much more room to discuss than we have here; but this we know, that the Great Western, for the twenty-three miles now open to the public, is by far the smoothest and easiest line we have ever travelled on.

Velocity of the wheels.

The relative ratio between the motion of the wheels and that of the piston will be much more advantageous at a given velocity as the wheels are large, within certain limits; the greater degree of stability acquired, from the increased width of guage is also desirable, if not carried too far; but we must confess we should ourselves be afraid of jumping from 4 feet $8\frac{1}{2}$ inches, to 7 feet, without more experience. Another company jumped from 2 feet 9 inches to 5 feet in their length of bearing, and the result was sufficiently inauspicious.

The effect of the diameter of the wheels on the velocity of the piston, may be thus computed:

$$\text{Let } \left.\begin{aligned} v &= \text{the velocity of the wheels,} \\ p &= \text{the velocity of the piston,} \\ l &= \text{twice the length of the stroke,} \end{aligned}\right\} \text{in feet,}$$

$m=$ the number of miles per hour the engine travels.

We then have

$$v : p = 3·14159 . d : l,$$

$$\text{or, } pd . 3·14159, \text{ \&c.} = vl,$$

$$\text{and } v = 88m \text{ feet per minute;}$$

$$\text{also } p = \frac{88 . m . l}{d . 3·14159},$$

$$= \frac{28·01127 . l . m}{d}.$$

This for all ordinary purposes may be taken at

$$p = \frac{28ml}{d},$$

with a stroke of 18 inches, or $l=3$ feet, if we take $d=9$ feet, and compute for the different values of m, the values of p, we may derive from them any other values of p, for all diameters of wheels by simple proportion. For the quantity p when $d=9$, our formula becomes

$$p = m . 9·33709,$$

and the table will stand as follows:

Table of the velocity of the piston in feet, when the diameter of the wheels $=9$ feet, and the strokes $=18$ inches.

m	p	$9p$
10	93·3709	840·3381
15	140·0563	1260·5057
20	186·7418	1680·6762
25	233·4272	2100·8448
30	280·1127	2521·0143
35	326·7981	2941·1829
40	373·4836	3361·3524
50	466·8545	4201·6905
60	560·2254	5042·0286
70	653·5963	5882·3667
80	746·9672	6722·7048
90	840·3381	7563·0429
100	933·7090	8403·3810

By means of the column $9p$ we have the value of p for any other diameter of wheel, by simply dividing the number in that column for the required value of m by the given diameter of the wheel; thus, for instance, with a 5-feet wheel, at 20 miles an hour, we have $\frac{1680·6762}{5} = 336·1352$ feet, per minute, for the velocity of the piston. At 60 miles an hour, with the same wheel, we have $\frac{5042·0286}{5} = 1008·4$ feet per minute. In the same way, if we have any other length of double stroke than 3 feet, we have only to take the value of p from the table for the given number of miles per hour, multiply it by 3, and divide it by the length of double stroke in feet, or calling l' the new double length of stroke, and p' the required velocity of the piston in feet per minute,

$$p' = \frac{3p}{l'}.$$

Reports on the Great Western.

Coming now to look at the Great Western Railway in its more general bearings, we may examine the late reports on its construction, which, published as they are by the directors, have the sanction at least of authority to give them weight. We are sorry, however, to say, that they possess none; they have left the main question as undecided as ever, and present little else but irrelevant matter, or that which contradicts itself. Our inquiry will naturally embrace, first, the reports themselves, and, secondly, the experiments on which they rest.

Mr. Hawkshaw's report.

The first is Mr. Hawkshaw's, and this is so completely set at rest in the reply of Mr. Brunel, that no one would require any discussion respecting it. Mr. Hawkshaw states that at the risk of being tedious, he has endeavoured to develope the process by which he has arrived at his "opinions," because he thinks it better that his report should "partake more of the nature of demonstration, than of mere assertion;" and he then informs us that the Great Western Railway, "has been applauded to the skies as wonderful; it has been derided and run down as little less than nonsensical. Now it is neither one nor the other of these." He has not furnished any "demonstration" of this fact, and is much less fortunate in another assertion, namely, that on coming first on the Great Western line of railway, that which immediately strikes the attention is the "enlarged capacity of all things." We have travelled on that line now four times, but are not aware, from our own observation, that all the things which were on it possessed a larger "capacity" than those which we have met on other railways.

Mr. Wood's report.

Coming next to the report of Mr. Wood, we find it stated that nearly all the experiments upon which it rests for its foundation, were made both by and under the superintendence of other persons, and the mere dressing them up, a purely arithmetical operation, has alone been performed by Mr. Wood. To those who are at all acquainted with that gentleman's knowledge of formulæ and figures, this would be quite a sufficient intimation of what might be expected; but, in addition to this, hardly any of the experiments are given in the report, and no formulæ; and thus the only essential things, from which a right conclusion can be drawn, have been withheld from the shareholders. In the meantime the farce has been played out, and the curtain has fallen.

We shall not stop to notice such mistakes as, that one ton and a half is to one ton and a quarter as four to three; but proceed to the tabular matter in the report, selected from all the records which have been taken of the various experiments, we presume, as that which was most worthy of being laid before the directors and the public, as a fair statement of the capabilities of the Great Western Railway as compared with others; and it should be remembered that Mr. Wood sets out by laying down a rule that, unless his inquiries were conducted in such a way, as to "elicit by incontrovertible and practical experiments, the relative capabilities of the two systems of forming and constructing railways," it would "not only be a waste of time, but would be attended with perhaps still worse consequences."

The advantages which have been aimed at in the extension of the guage, from 4 feet 8 inches, to 7 feet, and in Mr. Brunel's other alterations, are principally as follows. A greater speed; a decrease of friction, by enlarging the diameter of the wheels; greater stability, by keeping down the centre of gravity, through the body of the carriages being inside the wheels, and not over them, as in other railways. The main objections made to his system, are the increased cost of forming the railway; the greater weight and size of the engines and carriages; the additional friction on curves; the extra cost of construction both in carriages and engines, and the impossibility of a junction with other railways. It is to strike a balance between these that Mr. Wood has produced what he states as "correct and indisputable results."

On the question of speed, Mr. Wood decides that the less powerful engines on the ordinary railways go within three miles an hour of the most powerful ones on the Great Western, and he presumes from this, that the more powerful ones would exceed the best of the Great Western engines; the effective power yielded by the former being apparently much greater than that which is obtained from the latter. This very extraordinary statement is attributed to the resistance of the air, which Mr. Wood seems to think a new discovery in railway matters, although Newton, Robins, Smeaton, Hutton, Dalton, Pambour, and others, have given it in print from nearly two hundred years ago up to the present day, and practical men have all along considered its effects on railways, whilst theorists alone have stated it to be of no consequence. It is twelve months since anemometers were planned, and estimates obtained for their erection at the stations along the London and Birmingham railway, by the writer of this article, at the desire of Mr. Bury, who has contracted for the locomotive power on that line. With respect to the speed of the Great Western engines, in consequence of those improvements to be expected in all mere mechanical contrivances, and which the usual engines have been ten years benefitting by, whilst those on the Great Western line are yet insufficiently tried, Mr. Brunel states, that since Mr. Wood's experiments, he has so improved the very engine with which the highest velocity was then attained on those trials, that, all other things being the same, her performance was, and is as follows:—

	Load; tons.	Average speed.	Coke per ton per mile.
Mr. Wood, Sept. 1838,	15·9	38½	2·76
Mr. Brunel, Dec. 1838,	40·0	40	0·90

The decrease of friction in large wheels is admitted as well as other conveniences, although it is stated these can be arrived at with a less guage than 7 feet, and 6 inches is given as the maximum increase on the old width requisite for improving the engines. The weight per passenger appears to be the same with the Great Western and the ordinary railway carriages, although Mr. Wood states they have 1½ tons on each wheel, while the ordinary ones have only 1¼. That there is a greater stability and steadiness of motion in the carriages, Mr. Wood denies.

We have now to examine the tables given in this report, containing the incontrovertible experiments which are presented as affording a foundation for the opinions delivered, and it will be quite sufficient for every purpose of testing their value, if we take those on the deflection of the rails and supports on the Great Western and other railways. These experiments, it appears, were made almost exclusively on the short space of about two miles in the clay cuttings near Paddington, undoubtedly the worst part of the road.

Deflection of the rails.

Mr. Wood states that stone blocks afford decidedly the firmest and most unyielding base, and that between longitudinal bearings, the usual sleepers, and the Great Western plan, not much difference of deflection exists. The weight of the engines not being given, we must chiefly confine our observations to the quantity of deflection produced by the coaches, the weight of which, on one wheel, is as 6 to 5 on the Great Western, compared with other railways.

	Engines.		Coaches.	
	Vertical.	Lateral	Vertical.	Lateral.
Great Western in a perfect state.	·13113	·02453	·10517	·02473
Do. with the piles cut.	·0979	·01047	·06923	·00843
Do. with the transoms cut.	·07743	·00513	·0768	·00353

The above are means of three deflections taken at a single transom, a double one, and mid-way between them. Comparing now the effect of coaches on this and other railways, we have as follows:—

	Vertical deflection.
London and Birmingham, 60 lb. parallel rail, 3·75 feet bearings on blocks	·0261
Do. do. 50 lb. fish belly, at 3 feet bearings on blocks	·03277

	Vertical deflection.
Liverpool and Manchester 62 lb., parallel, 3 feet on blocks	·03853
Manchester and Bolton, on longitudinal bearings	·05703
Grand Junction 65 lb., parallels, on blocks, 4 feet bearings	·0301
,, the chair under the rail	·0149
,, the block under the chair	·0714
,, 65 lb. parallels on sleepers	·10293
,, the chair under the rail	·0717
,, the sleeper under the chair	·0511

	Engine.	Coaches.
Grand junction, lateral deflection on blocks, rail	·01615	·01
Do. do, chair	·0200	·0135
Do. do, block	·0053	·0007
Do. on sleepers rail	·0188	·012
Do. do, chair	·0112	·077
Do. do, sleeper	·0125	·008
Do. on longitudinal timbers rails	·02985	·0221
Do. do, chair	·0387	·0265

From the tables in the report whence we have formed the above means, we find that a 60 lb. parallel rail at 45 inches bearing, deflects only ·0261, while a 62 lb. parallel at 36 inches bearings, deflects ·03853, and a fish-belly at 36 inches bearing, and 50 lbs. in weight, only deflects ·03277.

In the 50 lb. rail upon blocks, at the joint chair, there is more deflection than in the middle of the rail, and about three times as much as at a single chair with the weight of a coach; whereas, in the 60 lb. rail, the deflection is more at the single chair than at the joint, but, in this case also, it is least in the middle of the rail with a coach. In the 62 lb. rail it is also greater at the single than the joint chair, and less in the middle of the rail than at the single chair.

In the Manchester and Bolton experiments, the rail deflects more than the timbers at the transoms and joints, but in the middle, the timber deflects more than the rail. With the 65 lb. rails, either on sleepers or blocks, the deflection is considerably more, either with an engine or a coach, at the chairs than mid-way between them; and whilst the rail only deflects ·0301, and the chair which supports it less than half this, namely, 0149; the block which supports the chair deflects five times as much as the chair itself, namely, ·0714. These are called incontrovertible experiments.

In addition to this, Mr. Babbage, no mean authority, who has seen the original records of the experiments, which the report made to the directors does not contain, states in his speech at the meeting of Great Western proprietors, held on the 9th January 1839, that with respect to the increased power required through the resistance of the air, that instead of 15 per cent. being necessary to gain an increase of speed of 3 per cent., it turned out that from the use of the same formula, and the same experiment whence Mr. Wood had deduced the above results, that the increased power required was only as 2 to 1, instead of 5 to 1, as stated by Mr. Wood.

Resistance of the air.

It is astonishing to see what mistaken ideas many persons have entertained amongst the proprietors of this railway. One stated that although the resistance of the air might have been known, yet, it was never taken into consideration at such speed as had now been attained in railway travelling. What, then, becomes of the experiments of Robins and Hutton, which upset the ancient parabolic theory of projectiles, and established the present practical system of gunnery; the deduction of these writers were carried up to velocities considerably greater than that in which air can rush into a vacuum, that circumstance forming one great guide in establishing their results.

Another person wished to know, when such a very great advance had been made by Mr. Brunel in so short a time, by which, with fully one-third less fuel the load drawn by the North Star engine, was increased from 16 tons to 40, at an increase in velocity also; why the same could not be done with all other engines upon narrower railways, and thus an equal effect produced with a much less costly mode of construction. The simple answer to which is, that on the railways with the original guage, the engines have been made gradually more and more perfect up to their present state; whereas on the Great Western, this has yet to be done. Mr. Brunel, in the above improvement on the North Star, has not made any new discovery in the organization of a locomotive; he has has only brought its mode of operation nearer to that which is in action on other lines of railway.

Other persons have said, that granting Mr. Brunel does obtain the speed and power he has anticipated, his engines will then do too much, that passengers will never be found to assemble in sufficient numbers to fill such heavy trains, and that consequently all the extra cost of the new system will in the end be thrown away. This argument is no more tenable than the others, and throughout the whole inquiry there appears a lamentable want of nearly every requisite for coming to a right conclusion; even the instruments used in the experiments are inadequate for that which they were intended to shew; of those used to ascertain the motion of the carriages, Mr. Babbage states, that having tried three similar ones of different lengths merely, he could make each of them tell different stories, and whichever he pleased give the greatest result; also that when he tried the very same instrument used in the experiments of Mr. Wood, instead of finding any thing like corresponding measures of the oscillations, his so grossly exceeded those which formed the basis of the report, that they were beyond all magnitude; and after travelling 120 miles in those trials, he came to the conviction that every thing in the shape of an experiment connected with that instrument, must be thrown overboard.

Unsatisfactory result of the experiments on the Great Western.

No inquiry, in fact, could have ended more unsatisfactorily than have these experiments on the Great Western railway; and their records, which should, above all things, together with any formulæ used, have accompanied the report, were not published with it. This is the most unfortunate error of all; for as they were chiefly made by other persons, and not by Mr. Wood, they require to be examined, first, as to their correctness as experiments, and secondly, as to how they have been dressed up to produce to the proprietors. In the first case, there might be some little difficulty, but in the second, every proprietor could have judged for himself, and he ought to have had the means put in his hands to do so. Strange to say, too, Mr. Wood has quarrelled with his own report, and declares he made the North Star engine do just the same as Mr. Brunel has done. Why then did he not publish this himself, instead of giving a very different experiment, after placing which in his own report, he blames the directors for sending it forth to the public?

The whole of the proceedings in this discussion serve to shew, as we have before stated, that it is high time some government measure was brought forward to regulate, at least, the general principles of railways; many persons are afraid of this interference with what is justly considered private rights, but to these we would say, that on several of the leading lines in England, a far worse oligarchy now exists than can be called into operation by any measure of government, thoroughly sifted as it would be in parliament by the numerous members of both houses who are interested so many ways in the right management of these important concerns.

Summary, with remarks.

The result of the Great Western discussion is as follows: The unanimous abandonment of the piles; the substitution of a larger scantling of timber and a heavier rail; and the retention of the wide guage and continuous bearings. As far as the railway public are concerned, they will be but little affected by this. The rails are much too light and want depth, and their shape should be the subject of properly conducted experiments. The guage being retained, all the necessary information relative to its efficiency and economy, will, no doubt, in time be made known. The question of longitudinal or transverse bearings is of much less import than is generally imagined. The part of the line on piles between London and Maidenhead, twenty-three miles, if it be retained and kept in good order, will soon set at rest the question of expense in maintaining the way. Thus, then, so far as the public are concerned, all is well; but the effect of this decision on the interests of the proprietors has received no light whatever; there is nothing even to shew that in adopting a heavier rail, there is the slightest necessity also to adopt a greater scantling of timber; and it is extraordinary that a point so easily submitted to experiment and calculation, should have been entirely passed by in the final report to the proprietors.

We have hitherto looked principally to the construction of a railway; there is, however, an equally important point to be considered, and that is, the working of it after it has been constructed. On this will mainly hinge the degree of profit which may be expected; for, let all our previous instructions be duly considered and properly followed out, with such deviations only as may be rendered necessary by local circumstances; or let a railway be constructed in the best and most advantageous manner, yet it will soon be discovered that, if it is not worked on a sound and effective system, it will turn out a vastly different speculation to what it would be under proper management.

For this purpose every thing should centre in one committee of directors; these may with advantage subdivide themselves into smaller bodies, for particular purposes; all business transacted by these subdivisions being merely preparatory, and nothing being finally concluded till brought before the general body. There should be no boards of direction at each end of a line, but that terminus which is best situated to effectually overlook the whole of the various business, should be made choice of for the seat of government. There should be ample inspection into every department, but it should be inspection only; all orders should come from one committee, and through one general head. It may often happen, and always with advantage, that both ends of a railway may be opened before the middle is finished; still every thing should centre at the governing end of the line, at one point; and the mode by which this government should be carried on, must now be considered a little more at large.

System of management.

The first question which arises is, by what system can a joint stock company be so managed as to obtain the same amount of alacrity, vigilance, and industry in its service, as characterises the conduct of individuals when acting for themselves, and to combine with these qualities an honest and economical administration. The system of management by boards of directors has stood the test of considerable experience, and, where the proper men are found for directors, this system is admirably adapted to answer the primary object of a board, viz. to deliberate and decide on principles. More information and greater variety of view is brought to bear upon a subject when it is discussed by several men, than almost any individual intellect could furnish; and, as joint-stock companies consist of persons in almost all classes of society, a board composed, as it should be, of individuals holding a large amount of stock, and giving their services gratuitously, for that reason, as well as from a sense of public duty, by embodying various interests, claims and secures the confidence of all.

It is well known, however, that a body consisting of many individuals is utterly unfitted for executive functions. It is admitted as a principle, that executive administration is best and most efficiently exercised by one and one only, and, accordingly, every board, whether of government commissioners, or of joint-stock companies, or of charitable institutions, has some one to whom is entrusted the executive superintendence, and control of that, whatever it be, on which the board exercises its legislative and judicial functions. Connected with this executive are other officers, many or few, exercising a separate jurisdiction over their several departments, and in all details independent, yet held together, for the purposes of combination, by the executive officer.

In the management of railways, such an officer is more especially required where the heads of departments are necessarily numerous, in consequence of the several branches of business into which the working of a railway is divided; where each department employs a considerable number of men, two alone, those of the police and porters, amounting almost to a regiment, and where all are to be brought to act with the precision and regularity of a steam engine. It would be impossible to produce unity of action amidst such conflicting elements, without a close, active, and unremitting personal superintendence, such as may be accomplished by an individual, but can never be effected by a board.

Several attempts at a different system of management have been made by railway companies, but they have not been found to answer. A favourite project has been much talked of lately, viz. that a committee of three should be chosen from the body of the directors, in which triumvirate should reside all administrative and executive functions, and so much of the deliberative and judicial as relates to the ordinary affairs of the company, and that each triumvir should receive a salary sufficient to command his whole time for the company's service, the chairman receiving a higher remuneration than his colleagues. The advocates of this plan contend, that it would first secure unity of action in the principles of management, with prompt execution in the details, a ready redress of grievances, and remedy, or rather prevention of abuses. Secondly, that it would give the personal responsibility of a few to the proprietors, in place of the collective responsibility of many; and, thirdly, that it would keep in check the undue power and influence which, under a different system, the executive officers would be likely to acquire.

This view appears more plausible than sound, more specious than solid. In the first place, the triumvirate would monopolize the whole power of the company, and the board would go to sleep. The board of which the triumvirate form a part, would meet too seldom and know too little, to be a match for three men, who would act together every day and know every thing, and who, above all, would enter into debate with the larger body, and vote as directors upon questions affecting their own conduct. It has always proved a thoroughly vicious system to have an executive officer a member (as in many boards he is) of that body, whose orders he is to execute, and to whom he ought to be responsible; and this applies to the triumvirate.

In the second place, the responsibility of each triumvir would merge in the collective responsibility of the whole board, and men would be exercising a power for which, practically, they could not be called to an account; for, when the board had confirmed an act of the triumvirate, what chance would the proprietors have to make them accountable? The results of irresponsible authority, it is well known, are jobbing and every sort of peculation.

In the third place, it is not likely that three men chosen out of a body of directors, would be the men best fitted for the situations contemplated. Not only is the number out of which they would be chosen too few to present sufficient of the peculiar ability required, but the selection of the individuals would be rather determined by personal predilections than by their fitness. It would be an appointment to be canvassed for, and the men who would take the most pains to get it, would be just those least suitable for it.

It will be readily seen, also, that under such a triumvirate no really good officer could act. The perpetual meddling with matters they know little about, the jealousy of their authority, and the necessity to be busy in order to give a colour to the notion that they do work, which would inevitably belong to such a body, would disgust an officer who knew his duty and wished to do it, and they would be left to perform the business with none but subordinates. So far, then, from attaining the advantage contended for, a triumvirate committee of management constituted on the above plan, would tend to greater evils than those sought to be remedied by it. The old Navy board, abolished by Sir James Graham, is a case in point: this board was an executive one, and yet subordinate to the admiralty, and the natural consequence followed; they were continually working against the orders they received from the superior board, in order to carry out their own plans, not openly, but covertly; there was, in fact, a constant under current of opposition, from which the business of the country notoriously suffered.

If, indeed, the proprietors of any railway would agree to invest the whole power of management in three commissioners, chosen from the country at large, as the fittest men to be found, making them responsible to the proprietors assembled in general meeting, and assimilating this triumvirate as nearly as possible to a government board, more favourable results might be anticipated than from any other plan; but how should any company get three paid commissioners, who are not proprietors, to look sufficiently closely to the economy, out of which a good dividend should arise?

System of direction.

The conclusion, then, is, that the present system of direction is, on the whole, the most suitable for managing a concern, whose nature is commercial, and the end of which is the realising of a profit to the proprietors, upon a money investment. A very important principle, however, is too much lost sight of in the composition of boards of directors. The practice is, for the same persons to be selected year after year, till all sense of responsibility to the constituent body is lost, and the board becomes an oligarchy, of a spirit akin to the old self-elected municipal corporations, the members losing year by year their interest and sympathy in the views and feelings of their constituents, and yet prone to consider them as identical with their own.

For this the appropriate remedy is, periodically a new infusion into the direction from the body of the proprietors, and for which parliament has in most cases provided, by requiring a certain portion of directors to retire every year. If the proprietors give common attention at their general meetings, and are careful to select for directors the fittest men, not allowing the re-election of retiring directors to take place, as a matter of course, they will find their interests as well secured under the system recommended, as they are likely to be under any other, namely, one general board and an efficient executive officer. We should always recommend one thing, which is, that the half-yearly reports should be printed and sent to the proprietors, at least a fortnight before the general meeting.

Progress made in the science of locomotion.

If we look back at the rapid progress which we have made in the science of locomotion during the last half-dozen years, and at the degree of comfort and accommodation which, in conjunction with rapidity of transport, have been afforded to the public, at in most cases so very moderate a cost, the strides by which we have attained our present advanced position, are certainly sufficiently gigantic; but if we look forward, it requires but little of the gift of divination to perceive, that in a very few years more, a still greater change will take place, more particularly in the essential article of comfort. In conducting a mode of transit so essentially new, and in which all our previous machines and appliances had to be completely reorganized, and numerous inventions of almost every kind were to be produced at a moment's call, to meet the various difficulties and wants which were continually arising out of such a novel mode of conducting the business of travelling in what may be called the wholesale way, it has been singularly fortunate, that in almost every instance, the various railway companies have kept on the safe side, that is to say, they have not done too much. They have erred on the best side they could commit an error on; they have been too cautious. It seems as if it required a certain time merely to travel at twenty miles an hour, and let the mind sober down a little before much else could be attempted. This feeling may now be rapidly expected to give way, and we shall find that as confidence is acquired, all the requisite arrangements will become consolidated in much more perfect and improved forms.

Fares.

There is nothing now which ought to be more attended to by railway companies, than keeping their fares down; and this has in most instances been very much neglected. When parties possess such a complete monopoly as a railway, they should be particularly careful not to shew it. The expenses in many instances are certainly very great, and the companies have much to suffer in their progress through Parliament, and the rough grinding they have generally received from the rapaciousness of landowners. Accidents, too, must happen, estimates will be exceeded, and these sources of expenditure must be met by a corresponding rate of price; but when the railways are made, the feeling seems to be too general amongst some of these proprietors, that this is the moment for making reprisals upon the public for all losses, vexations, mishaps and mistakes.

In some cases railways have charged more for the carriage of passengers than the stages or mails did, trusting to beat them on the question of time only. In part the receipts are great; a certain sum must be set aside for a good dividend, and the rest is to be spent somehow or other. The same thing is observable in the statistics of the road trusts, many of them largely in debt, yet spending their money on fancied improvements, instead of getting out of debt, and then lowering the tolls.

The effect of this on travelling is fully shewn in the report of the Irish Railway Commission. For instance, the travellers from Brussels to Antwerp by railway in the year 1836 were 872,893, whereas those on the Liverpool and Manchester Railway for the same year were only 522,991, being the largest number for any year since the opening. Now, the population of Brussels, Antwerp, and Mechlin was 209,200, whilst that of Liverpool, Manchester, and Warrington was 486,812, considerably more than double, or the ratio of population was as 2·327 to 1, whilst that of the travelling was only as ·599 to 1. We must seek for the solution of this problem in the respective fares of the two companies. In the Liverpool and Manchester Railway, Mr. Pambour states, that there are 13 first-class trains to 16 second-class; and as the last class hold most passengers, suppose we omit the mails, and say $\frac{13\times5\cdot5\text{s.}+16\times4\text{s.}}{29}=\frac{135\cdot5}{29}=4\cdot6724$ shillings, the average fare. We have no means of ascertaining the numbers on the Brussels railway, but if we take the dearest and cheapest, and compare them in the same ratio as we did the others, we shall have $\frac{3\cdot50\times13+1\cdot20\times16}{29}$ $=\frac{64\cdot70}{29}=2$ francs 23 cents per passenger on the average, or about 1·784 shillings, or 4s. 8d. in the one case, and 1s. 9¼d. in the other, or, allowing for the value of money in the two countries, about double the price; and this double price is accompanied with only one-fourth of the travelling, the ratio of population to that of travelling being very nearly 4 to 1. A still stronger case is that of the Paisley canal, where the fly-boat fare is 1d. per mile. Here, with a population of 262,725, the passengers in 1835 were 373,290, whilst in the same year, with a population of 486,812, the Liverpool and Manchester railway had only 473,849 passengers. The railway company from Paris to St. Germain's has tried the experiment of low prices with complete success; their greatest reduction of fares was at the station of Nanterre, where they were lowered from 7½d. to 5d., and the result was, that twelve days, ending the 4th December 1838, at the low fares, compared with twelve days ending November 22, at the high ones, shewed an increase of 839 passengers; and although the diminution in price was 34 per cent., the increase in the amount received was 16½ per cent. We therefore strongly recommend that fares should be moderate, or it will form the best plea in the world for the establishment of competing lines; and it should be remembered that railways will to a certain extent drive vans and waggons off the road, which were the ordinary vehicles for the travelling poor, and they ought to have a substitute, if it were merely an open box without seats. Soldiers are generally conveyed at 1d. each per mile, and their baggage at 3d. per ton per mile; this is less than half what is charged on some railways in second-class carriages.

General system here laid down.

The general system of working a line, which we have here laid down, is that which is adapted for a first-rate railway. On secondary lines it will perhaps be necessary to place several of the departments under one person's superintendence, instead of having a head to each; but as this would be merely on the score of lessening expenditure, it should not be resorted to without there be a rigid necessity for it. On short lines this necessity will exist. When this is the case, one person might take the coaching department, goods' department, and the police, porters, and guards; the disbursement clerk might be dispensed with; one engineer might take the locomotive department, the construction and repairing department, and also the maintenance of the way, having good foremen in each case. But it is so much better to have a responsible head in every department, that we should always recommend that course to be adopted whenever it is practicable, that is to say, whenever the income of the company will allow it. It may, however, well deserve consideration, in every railway establishment, whether, at each of the stations of every kind, it would not save a considerable expense to have the parties, or a part of them, sworn in as police, so that they might on occasion act in either capacity. Attention to the number of entrance and exit gates, in planning out the stations, will also conduce to economy, as each of these will in general require an attendant policeman. There are numerous other means by which, in the middling and smaller class of railways, a moderate expenditure as well as a good arrangement, may be combined; but so much depends on the localities, together with the nature and extent of the traffic, that nothing definitive can be pointed out, except from a careful consideration of these; and the best step which the directors of all railways can take previous to forming any system whatever, is to consult a properly qualified and experienced person, both as to general principles and as to details.

EXPLANATION OF THE PLATES.

Plate CCCCXX. fig. 1, is a plan of a sliding rail and eccentric for a crossing or siding place. The eccentric being attached by rods to the sliding rails (which move on a joint at the opposite end) draws them to either line, as required.

Fig. 2 is a longitudinal, and fig. 3 a transverse section of the same.

Fig. 4 shews a plan and section of a fixed point.

Fig. 5 shews the general arrangement of the whole of the preceding figures, to form a complete crossing.

Fig. 6 is a plan, fig. 7 a longitudinal, and fig. 8 a transverse section of the mode of laying the blocks, sleepers, and rails in an excavation, together with the ballasting, and an approved method of drainage. The blocks are shewn as laid diagonally in the manner they have been on the London and Birmingham Railway. The drains are of brick.

Plate CCCCXXI. fig. 1, is a mail carriage, as at present used, with its imperial.

Fig. 2 a side, and fig. 3 an end view of a first-class carriage.

Plate CCCCXXII. fig. 1, shews a close second-class carriage, with brakes which are worked by the handle at the top of the right hand end.

Fig. 2 is a plan of the buffer and draining apparatus for the first and second-class carriages, and the mails.

Fig. 3 is a third-class carriage, and fig. 4 a plan of the drawing apparatus. In these carriages there are no buffer springs, but merely blocks at each end of the body. On some railways, the second-class carriages shewn here are not used, but the third-class, with the addition of a roof, is called the second-class. When this is the case, the ends are generally closed, but the sides are left open.

Fig. 5 shews a different form of buffing apparatus used on the Dublin and Kingston Railway; the buffer rod goes the whole length of the carriage, having a similar head and spring at the other end.

Plate CCCCXXIII. figs. 1 and 2, are an end and side view of an approved earth waggon; and figs. 3 and 4 shew another which has been very generally adopted. The brakes are shewn in both.

Plate CCCCXXIV. fig. 1, is a ground plan of the London and Birmingham Railway engine-house at Birmingham, shewing also the mode of laying on the water; *a, a, a* are the main water pipes; *b, b, b* air vessels placed over the main pipes, to prevent the ram of the water when the cleansing and forcing cocks are shut suddenly, which, with a considerable head of water, would endanger the breaking the pipes; *c, c, c* cleansing and forcing cocks; these have strong hoses attached to them, by means of which an engine standing over the cleansing pits *d, d, d,* may be worked, and the boiler cleansed, and also filled when the steam is up, the usual force of water on the jet being 78 lbs. 10 oz. to the square inch; *e, e, e* lines of rails from the central turnplate to each engine pit.

Fig. 2 is a sectional view of the guard pipes through which the water mains are taken, when they cross the lines of rails as seen in fig. 1, in order to prevent damage to the road from leakage or accident. They also admit new pipes being laid down without disturbing the rails; *a* is the iron guard pipe; *b* the water main; *c* manhole for an entrance to the guard pipe; under this, at the lower part of the man-hole, is a drain to the nearest culvert.

Fig. 3 is a general plan of a siding on each side of the main lines, and also of a crossing from one line to the other. See also Plate CCCCXX. figs. 1 to 5.

Fig. 4 shews the rope as attached to the working wheels in the fixed engine-house at Camden Town, on the London and Birmingham Railway, by which the trains are drawn up from Euston Square. To obviate the effects of the atmosphere on the rope, a tightening wheel, travelling on a railway, as shewn in fig. 5, is used, from which a heavy weight is attached by a chain, and hangs in a well; by this means there is always an equal tension on the rope. The running sheeves on inclined planes should be very well fitted, and nearly all noise will be prevented by covering their working edges with netting.

Plate CCCCXXV. fig. 1, is a vertical section of a water crane; *a* the lever for opening the upper valve inside the tank; *b* the tank; *c* a compartment to be filled and warmed by the exhaust steam from the pumping engine, so as to warm the water before it is filled into the locomotives; the escape steam from the safety valve also is blown into the compartment *c; d, d* the ends of the boilers; *e* the supply pipe, fitted with a stuffing gland at the top at *f,* where it enters the tank to allow for expansion; *g* the continuation of the supply pipe, which goes to the crane on the opposite line of rails; the blank flange has a cock at *h,* by which the pipes can be emptied and cleaned, also to prevent the water freezing.

Fig. 2 is an end view of the part *h; i* the crane turning in a gland at *k,* and a collar at *l; m* the brace of the crane; *n* the gib of the crane; *o* hose of the supply valve for filling the engines; *p* a leather hose to conduct the water. When the fall of water is high, these cranes must be very firmly fixed, or else instead of a supply valve on the gib, they must be fitted with a sluice cock fixed in the horizontal portion of the pipe; *s, s* the line of rails. When not in use, the cranes are turned round flat against the wall *t,* to which they are fixed.

Fig. 3, plan of an invalid carriage; *a, a* the seats; *b, b* doors leading into the passage *d; c, c* apartments containing portable water-closets; *c′* do. containing a urinal; *d, d* passage from each body to the water-closets; *e* door to urinal; *f* and *g* doors to the water-closets.

Fig. 4, plan of a smoking carriage, having seats (*c*), in the direction of its length, and a place (*a*), fitted with shelves for the attendant to keep cigar boxes, soda water, &c.

Fig. 5 is an elevation of a mile mark; the numbers are either painted on glass, or cut out from sheet iron; the box at the top contains a lamp, which will shew the miles by night.

Plate CCCCXXVI. fig. 1, elevation and section of a water apparatus for washing the carriages, as constructed on the London and Birmingham Railway; *d* air vessels to prevent the ram when the cocks are shut suddenly; *a*, *a* saddle cocks fitted with hollow plugs, one of which is shewn detached at *g*; *c*, *c* hollow space to be filled with charcoal, as a security against the water being frozen; *b* the connection with the feed pipe by means of a union joint; *e* the feed pipe; *f*, *f* holding down pins.

Fig. 2, elevation of the west end of the great Blisworth cutting on the London and Birmingham Railway, shewing the method of undersetting the rock.

Fig. 3 is a section of the side walls at the same place; the left hand side shews a section of the wall in the recesses, and the right hand side shews the same through a buttress, together with the invert and drains.

Fig. 4 is an elevation of fig. 3.

Fig. 5 shews the method of drawing bridges to answer both for cuttings and embankments. The left hand side is for a cutting and a bridge over the railway; the right hand side is for an embankment and a bridge under the railway.

Fig. 6 is a plan of the fixed engine-house at Camden Town, on the London and Birmingham Railway, where the trains are drawn up from Euston Square. There are four lines of rails for a double railway, between these and the stairs leading down to the engine-room, on each side of which are the boiler rooms, with receptacles for fuel, &c. The working wheels for the endless rope are in the engine-room, and the well and tightening sheeve behind it. The mode of working these is shewn on a larger scale in Plate CCCCXXIV. figs. 4 and 5.

Plate CCCCXXVII. fig. 1, plan of a station; *s*, road to the booking offices; *d*, building, containing booking offices, waiting rooms, and the offices requisite for the general railway business; on the opposite side of this building, on the road *s*, is the departure platform, and line of rails which go to the left; *e*, the first class carriage house; *f*, the second-class carriage house; *g*, the stables for the goods' station; *h*, the goods' waggon house; *c*, the gullet for embarking horses and private carriages; *i*, the engine house; *p*, coke store, with tank over it; *m*, store-house for the engine department; *k*, repairing house and engine manufactory; *n*, lathe room; *t*, road next the arrival stage to the town for the passengers inwards; *b*, offices for goods and general store department; *q*, *q*, goods' arrival and departure sheds, with roads, *t* and *s*, to and from the town; *a*, the point from which the engine tows in the goods' arrival trains with a rope; *r*, workshops, lodging houses, &c.

Fig. 4, another plan of a principal station in which turnplates are required; the same letters refer to the same things.

Fig. 2, an elevation, and fig. 3 a plan of the fittings to a booking office; *a*, *a*, the counter; *b*, the clerks for booking second-class passengers; *c*, the clerks for booking first-class passengers. The first-class passengers enter by the right hand door c', and having received their tickets, pass through c'' to the door c''', which leads to the first-class working room and the platform. The second class passengers enter by the left hand door b', and in like manner pass through b'' and b''', which leads to the second-class waiting room and platform.

Plate CCCCXXVIII. *Turnplates in plan and section, with details.*

Fig. 1, the plan; fig. 2, the section; fig. 3, elevation of the frame; fig. 4, catches; these should have long handles to lift them by; fig. 5, elevation of roller and turnplate on it; fig. 6, the roller; fig. 7, section of the roller; fig. 8, provision to lock the plate when required, by inserting a bolt through the plate and frame.

Plate CCCCXXIX. *a*, the steam whistle which is made use of to warn workmen on the road, and persons on the stations, when the engine is approaching; *b*, an elevated dome, up which the steam pipe rises to nearly the top, to prevent the motion of the engine throwing water out of the boiler. This dome, when taken off, forms the man-hole; *c*, working safety valve, the lever of which is attached to a spring weighing-machine; *d*, lock-up safety valve, which is screwed down to the required pressure by a series of springs; *e*, chimney; this generally has a wire guage at the top to prevent the escape of sparks, and sometimes a damper to regulate the force of the blast-pipe; *f*, smoke box, in which are the cylinders, the end of one of which is seen at *g*, with the cock *h*, which is to let out condensed water or priming from the cylinder. There is a large door in the front of the engine, opening into the smoke-box, to allow of repairs being made to the cylinders, tubes, &c. inside; *i*. *i*, *i*, three guage cocks, to ascertain the height of the water in the boiler; *k*, water guage, shewing in a glass tube the height of the water in the boiler. This guage communicates by a cock at the top with the steam, and by one at the bottom with the water. It also has a second cock at the bottom, for the purpose of emptying it when necessary; *l*, steam regulator, by turning which, the steam is shut off, or let into the cylinders; *m*, railing round the place where the engine-man and fireman stand; *n*, fire box, containing the furnace, round which a thickness of about three inches of water circulates from the boiler; the top is also full of water to the height of that in the boiler; *o*, supply pipe connected with the tender, from which water is pumped in at pleasure by means of the pumps *p*, which are worked by arms fixed on the piston rods, and running in guides; *q*, the handle which turns the pet cock; this is used by the engine-man to ascertain when his pumps are in proper order, in which case it throws out water, but when they are deranged it gives out steam; there is one on each side of the engine; *r*, cock by which the boiler is emptied, and the engine blown off. Plates also take off at the bottom of the boiler, and open into the mud-holes, which are also used to clean the engine internally; *s*, *s*, strengthening rods to the frame-work of the engine; *t*, *t*, stays from the framing to the boiler; *u*, draw-box to which the tender is attached; *v*, door to the furnace; there is a similar one to the lower part of the fire-box, which is formed into the ash pit, and is open to the front for the purpose of increasing the draft; *w*, the frame-work of the engine. Some makers place this with its breadth horizontal instead of vertical, and Mr. Bury of Liverpool has his bearings inside the wheels instead of outside; *x*, *x*, the axle guards which play up and down in grooves in the sides of the axle-boxes; *y*, hook for attaching carriages to the foremost end of the engine; there is a similar one on the other side; *z*, the buffer.

The lower part of the boiler has a number of brass tubes running through its whole length, through which the flame and hot air rush in their passage to the chimney, up which the steam, after it has performed its office in the cylinders, is thrown through an iron pipe called the blast pipe. This is one of the most essential of all the improvements of the locomotive. The boiler is cased with wood, to preserve the heat as much as possible; its tubes last about two years, and cost about L.1 each.

The steam pipe, by which the steam is conveyed to the cylinders, is divided into two after it enters the smoke-box, and one goes to each cylinder; these are all made of copper, and the entrance and exit of the steam into the cylinder is regulated by slide valves worked by eccentrics on the cranked axle, which move levers fixed to the weigh bars. The pistons are formed of metal rings in several divisions, so placed as to break joint. The piston rod is fixed with a joint to the connecting rod; and this last gives motion to the cranked axle, having its end next the piston rod fixed to the cross heads, each end of which work in guide blocks, thus causing a parallel motion in the piston rod.

The cranks are placed at right angles to each other, to enable the engine to get over her casters; one piston thus works at the greatest advantage, when the other is at the least. By the eccentrics on the crank axle, and a series of levers, the slide valves are continually worked backwards and forwards with the engine, and this motion can be reversed instantly, so as to cause the engine to go in the opposite direction when required; this is done by means of the long handle near the fire box, which moves against an arc having three notches in it; when the handle is placed in the upper or lower notch, the engine goes either forward or backward, and when in the middle, the slide valves no longer work. There are many modes by which this is arrived at by different makers, and there is generally two starting handles, by pulling which the slides can be worked by hand; these are constantly in motion while the engine is going.

Proper cups containing oil are placed over each of the working parts, so as to ensure a steady and constant supply of oil to every moving portion of the engine. These cups have a tube inside them, which leads through to the part which is intended to be supplied with oil, and a cotton wick is put through the tube, one end of which hangs over the top into the oil cup, and thus acts as a syphon. The axle boxes are filled with grease, and have a cover on the top to ensure a proper lubrication of the axles.

Inside bearings are often used to strengthen the engine, and ensure its correct action; they also steady the cranked axle against the horizontal force of the piston rods. The whistle is formed by a pipe through which the steam is allowed to pass at pleasure, by turning a cock; it then rushes against the thin edge of the upper domed part, which is hollow like a bell, and gives out a clear sound when the cock is properly turned, which may be heard at a very great distance.

The buffers consist of leather cushions stuffed with horse hair, and their use is to break the shock arising from any concussion which the engine may receive. Each of the wheels has a cover, called a splasher, placed over them, to prevent their throwing the dirt from the rails into the machinery. Sometimes two pair of wheels are coupled together; this gives more adhesion, and is generally done to goods' engines only, which also have usually their wheels of less diameter than those used for passenger trains, velocity being not so much an object as power of draught. Mr. Stephenson does not now make his engines with any flanges on the middle pair of wheels. (B. H.)

Rain.

RAIN, the descent of water from the atmosphere in the form of drops of considerable size. By this circumstance it is distinguished from dew and from fog. In the former the drops are so small that they are quite invisible; in the latter, although their size be larger, they seem to have very little more specific gravity than the atmosphere itself, and may therefore be reckoned hollow spherules rather than drops. This subject will be found fully discussed in the articles on METEOROLOGY, PHYSICAL GEOGRAPHY, and WEATHER.

Preternatural RAINS. We have numerous accounts, in the historians of our own as well as other countries, of preternatural rains; such as the raining of stones, of dust, of blood, nay, even of living animals, as young frogs, and the like. We cannot doubt the truth of what authors of veracity and credit relate to us of this sort, nor can we suppose that the falling of stones and dust never happened; the whole mistake consists in supposing them to have fallen from the clouds. But as to the blood and frogs, it is very certain that they never fell at all, and the opinion to the contrary has been produced by a mere deception of sight. Men are extremely fond of the marvellous in their relations; but the judicious reader must examine strictly whatever is reported of this kind, and not suffer himself to be deceived.

There are two natural methods by which quantities of stones and of dust may fall in certain places, without their having been generated in the clouds or descended as rain. The one is by means of hurricanes; the wind which we frequently see tearing off the tiles of houses, and carrying them to considerable distances, being equally capable of raising a quantity of stones, and dropping them again at some distant place. But the other, which is much the most powerful, and probably the most usual way, is by the eruptions of volcanoes and burning mountains tossing up, as they frequently do, a vast quantity of stones, ashes, and cinders, to an immense height in the air; and these, being hurried away by the hurricanes and impetuous winds which usually accompany such eruptions, and being in themselves much lighter than common stones, from being half calcined, may thus be easily carried to vast distances, and there falling in places where the inhabitants know nothing of the occasion, cannot but be supposed by the vulgar to fall on them from the clouds. It is well known, that, in the great eruptions of Ætna and Vesuvius, showers of ashes, dust, and small cinders, have been seen to obscure the air, overspread the surface of the sea for a great way, and cover the decks of ships; and this at such a distance, that it might appear scarcely conceivable they should have been carried so far: and probably, if the accounts of all the showers of these substances mentioned by authors were collected, they would all be ascertained to have fallen within such distances of volcanoes, whilst, if compared as to the time of their falling, they would be found to correspond in that also with the eruptions of those mountains. We have known instances of the ashes from Vesuvius having been carried thirty, nay, forty leagues; and peculiar accidents may have carried them still farther. It is not to be supposed that these showers of stones and dust fall continuously in the manner of showers of rain, or that the fragments or pieces are as frequent as drops of water. It is sufficient that a number of stones, or a quantity of dust, fall at once on a place, where the inhabitants can have no knowledge of the point whence they came, and the vulgar will not doubt their dropping from the clouds. Nay, in the canton of Berne, in Switzerland, the inhabitants accounted it a miracle that it rained earth and sulphur upon them at a time when a small volcano terrified them; and even whilst the wind was so boisterous, and hurricanes so frequent, that they saw almost every moment the dust, sand, and little stones torn up from the surface of the earth in whirlwinds, and carried to a considerable height in the air, they never considered that both the sulphur thrown up by the volcano, and the dust, sand, and stones carried from their feet, must soon afterwards fall somewhere. It is very certain that in some of the terrible storms of hail, where the hailstones have been several inches in circumference, there have been found, on breaking them, what people called *stones in their middle;* but these observers need only to wait the dissolving of one of these hailstones, to see the stone in its centre also disunite, it being formed merely of the particles of loose earthy matter, which the water, exhaled by the sun's heat, had taken up with it in extremely small molecules, and this serving to give an opaque hue to the inner part of the congelation, to which the freezing of the water alone gave the apparent hardness of stone.

Preternatural Rains.

The raining of *blood* has ever been accounted a more terrible sight and a more fatal omen than the other preternatural rains already mentioned. It is very certain that nature forms blood nowhere but in the vessels of animals, and therefore showers of it from the clouds are by no means to be credited. Those who suppose that what people took for blood has actually been seen falling through the air, have had recourse for its origin to flying insects, and suppose it to be the eggs or dung of certain butterflies discharged as they were high up in the air. But this seems to be a very wild conjecture, as we know of no butterfly the excrements or eggs of which are of such a colour, or its abode so high in the air, or its flocks so numerous, as to be the occasion of such a phenomenon.

It is most probable that these bloody waters were never seen falling; but that people, seeing the standing waters blood-coloured, were assured, from their not knowing how it should else happen, that it had rained blood into them. A very memorable instance of this took place at the Hague in the year 1670. Swammerdam, who relates it, tells us, that one morning the whole town was in an uproar on finding, as they thought, their lakes and ditches full of blood; for these having certainly been full of water the night before, they agreed that it must have rained blood during the night. But a certain physician went down to one of the canals, and taking home a quantity of this blood-coloured water, he examined it by the microscope, and found that the water was water still, and had not at all changed its colour; but that it was full of prodigious swarms of small red animals, all alive, and very nimble in their motions, the colour and prodigious number of which gave a reddish tinge to the whole body of the water in which they lived. The certainty that this was the case, did not however persuade the Hollanders to part with the miracle. They prudently concluded, that the sudden appearance of such a number of animals was as great a prodigy as the raining of blood would have been; and remain assured to this day, that this portent foretold the scene of war and destruction that Louis XIV. afterwards brought into that country, which had previously enjoyed forty years of uninterrupted peace.

The animals which thus colour the water of lakes and ponds are the *pulices arborescentes* of Swammerdam, or the water-fleas with branched horns. These creatures are of a reddish-yellow or flame colour. They live about the sides of ditches, under weeds, and amongst the mud; and are therefore the less visible, except at a certain time, which is in the beginning or end of June. It is at this time that these little animals leave their recesses to float loose about the water, and meet for the propagation of their species; and by this means they become visible in the colour which they give the water. The colour in question is visible, more or less, in one part or other of almost all standing waters at this season; and it is always at the same season that the bloody waters have alarmed the ignorant.

The raining of *frogs* is a thing not less wonderful in the accounts of authors who love the marvellous than those of blood or stones; and this is supposed to happen so frequently, that there are multitudes who pretend to have been eye-

Preternatural Rains.

witnesses of it. These rains of frogs always happen after very dry seasons, and are much more frequent in the hotter than in the cold countries. In Italy they are very frequent; and it is not uncommon to see the streets of Rome swarming with young frogs and toads in an instant after a shower of rain. Nay, they have been seen to fall through the air down upon the pavements. This seems to be a strong circumstance in favour of their being rained down from the clouds; but, when strictly examined, it comes to nothing. For these frogs which are seen to fall are always found dead, lamed, or bruised by the fall, and never hop about like the rest; and they are never seen to fall, except close under the walls of houses, from the roofs and gutters of which they have accidentally slipped down. Some people who love to add to things strange others yet stranger, affirm that young frogs have fallen into their hats in the midst of an open field; but this is equally idle and false.

Others, who cannot agree with the opinion of their falling from the clouds, have tried to solve the difficulty of their sudden appearance, by supposing them hatched out of the egg, or spawn, by these rains. Nay, some have supposed them to be made immediately out of the dust. But there are unanswerable arguments against all these suppositions. Equivocal generation, or the spontaneous production of animals out of dust, is now wholly exploded. The fall from the clouds would destroy and kill these tender and soft-bodied animals. And they cannot be at this time hatched immediately out of eggs, because the young frog does not make its appearance from the egg in form, but has its hinder legs enveloped in a skin, and is what we call a *tadpole;* and the young frogs are at least a hundred times larger at the time of their appearance than the egg from which they should be hatched.

It is beyond a doubt that the frogs which make their appearance at this time were hatched and in being long before. But the dry seasons had injured them, and kept them sluggishly in holes or coverts; and all the rain does is enlivening them, giving them new spirits, and calling them forth to seek new habitations, and enjoy the element they were destined in a great measure to live in. Theophrastus, the greatest of all the naturalists of antiquity, has affirmed the same thing. We find that the error of supposing these creatures to fall from the clouds was as old as the time of that author; and also that the truth in regard to their appearance was as early known; though, in the ages that followed, authors have taken care to conceal the truth, and to hand down to us the error. We find this venerable sage, in a fragment of his on the generation of animals which appear on a sudden, ridiculing the opinion, and asserting that they were hatched and living long before. The world, however, owes to the accurate Signor Redi the great proof of this truth, which Theophrastus has only affirmed. This gentleman, dissecting some of these frogs, found in their stomachs herbs and other half-digested food; and, openly showing this to his credulous countrymen, asked them whether they thought that nature, which engendered, according to their opinion, these animals in the clouds, had also been so provident as to provide grass there for their food and nourishment?

To the raining of frogs we ought to add the raining of *grasshoppers* and *locusts*, which have sometimes appeared in prodigious numbers, and devoured the fruits of the earth. There has not been the least pretence for supposing that these animals descended from the clouds, though they appeared on a sudden in prodigious numbers. The naturalist, who knows the many accidents attending the eggs of these and other like animals, cannot but know that some seasons will prove particularly favourable to the hatching them; and the prodigious number of eggs that many insects lay could not but every year bring us such abundance of the young, were they not liable to many accidents, and had not provident nature taken care, as in many plants, to continue the species by a very numerous stock of seeds, of which perhaps not one in five hundred need take root in order to continue an equal number of plants. It is thus also in regard to insects; and hence it cannot but happen, that if a favourable season encourage the hatching of all those eggs, a very small number of which alone is necessary to continue the species, we must in such seasons have a proportional abundance of them. More than half a century ago, there appeared in London such a prodigious swarm of the little beetle called the *lady-cow*, that the very posts in the streets were everywhere covered with them. But, thanks to the progress of philosophy amongst us, we had nobody to assert that it rained cow-ladies, but we contented ourselves with saying that it had been a favourable season for their eggs. The prodigious number of a sort of grub, which, about the same period, did vast mischief to the corn and grass, by eating off the roots, might also have been supposed to proceed from its having rained grubs, by people fond of making everything a prodigy; but our knowledge in natural history assured us, that these were only the hexapod worms of the common hedge-beetle called the *cockchafer*.

The raining of *fishes* has also been a prodigy much talked of in France, where the streets of a town at some distance from Paris, after a terrible hurricane in the night, which tore up trees, blew down houses, and did other damage, were found in a manner covered with fishes of various sizes. Nobody here made any doubt of these having fallen from the clouds; nor did the absurdity of fish, of five or six inches in length, being generated in the air, at all startle the people, or shake their belief in the miracle, until they found, upon inquiry, that a very well-stocked fish-pond, which stood on an eminence in the neighbourhood, had been blown dry by the hurricane, and only the great fish left at the bottom of it, the smaller fry having been tossed into their streets.

Upon the whole, all the supposed marvellous rains have been owing to substances naturally produced on the earth either never having been in the air at all, or only carried thither by accident.

Rainbow.

RAINBOW. See METEOROLOGY and OPTICS.

Lunar RAINBOW. The moon sometimes exhibits the phenomenon of an iris or rainbow by the refraction of her rays in drops of rain during the night-time. But this phenomenon is very rare. In the Philosophical Transactions for 1783, however, we have an account of three which were seen in one year, and all in the same place; it is communicated in two letters by Mr Marmaduke Tunstall. The first was seen on the 27th of February 1782, at Greta Bridge, Yorkshire, between seven and eight at night, and appeared in tolerably distinct colours, similar to a solar one, but more faint, the orange colour seeming to predominate. It happened at full moon, at which time alone they are said to be always seen. Though Aristotle is stated to have observed two, and some others have been seen by Snellius, Mr Tunstall could only find two described with any accuracy; one by Plot, in his History of Oxfordshire, which was seen by him in 1675, though without colours; and the other seen by a Derbyshire gentleman at Glapwell, near Chesterfield, described by Thoresby, and inserted in the Philosophical Transactions, No. 331. This was about Christmas 1710, and is said to have had all the colours of the *iris solaris*. The night was windy; and although there was then a drizzling rain and a dark cloud, in which the rainbow was reflected, it proved afterwards a light frost.

Two others were afterwards seen by Mr Tunstall. One of these was observed on the 30th of July, about eleven o'clock, which lasted about a quarter of an hour, but without colours; and the other, which appeared on the 18th of October, was perhaps the most extraordinary one of the kind that had ever been seen. It became visible about nine o'clock, and continued, though with very different degrees of brilliancy, till past two. At first, though a strongly-marked bow, it was without colours; but afterwards they were very conspicuous and vivid, in the same form as in the solar, though fainter, the red, green, and purple being the most distinguishable. About twelve it was the most splendid in appearance; its arc was a considerably smaller segment of a circle than a solar; and its south-east limb first began to fail, a considerable time before its final extinction. The wind was very high, nearly due west, accompanied most part of the time with a drizzling rain. It is a singular circumstance, that three of these phenomena should have been seen in so short a time and in one place; as they have been esteemed, ever since the time of Aristotle, who is said to have been the first observer of them, and saw only two in fifty years, and since by Plot and Thoresby, almost the only two English authors who have spoken of them, to be exceedingly rare. They evidently appear to be occasioned by a refraction in a cloud or turbid atmosphere, and in general are indications of stormy and rainy weather. Thoresby, indeed, says the one he observed was succeeded by several days of fine serene weather. One particular, rather singular, in the second, namely, that of July the 30th, was its being six days after the full moon; and the last, though of so long a duration, was three days before the full moon. That of the 27th of February was exactly at the full, which used to be judged the only time when they could be seen, though there is an account that Weidler observed one in 1719, during the first quarter of the moon, with faint colours, and in very calm weather.

In the Gentleman's Magazine for August 1788 an account is given of a lunar rainbow by a correspondent, who saw it. "On Sunday evening the 17th of August," says he, "after two days, on both of which, particularly the former, there had been a great deal of rain, together with lightning and thunder, just as the clocks were striking nine, twenty-three hours after full moon, looking through my window, I was struck with the appearance of something in the sky, which seemed like a rainbow. Having never seen a rainbow by night, I thought it a very extraordinary phenomenon, and hastened to a place where there were no buildings to obstruct my view of the hemisphere. Here I found that the phenomenon was no other than a lunar rainbow; the moon was truly 'walking in brightness,' brilliant as she could be; not a cloud was to be seen near her; and over against her, toward the north-west, or perhaps rather more to the north, was a rainbow, a vast arch, perfect in all its parts, not interrupted or broken as rainbows frequently are, but unremittedly visible from one horizon to the other. In order to give some idea of its extent, it is necessary to say, that as I stood toward the western extremity of the parish of Stoke-Newington, it seemed to take its rise from the west of Hampstead, and to end, perhaps, in the river Lea, the eastern boundary of Tottenham; its colour was white, cloudy, or grayish, but a part of its western leg seemed to exhibit tints of a faint sickly green. I continued viewing it for some time, till it began to rain; and at length the rain increasing and the sky growing more hazy, I returned home about a quarter or twenty minutes past nine, and in ten minutes came out again; but by that time all was over, the moon was darkened by clouds, and the rainbow of course vanished."

RAISEEN, a district of Hindustan, in the province of Malwah, situated between the 23d and 24th degrees of north latitude, belonging to the Mahrattas. It is bounded on the south by the Vindhaya Mountains, and is intersected by the river Betwah. The principal towns are Raiseen, Bilsah, and Choonpore. This district is principally laid out in tobacco-fields, for which it is famed. The capital of the above district is of the same name, 126 miles east from Oojain. Long. 77. 47. E. Lat. 23. 15. N.

RAISEN-MARKET, a town of the county of Lincoln, in the hundred of Walshcroft, and in Lindsey division. It is situated near the navigable river Anklom, and has a market, which is held on Saturday. The population amounted in 1801 to 774, in 1811 to 964, in 1821 to 1166, and in 1831 to 1428.

RAISINS, grapes prepared by suffering them to remain on the vine until they are perfectly ripe, and then drying them in the sun, or by the heat of an oven. The difference between raisins dried in the sun and those dried in ovens is very obvious. The former are sweet and pleasant, but the latter have a latent acidity mixed with the sweetness, which renders them much less agreeable.

The common way of drying grapes for raisins, is to tie two or three bunches of them together whilst yet on the vine, and dip them into a hot lixivium of wood-ashes, mixed with a little of the oil of olives. This disposes them to shrink and wrinkle; after which they are left on the vine three or four days, separated on sticks in an horizontal situation, and then dried in the sun at leisure after being cut from the tree. The finest and best raisins are those called in some places *Damascus* and *Jube raisins;* which are distinguished from the others by their size and figure. They are flat and wrinkled on the surface, soft and juicy within, and nearly an inch long; and, when fresh and growing on the bunch, are of the size and shape of a large olive.

RAJAH, the title of the Indian princes, the remains of those who ruled there before the Moguls.

RAJAH CHOHANS, a wild, rugged, and mountainous country, very little cultivated, in the province of Gundwana, and situated between the 23d and 24th degrees of north latitude. The principal town is Sonehut, the usual residence of the Corair rajah. This tract of country is inhabited by the wildest tribes of India, and presents one continued succession of deep gullies, ravines, chasms, and defiles. The inhabitants are very poor, being collected in villages, which consist of not more than four or five huts each. A little rice, Indian corn, and a few other smaller grains, are the chief products. The country affords abundant cover for game of all sorts; and tigers, leopards, tiger-cats, and large black bears, abound in its woods and jungles.

RAJABARY, a considerable trading town of Bengal, in the district of Dacca, situated on the western bank of the river Megna. Long. 96. 21. E. Lat. 23. 25. N. Rajah, signifying prince, is the prænomen of numerous towns in Hindustan.

RAJAHNAGUR, a town of Bengal, in the district of Dacca, situated on the eastern bank of the Ganges. Long. 93. 14. E. Lat. 23. 22. N. There is another place of this name in the Northern Circars, 12 miles north-east of Rajamundry.

RAJAMUNDROOG, a town and fortress of Hindustan, in the province of Bejapore, and district of Concan. It was taken by General Matthews in 1783, but afterwards ceded to Tippoo. It commands the entrance into the estuary and river Mirjee. Long. 73. 30. E. Lat. 14. 30. N.

RAJAMUNDRY, an extensive district of Hindustan, in the province of the Northern Circars, bounded on the north by Cicacole, and on the south by Ellore; on the west by the territories of the Nizam, and on the east by the Bay of Bengal. This district is intersected by the Godavery, and lies chiefly to the north of that river, though part of it is also to the south. At the distance of about thirty-five miles from the sea, this river divides itself into two great branches, and forms the island of Nagur, comprehending, within a triangular space, 500 square miles, but much greater in value than in extent. The whole district includes an area of 1700 square miles. The island of Nagur is intersected by lesser branches of the Godavery, which, supplying abundance of water, render it very productive, being fertilized by the slimy mould carried down by this great river of the Deccan. The country produces abundance of sugar, which is cultivated to a great extent in the island of Nagur, and along the banks of the Elyseram River, from the abundant flow of whose water during the whole year the sugar-plantations are watered during the driest seasons; and also a variety of other productions are grown, such as paddy, ginger, turmeric, yams, and chillies. Sugar is also grown in considerable quantities in the delta of the Godavery, where the cultivation might be carried to any amount, and where, during the interval between the crops, leguminous plants are reared. The country, from the commencement of the hills along the banks of the Godavery, to Poloonshah on the frontiers of Commamet, is the seat of extensive forests, where the teak-trees are produced in abundance, there being no other country on the east side of the Bay of Bengal which furnishes this valuable timber. Some attempts have been made to raise pepper, but this valuable product is produced in greater abundance and perfection on the Malabar coast. The principal towns are Rajamundry, Ingeram, Coringa, Bundermalanca, Peddapoor, and Pettipoor; but Coringa is the only port which carries on any considerable export trade. Rajamundry was ceded to the French in 1753 by Salabut Jung, the subahdar of the Deccan, and acquired by the British under Lord Clive in 1765. Many additional dependencies, however, have since been acquired by conquest or policy; and it now constitutes one of the five collectorships into which the Northern Circars were subdivided in 1803.

RAJAMUNDRY, the capital of the above-mentioned district, and the residence of the British civil establishment, is situated on the east bank of the Godavery, forty miles from the sea. It formerly possessed a good brick fort, which is now in ruins. Long. 81. 54. E. Lat. 16. 59. N.

RAJEGHUR, a town of Hindustan, in the territories of the Mahrattas, and province of Malwah, situated on the western bank of the Sopra River, sixty-seven miles north-east from Oojain. Long. 76. 27. E. Lat. 23. 56. N. There is another town of the same name in the province of Allahabad, situated on the river Cane, eighteen miles south-east from Chatterpoor. Long. 80. 5. E. Lat. 24. 44. N. Rajeghur is also the name of a range of hills in the province of Bahar.

RAJEMAL, or RAJEMAHAL, an extensive but unproductive district of Bengal, situated about the twenty-fifth degree of north latitude. It has on the north Purneah and Dinagepoor, on the south the large zemindary of Raujeshy, on the east Dinagepoor and Raujeshy, and on the west Monghir and Purneah. It is situated on the western bank of the Ganges, and comprises a great extent of waste and mountainous territory, inhabited in many parts by the aborigines of the country, who speak a distinct language, and differ entirely from the Hindus of Bengal in their manners, as they eat without scruple all kinds of animals. They are mostly low in stature, but strong and well proportioned. There are many of them under five feet ten inches, and more under five feet than above it. They have generally flattened noses, and lips thicker than the inhabitants of the plains. The country is for the most part barren and sandy. The soil in the vicinity of Rajemahal is said to be composed of a mixture of granite rock, which is not to be found lower down the river. The plains produce wheat and barley, and the villages abound with mango-trees of excellent quality. Indian corn and other grains form part of the crops, as well as rice, the mulberry tree, and the indigo plant. The castor-oil plant is raised in great quantities in the field; and in the jungles, which occupy large tracts of the country, the grass grows to the height of eight or ten feet, and is adorned at the top with a beautiful white down, resembling swans' feathers. These jungles afford shelter to numerous tigers, bears, and other wild beasts. It was in this district that the experiment was first tried of granting lands to the native invalid officers and soldiers, on condition of their residing upon them and cultivating them. In this manner was formed in the wilds the village of Sicligully; and this measure has been attended with the best effects, so that the traveller now passes with as much safety from human foes, in this district, as in any other part of the country. The territory is separated from Bahar by a range of hills, the Rajemahal Hills, compared by Bishop Heber to the hills of Cheshire, and consisting of a coarse granite. Through these hills are several passes, the chief of which is Terriagully, up a narrow winding road, where there is a ruined gateway and fort, which formerly commanded the high road leading from Moorshedabad to Patna, and was considered as the key of Bengal. The roads are generally indifferent, owing to the force of the torrents during the rains, which bar up the bridges, and carry devastation throughout the country. The principal articles of traffic are common Hindustanee bedsteads, wood, planks, charcoal, cotton, honey, plantains, and sweet potatoes, which are exchanged for salt, tobacco, rice, cloth, iron heads for arrows, hatchets, crooks, and iron instruments. Their domestic animals are hogs, goats, and fowls, besides cats and dogs. The people of these mountains, observes Bishop Heber, and of all the hilly country between Sicligully and Burdwan, are a distinct race from those of the plain, in features, language, civilization, and religion. They have neither castes nor Hindu deities, and are even said to have no idols. They are still more naked than even the Hindu peasants, and live chiefly by the chase, pursuing their game with bows and arrows. Some few of them have fire-arms. Until within the last fifty years, a deadly feud existed between them and the cultivators of the neighbouring lands, upon which they were continually making forays; and being both thieves and murderers, they were shot without mercy by the zemindars, in the same manner as tigers or other wild beasts. But by the wise and benevolent management of an excellent young man, judge and magistrate of Boglipoor, these rude tribes were reclaimed from their barbarous habits by just and merciful treatment, all violence on the part of the zemindars being forbidden, and promptly punished. He took other methods of conciliating their favour, and engaged several of them to enter his service; he established bazaars at the villages nearest them, and encouraged them to bring for sale game, millet, wax, hides, and honey, which are produced abundantly in their hills; he gave them wheat and barley for seed; and, finally, he raised amongst them a corps of Sepoys, who were established at Sicligully, and gave the command of them to a native chief, named Jowrah, who, Bishop Heber remarks, was the Rob Roy, or more properly the Roderick Dhu, of the Rajemahals, but who fully justified the judgment and discrimination of Mr Cleveland's choice. "This good and wise man," adds Bishop Heber, a pattern himself of the same qualities, "died in 1784, at the early age of twenty-nine. In honour of his memory, a monument, in the form of a pagoda, was erected by the zemindars and others, at the expense of government." The principal towns are Rajemal and Maulda, and the chief river the Ganges, but it is intersected by a variety of smaller streams in all directions.

RAJEMAL (*the royal residence*), the capital of the above district, is situated on the western bank of the Ganges, at the foot of a range of hills. The modern town consists only of one street, composed of stone, generally two stories in height, with the ruins of a palace, which has been much injured by the encroachments of the river. Its empty halls, marble porticoes, and half-decayed vaults, still present images of its former grandeur. An inconsiderable traffic continues to be carried on with the inhabitants of the hills; and there are quarries which supply the neighbourhood with flags and millstones. This place decayed from various causes, namely, an inundation of the Ganges, which swept away a considerable part of it; a conflagration, which destroyed another portion of it; and, lastly, the transfer of the seat of government to Dacca. There is a tradition that this city was in very ancient times the seat of a Hindu government. It is first mentioned by Mahommedan historians in 1576, under the name of Agamahel, or the house of fire. In the reign of Akbar, about 1591, Rajah Mause Singh, on his return from the conquest of the Afghans of Orissa, fixed upon this city for the capital of Bengal, the name of which he changed to Rajamahal. He erected a palace, and surrounded the town with a rampart of brick and other fortifications. The city suffered considerable injury from the troops of Aurungzebe, who took it after a short siege. It was afterwards the residence of the military collector of the district, which contributed to its support; but since the union of the district with Boglipoor, and the transfer of the public offices to that town, it has fallen into decay. It is seventy miles north-north-west from Moorshedabad. Long. 87. 43. E. Lat. 25. 2. N.

RAJOORAH, a town of Hindustan, in the province of Aurungabad, forty miles south-west from Nandere. Long. 77. 15. E. Lat. 18. 38. N.

RAJPOOR, a town of Hindustan, in the province of Bejapoor, and situated on the sea-coast of the Concan district. This was formerly a much-frequented port, and was taken from the king of Bejapoor by the Mahratta chief Sevajee in 1670. It was also of considerable importance during the wars between Aurungzebe and the Mahrattas, and formed the principal station of the fleet. Long. 73. 3. E. Lat. 16. 48. N. It is also the name of a small village in the province of Gujerat, near its western boundary. The surrounding country is covered with thick jungle, which is the resort of numerous thieves. It is likewise the name of a town in the province of Berar, situated on the river Wurda, which here makes a considerable curve to the eastward. It is ten miles south-east from Chandah. Long. 80. E. Lat. 19. 56. N.

RAKAN, a river on the north-eastern coast of Sumatra, and the largest in the island, or rather it should be considered as an inlet of the sea. It has its rise in the interior, in the Rau country, and is navigable for sloops to a great distance from the sea. Vessels are deterred from entering it by the rapidity of the current, and by that peculiar swell known in the Ganges under the name of the "bore."

RAKE is a well-known instrument with teeth, by which the ground is divided. See Agriculture.

Rake of a Ship is all that part of her hull which hangs over both ends of her keel. That which is before is called the *fore-rake* or *rake forward*, and that part which is at the setting on of the stern-post is called the *rake-aft* or *afterward*.

RAKONITZ, a city of the Austrian kingdom of Bohemia, the capital of a circle of the same name, which extends over 896 square miles, comprehending eleven cities, eighteen towns, and 517 villages, with 144,600 inhabitants, mostly of the Sclavonian race. The city is situated on two streams, the Gelden and the Rakonitz, and has four churches, 295 houses, and 2350 inhabitants, making cotton and woollen cloths, and some hosiery and hardware. Lat. 56. 36. N.

RALEIGH, Sir Walter, fourth son of Mr Walter Raleigh of Fardel, in the parish of Cornwood, in Devonshire, was born in 1552, at Hayes, in the parish of Budley, a farm belonging to his father. About the year 1568 he was sent to Oriel College in Oxford, where he continued but a short time; for he became one of the hundred volunteers, commanded by Henry Champernon, who, with other English troops, were sent by Queen Elizabeth to assist the queen of Navarre in defending the Protestants. He has described some of the great battles in which he was engaged, in his History of the World. In 1577 or 1578 he proceeded to the Low Countries with the troops sent by the queen to assist the Dutch against the Spaniards, and probably shared the glory of the decisive victory obtained over Don John of Austria in 1578. On his return to England, a new enterprise engaged his attention. His half-brother, Sir Humphrey Gilbert, having obtained a patent to plant and inhabit some parts of North America, Raleigh embarked in this adventure; but meeting with a Spanish fleet, after a smart engagement they returned, without success, in 1579.

The following year the king of Spain, in conjunction with the pope, having projected a total conquest of the English dominions, sent troops to Ireland to assist the Desmonds in the Munster rebellion. Raleigh obtained a captain's commission under Lord Grey of Wilton, then deputy of Ireland, and embarked for that kingdom, where he greatly distinguished himself both for bravery and for skill. He returned to England, and attracted the notice of Queen Elizabeth, owing, as we are told in Naunton's *Fragmenta Regalia*, to the following accidental piece of gallantry. The queen, as she was one day taking a walk, being stopped by a *splashy* place in the road, Raleigh immediately took off his new plush mantle, and spread it on the ground. Her majesty trod gently over the soft foot-cloth. Surprised and pleased with the adventure, and much struck by the noble appearance of the young soldier, she admitted him to her court, and employed him first as an attendant on the French ambassador Simier upon his return home, and afterwards to escort the Duke of Anjou to Antwerp. During this excursion he became personally known to the Prince of Orange; from whom, at his return, he brought especial acknowledgments to the queen, who now frequently conversed with him. But the inactive life of a courtier did not suit the enterprising spirit of Raleigh. He took advantage of his favour with the queen to obtain, in 1584, a patent empowering him to possess such countries as he should discover on the continent of North America. Accordingly he fitted out, at his own expense, two ships, which sailed in the month of April, and returned to England about the middle of September, reporting that they had discovered and taken possession of a fine country, to which the queen gave the name of *Virginia*. About this time he was elected knight of the shire for the county of Devon, and soon afterwards received the honour of knighthood; and, to enable him to carry on his designs abroad, the queen granted him a patent for licensing the venders of wine throughout the kingdom. In 1585 he sent a new expedition to Virginia, commanded by his relation Sir Richard Greenville, who left a colony at Roanah of 107 persons, under the government of Mr Lane; and by the establishment of this colony he was enabled to import tobacco into England. In the same year Sir Walter Raleigh obtained a grant of twelve thousand acres of the forfeited lands in the county of Cork in Ireland. About the same time he was made seneschal of the duchy of Cornwall, and warden of the stanneries.

In the year 1587 he sent another colony to Virginia; but his various undertakings and offices obliged him to assign his patent to a company, and the plan of colonizing was by them speedily relinquished, so that the unfortunate colonists were left to their fate. About this time we find our knight distinguished by the titles of "Captain of the Queen's Guards," and "Lieutenant-General of Cornwall." From this period to the year 1594, he was continually engaged in projecting new expeditions, defending the kingdom from the insults of the Spaniards, and transacting parliamentary business with equal ability and resolution. Sir Walter fell under the queen's displeasure on account of an alleged intrigue with the daughter of Sir Nicholas Throgmorton, one of the maids of honour; however, he married the lady, and lived with her in great conjugal harmony. During his disgrace at court he projected the conquest of Guiana in South America, and in 1595 sailed for that country, in the vain hope of discovering the golden region of *El Dorado*, supposed to be situated in the depths of Guiana. He returned to England the same year, and soon afterwards published an account of his expedition. In the following year he was one of the admirals in the successful expedition against Cadiz, under the command of Howard and the Earl of Essex: and in 1597 he sailed with the same commanders against the Azores. Soon after these expeditions we find him assiduously engaged in parliamentary business. His speeches evince a knowledge of political economy far superior to any man of his time. In 1600 he was sent on a joint embassy with Lord Cobham to Flanders, and on his return made governor of Jersey.

Queen Elizabeth died in the beginning of the year 1603; and with her Raleigh's glory and felicity sunk, never to rise again. Upon the accession of James, Sir Walter lost his interest at court, was stripped of his preferments, and accused of a plot against the king. He was arraigned at Winchester, and, on his trial, insulted with the most shocking brutality by the famous Coke, attorney-general, who influenced the jury to convict him without any legal proof of his guilt. After a month's imprisonment, however, in daily expectation of his execution, he was reprieved and sent to the Tower; and his estates were given to Car, earl of Somerset, the king's favourite. During this confinement he wrote many of his most valuable pieces, particularly his History of the World. In March 1615, after sixteen years' imprisonment, he obtained his liberty, and immediately began to prepare for another voyage to Guiana, which proved equally abortive and ruinous. In the year 1618, he returned from this fatal voyage to England, where he was soon afterwards seized, imprisoned, and beheaded. He was sacrificed by the pusillanimous monarch to appease the Spaniards, who, whilst Raleigh lived, thought every part of their dominions in danger. He was executed in Old Palace Yard, and buried in St Margaret's adjoining, in the sixty-sixth year of his age. His behaviour on the scaffold was manly, unaffected, cheerful, and easy. Being asked by the executioner which way he would lay his head, he answered, "So the heart be right, it is no matter which way the head lies." He was a man of admirable parts, extensive knowledge, undaunted resolution, and perhaps the best prose writer of his age. His great work, the History of the World, is a truly remarkable performance, both for matter and for style. It has often been reprinted in folio. An edition of his whole works was published at Oxford in 1829, in eight volumes octavo.

RALPH, James, an ingenious historical and political writer, of whose birth and country nothing has been ascertained. He was first known as a schoolmaster in Philadelphia, in North America. He came to England about the beginning of the reign of George I. and wrote some things in the dramatic way, which were not received with great applause; but though he did not succeed as a poet, he was a very ingenious prose-writer. He wrote a History of England, commencing with the Stuarts, which is much esteemed; and so also were his political essays and pamphlets, some of which were looked upon as masterpieces. His last publication, the Case of Authors by Profession, is an excellent and entertaining performance. He died in 1762.

RAMA, or Ramla, a considerable town of Palestine, situated in one of the most fertile and extensive districts of the Holy Land; though at the time when Dr Clarke visited the country it was almost deserted, in consequence of the ravages of the plague. It seems doubtful, however, whether this was the ancient city described in Scripture. Some ascribe its origin to the Moslems; yet this can scarcely have been the case, as it is distinctly mentioned by St Jerome. Rama was a splendid city, well fortified, exceedingly populous, adorned with stately buildings, and abounding in all the luxuries of the East, during the time of the Crusaders. It was one of the first cities that fell into the hands of the Crusaders. In its neighbourhood many ancient ruins are still to be seen. It is twenty-five miles west-north-west from Jerusalem.

RAMAGIRY, a town and fortress of the south of India, and province of Mysore. The fort is situated upon a rock, and is of considerable strength, although it surrendered to the British in 1791 without any resistance. The country in the vicinity is very wild, being overrun with woods, deep jungle, and dreadfully infested with tigers. There is but little cultivation, the peasants being chiefly employed in the breeding of cattle. In this hilly tract there is a very mild race of men, who subsist on game, wild roots, herbs and fruits, and a little grain, which they purchase from the farmers in exchange for drugs, honey, and wax. It is fifty miles north-east from Seringapatam. Long. 77. 33. E. Lat. 12. 44. N.

RAMBERT, St, a town of France, in the department of the Loire, and arrondissement of Montbrison. It is situated on the river Loire, near to its source, but where it is navigable. It has a hospital, and contains 430 houses, with 2600 inhabitants. It has a very extensive trade in wine: and in the vicinity there are several extensive iron forges. There is another town of the same name in the department of the Aix, and arrondissement of Belley. It is situated in a valley between two mountains, portions of the Jura range, on the river Albarine, and contains 390 houses, with 2430 inhabitants, who carry on considerable trade in hempen cloth.

RAMBERVILLERS, a large market-town of France, in the department of the Vosges, and the arrondissement of Epinal. It stands on a mountain, at the foot of which runs the river Mortagne. It has a considerable number of iron forges in the vicinity, and much woollen and linen cloth is manufactured; and there are mills for making paper. It contains a population of 5230 persons. Long. 7. 5. 18. E. Lat. 48. 20. 43. N.

RAMBOUILLET, an arrondissement of the department of the Seine and Oise, in France, extending over 275 square miles. It is divided into five cantons, and these into eighty-four communes, containing 67,500 inhabitants. The capital, of the same name, is situated between two woods, has a royal palace and park, and contains 2800 inhabitants. There is here a large farm celebrated for breeding sheep with the finest wool.

RAMAZZINI, Bernardin, an Italian physician, born at Carpi, near Modena, in 1633. He was professor of physic in the university of Modena during eighteen years; in 1700 he accepted an invitation from Padua, where he was made rector of the college; and in 1714 he died. His works were collected and published in London in 1716; and of these, his treatise *De Morbis Artificum*, or on the maladies peculiar to artificers, will always be esteemed curious and useful.

RAMDROOG, a hill-fortress of Hindustan, in the province of Bejapoor, situated on the north side of the Malpurba river. It was taken from the Mahrattas, in 1785, by Tippoo Sultan, but was restored to them after the war of 1793.

RAMERGH, a town of Hindustan, in the province of Hyderabad, belonging to the Nizam. Long. 79. 32. E. Lat. 18. 31. N.

RAMESES, in *Ancient Geography*, a town built by the Israelites during their bondage in Egypt, and whence the Exodus took place. It must have been towards and not far from the Arabian Gulf, seeing that in their third station the Israelites arrived on its shore.

Rameses, king of Lower Egypt when Jacob went thither with his family, in the 1706th year before the Christian era. Ancient authors mention several other kings of Egypt of the same name; and it is believed that one of these princes erected, in the temple of the Sun at Thebes, the magnificent obelisk which the Emperor Constantine caused to be removed to Alexandria in the year 334. After the death of this prince, his son Constantius had the obelisk transported from Alexandria to Rome in 352, where it was erected in the circus maximus. Its height exceeded 130 feet. When the Goths sacked the city of Rome in 409, they overthrew the obelisk, which continued buried in the sand till the time of Sixtus V. in 1587, when it was found broken in three pieces; but these being joined together, it was set up in the square of St John Lateran.

RAMGERRY, a town and fortress of the south of India, in the province of Malabar, situated on the Paniany river, and taken by the British in 1782.

RAMGHAUT, a town of Hindustan, in the province of Delhi, pleasantly situated on the western bank of the Ganges, and carrying on a considerable traffic. Long. 78. 22. E. Lat. 28. 12. N.

RAMGONGA, a river of Hindustan, which rises in the mountains of Thibet, and falls into the Ganges ten miles north of the ancient city of Canonge. In some places it is fordable; but from quagmires and quicksands the fords are dangerous.

RAMGUNGE, a town of Hindustan, in the nabob of Oude's territories, twenty-five miles south-west from Lucknow. Long. 80. 35. E. Lat. 26. 37. N.

RAMGUR, an extensive district and town of Hindustan, in the province of Bahar. The district is situated about the 24th degree of north latitude, and is one of the most unproductive in India. Its boundaries on the north are the district of Bahar proper; on the south, Nagpoor and Pachete; on the east, Monghir and Pachete; and on the west, Palamow. Other limits, however, are assigned to the modern district, which comprehends a much greater space, and may be considered as belonging to the ancient province of Gundwana. A great part of the territory is mountainous, the soil is of rock, and a considerable portion of it is overrun with impenetrable woods. The chief produce is a coarse rice. All the hills abound with iron, which is fused by the natives in large quantities, and sold. The chief rivers are the Dummoodah and the Burrahkur; and the principal towns are Ramgur, Chittra, and Muckundgunge. A great part of the population consists of Hindus, though it was conquered by the Mahommedans in the middle of the sixteenth century. The capital, of the same name, is situated on the northern bank of the Dummoodah river, and formerly possessed a strong fortress. It is 910 miles north-west from Calcutta. Long. 84. 35. E. Lat. 20. 38. N.

RAMGURRY, one of the innumerable hill-forts with which the face of the country in India is in many parts studded. It is situated in the province of Mysore, on a very steep rock, and is well fortified by art. It is twenty miles south-west of Chitteldroog.

RAMILLIES, a small village of Brabant, in the Netherlands, twelve miles north of Namur, and twenty-two south-east of Brussels. Long. 4. 48. E. Lat. 50. 51. N. It is famous for the battle fought by the allies commanded by the Duke of Marlborough and M. d'Auverquerque, against that of the two crowns, commanded by the Duke of Bavaria and Marshal Villeroi, on the 22d of May 1706.

RAMKEWRA, a town of Hindustan, belonging to the peshwa of the Mahrattas, in the province of Bejapore, twenty-seven miles north-east from Poonah. Long. 74. 20. E. Lat. 18. 41. N.

RAMLEAH, the name of a ridge of mountains in Arabia, crossing the division of Nedsjed, extending 250 miles from south-west to north-east, and terminating within eighty miles of Kalaat el Moilah.

RAMMISSER, a town of Hindustan, in the province of Khandeish, belonging to the Mahrattas, and situated at the confluence of the rivers Ghirah and Tuptee. Long. 75. 21. E. Lat. 21. 4. N.

RAMMISSERAM ISLE, an island situated in the straits between the island of Ceylon and the continent; it is eleven miles in length, by six in breadth, and separated from the latter by a narrow strait. It is low, sandy, and uncultivated, and is of little value, except as a seat of Hindu superstition. It possesses a celebrated pagoda, the entrance to which is through a lofty gateway, about a hundred feet in height, covered with carved work to the summit. It contains a town called Panban; but its chief value is derived from a celebrated temple, which is about six hundred feet square, and is one of the finest pieces of architecture in India. The entrance into this temple is by a door forty-six feet in height, placed perpendicularly, with others crossing, and in massiveness of workmanship resembling the Egyptian style of architecture. None is permitted to enter into the inner temples except the attendants of Brahmins, who live in the town, and have their share of the offerings. The expenses of the rajah of Tanjore at this place usually amounted to 60,000 pagodas. No water is used except what is brought all the way from the Ganges, and is poured over the deity every morning, and then sold to the devout, by which a considerable revenue accrues to the temple. The capital is about nine miles distant from the great temple.

RAMNAD, a town and capital of a district of the same name, in the south of India, and province of Marawar. This pollam or zemindary was granted to the ancestors of the present family, on condition of their granting protection to the pilgrims on their road to Rammisseram, and for which protection they were also to pay a tax. The ruler is a lady, styled the rannee, who has a clear revenue of 90,000 pagodas a year, of which she pays one half to the Company, reserving 45,000 for herself. Here is a fort built many years ago by the rannee's ancestors, but never completed. The palace adjoins it, and is a gloomy building, with lofty walls, and no window on the outside. Near it is the tomb of the rannee's deceased husband, and a Protestant church of very neat architecture. Betel-nut from Ceylon, and red silk cloths from Bengal, constitute the chief imports; and the exports are piece-goods, cotton, and conch-shells.

RAMNAGUR, a town of Hindustan, in the province of Allahabad, and district of Benares, which stands on the eastern bank of the Ganges, opposite the city of Benares, and is esteemed one of the neatest towns of its size in India; the houses are of stone, and the streets of a good breadth. It contains also the palace of the rajah, and a very handsome small temple, covered with figures in alto-relievo, having in front an extensive reservoir, and surrounded by gardens. It was the favourite residence of Cheyt Sing. Long. 83. 1. E. Lat. 25. 30. N.

RAMNODE, a town of Hindustan, in the Mahratta territories, and province of Malwah, forty miles south-east from Narwar. Long. 78. 5. E. Lat. 25. 6. N.

RAMPANT, in *Heraldry*, a term applied to a lion, leopard, or other beast that stands on its hind-legs, and rears up his fore-feet in the posture of climbing, thus showing only half his face. It is different from salient, in which the beast seems springing forward as if making a sally.

RAMPART, in *Fortification*, is an elevation of the earth thrown out of a ditch round a place, and capable of resisting the cannon of an enemy. It is formed into bastions, curtains, and other defences.

RAMPOOR, a town of Hindustan, in the Mahratta province of Malwah, thirteen miles east from Bopal. Long. 77. 42. E. Lat. 23. 15. N.

RAMPOOR, a town and district of Hindustan, province of Delhi, in the district of Bareily, situated on the banks of the Corilla river. This town and district was, by the peace of Lahdong, in 1774, secured to Fyzoola Khan, a Rohilla chief. His eldest son succeeded at his death. He was afterwards assassinated by his second son, who seized the throne; but the latter was soon afterwards expelled by a British force under Sir Ralph Abercromby, and his treasures seized, amounting in value to L.640,000, and delivered up to the nabob of Oude, who presented the British army with eleven lacs of rupees for their services. The country was in a highly cultivated and flourishing condition under the just administration of its native ruler Fyzoola Khan; but it quickly decayed, and was reduced to a deplorable condition under the extortions of the British, to whom it was ceded in 1801.

RAMPOORA, a town of Hindustan, in the province of Gujerat, and district of Chalawara. This place had formerly a respectable fort, which was destroyed in 1805. In the neighbourhood are many pallias or stones, erected to the memory of persons who have fallen in defence of the village. These monuments are also erected in honour of females who have sacrificed themselves to the memory of their deceased husbands.

RAMSAY, Allan, a Scottish poet, was born at Leadhills in Lanarkshire, in October 1686. His father was employed in the management of Lord Hopetoun's mines at that place; but died whilst the poet was yet in his infancy, in consequence of which, and the marriage of his mother soon after his father's death, it seems probable that, during the earlier part of his life, he continued in rather a destitute situation. He remained at Leadhills till he reached his fifteenth year, and was employed in washing, preparing the lead ore for smelting, and other operations about the works in which the children of miners and young persons are usually employed.

In 1701, when in his fifteenth year, he was bound apprentice to a wigmaker in Edinburgh; and it appears from the record of his children's birth in the parish register that he continued in the same humble profession until the year 1716. One of the earliest of Ramsay's productions now known, an address to the members of the Easy Club, appeared in 1712, when he was twenty-six years of age; and three years afterwards he was humorously appointed their poet laureat. Many of his poems written about this time were published in the form of separate pamphlets. When he had followed the occupation of wigmaker for a considerable time, he at last abandoned it for that of bookseller, as being more congenial to the literary turn of his mind. His detached pamphlets were afterwards published by him in the year 1721, in one volume 4to, which was encouraged by a very liberal subscription. The first volume of his well-known collection, the Tea-table Miscellany, was published in 1724, after which a second volume soon made its appearance, a third came forth in 1727, and a fourth after another interval of time. He soon afterwards published what is called the Evergreen, being a collection of Scotch poems written by ingenious poets prior to the year 1600. In 1725 appeared his Gentle Shepherd, part of which, called Patie and Roger, was printed in 1721, and Jenny and Meggy in 1723, the great success of which induced him to form them afterwards into a regular drama.

In the year 1728, he published a second volume of his poems, which was afterwards reprinted in 8vo. These performances so rapidly enlarged the circle of his fame and reputation, that in 1731 an edition of his poetical works was published by the booksellers of London, and two years afterwards they appeared at Dublin. From his shop opposite to Niddry Street, he removed to one at the east end of the Luckenbooths. In this shop he continued to sell and lend out books until he was far advanced in years; and we have reason to believe that he was the first person who established a circulating library in Scotland. His collection of Fables appeared in 1730, after which period he may be said to have almost discontinued the occupation of author.

Such, however, was his enterprising spirit, that he built, at his own expense, the first theatre for dramatical performances ever known in Edinburgh, which took place in what is called Carrubber's Close, in the year 1736; but he did not long enjoy his character of manager, for the magistrates of Edinburgh required him to shut it up, as an act of parliament prohibited all such amusements without a special license and his majesty's letters patent. It is generally understood that he relinquished the trade of bookseller about the year 1755, being then sixty-nine years of age, and lived the remainder of his days in a small house erected by himself on the north side of the Castle-hill. A scorbutic complaint, attended with excruciating pain, deprived him of his teeth, and, after corroding one of his jaw-bones, put a period to his existence on the 7th of June 1758, in the seventy-first year of his age.

Ramsay possessed a very considerable share of poetical genius. Of this his Gentle Shepherd, which will continue to be admired as long as the language in which it is written shall be understood, and especially by the natives of North Britain, to whom only the peculiarities of dialect by which it is distinguished can be familiar, affords the best proof. Some of his songs may contain far-fetched allusions and childish conceits; but many of them are equal, if not superior, in their pastoral simplicity, to productions of a similar nature in any other language. Some of the imitations of the ancients by this poet are extremely happy; and several of his tales have all the excellencies that belong to that species of composition. But of a great proportion of his other productions it may be pronounced with truth that they are mere prosaic compositions, filled with the most commonplace observations, and destitute even of the ornament of smooth versification and correct rhymes. A complete edition of his works, with a Life, written by the late Mr George Chalmers, was published in two volumes 8vo.

Ramsay, *Andrew Michael*, generally known by the name of the *Chevalier Ramsay*, a polite Scotch writer, was descended of a good family, and born at Ayr in 1686. His parts and learning recommended him as tutor to the son of the Earl of Wemyss; after which, conceiving a disgust for the religion in which he had been educated, he in the same humour reviewed other Christian churches, and, finding none to his liking, rested for a time in Deism. Whilst he was in this uncertain state of mind, he went to Leyden, where, falling into the company of one Poiret, a mystical divine, he received the infection of mysticism, which prompted him to consult Fénélon, the celebrated archbishop of Cambray, who had imbibed principles of the same nature, and who in 1709 gained him over to the Catholic religion. The subsequent course of his life received its direction from his friendship and connection with this illustrious prelate; and being appointed governor to the Duke de Chateau-Thierry and the Prince de Turenne, he was made a knight of the order of St Lazarus. Ramsay was sent for to Rome by the Chevalier de St George, to undertake the education of his children; but on his arrival there in 1724, he found so many intrigues and dissensions, that he obtained the chevalier's leave to return to Paris. He died in 1743, in the office of intendant to the Duke of Bouillon, prince de Turenne. The principal work of his composition is the Travels of Cyrus, which has been several times printed in English.

Ramsay, *James*, was born on the 25th of July 1733, at Frasersburgh, a small town in the county of Aberdeen. His parents were of most respectable character, but in circumstances by no means affluent. From his earliest years he discovered a serious disposition, and a strong thirst for knowledge; and after passing through the usual course of a Scotch grammar-school education, he inclined to pursue the studies necessary to qualify him for the profession of clergyman. Several circumstances, however, conspired to divert him for a time from his favourite pursuit.

He was educated in the episcopal persuasion; and having been unhappy enough to lose his father whilst yet very young, he found, upon his advancing towards the state of manhood, that the joint fortunes of himself and his mother could not bear the expense of a regular education in either

Ramsay.

of the universities of Oxford or of Cambridge. Yielding, therefore, to necessity, he resolved to study surgery and pharmacy; and was with this view bound apprentice to Dr Findlay, a physician in Frasersburgh. But though obliged to relinquish for a time his favourite studies, he did not think ignorance excusable in a surgeon any more than in a clergyman; nor did he conceive that he would ever become eminent in the profession in which circumstances had placed him, merely by skill in setting a bone or compounding a medicine. He determined, therefore, to make himself acquainted with at least the outlines of the liberal arts and sciences; and with this view he repaired in 1750 to King's College, Aberdeen, where he obtained one of the bursaries or exhibitions which are there annually bestowed upon such candidates as display the most accurate knowledge of the Latin language. The small sum of five pounds, however, which none of these bursaries exceeds, was still inadequate to the expense of residence in college; but our young student was soon destined to obtain a more valuable exhibition, also by his own merit.

During the long vacation he returned to his master Dr Findlay, and was by him intrusted with a very desperate case in surgery, of which his management may be said to have laid the foundation of his future fortunes. His skill and excellent character recommended him so effectually to Sir Alexander Ramsay of Balmain, that he presented him with a bursary of fifteen pounds a year, which commenced at the next session or term in the same college.

Sir Alexander, whom he visited during some of the vacations, was so well pleased with his conversation, that he promised him another bursary, in his gift, of L.25 a year, to commence immediately on the expiration of that which he enjoyed. This promise he performed in the beginning of the year 1755; and, at the solicitation of Dr Findlay, even paid the money in advance, to enable the exhibitioner to travel for the purpose of improving himself in his profession.

Thus provided, Mr Ramsay went to London, and studied surgery and pharmacy under the auspices of Dr Macaulay, in whose family he lived for two years, esteemed alike by him and by his lady. Afterwards, having passed the usual examination at Surgeons' Hall, he served in his medical capacity for several years in the royal navy.

Having met with an accident, by which his thigh-bone was fractured, he once more turned his thoughts towards the church; and on coming home with Sir Charles Middleton he was admitted into orders; after which he immediately returned to St Christopher's, where he was presented by the governor to two rectories, valued at L.700 a year.

As soon as he took possession of his livings, in 1763, he married Miss Rebecca Akers, the daughter of a planter of the best family connections in the island, and began to regulate his household on the pious plan inculcated in his Essay on the Treatment and Conversion of the African Slaves in the British Sugar Colonies. He summoned all his own slaves daily to the prayers of the family, when he took an opportunity of pointing out to them their duty in the plainest terms, reproving those who had done amiss, and commending such as had shown anything like virtue. Although his serious studies were now theological, he considered himself as answerable to God, his country, and his own family, for a proper use of every branch of knowledge which he possessed. He therefore took the charge of several plantations around him in the capacity of a medical practitioner, and attended them with unremitting diligence and with great success. Thus he lived till the year 1777, when, relinquishing the practice of physic entirely, he paid a visit to the place of his nativity, which he had not seen since 1755. His mother, whose latter days he had made comfortable by a handsome annuity, had been dead for some years; but he rewarded all who had been attentive to her, or in early life serviceable to himself; and he continued the pension to his sister, who had a numerous family, for which her husband was unable to provide.

Ramsbury
||
Ramsey.

After remaining three weeks in Scotland, and nearly a year in England, during which time he was admitted into the confidence of Lord George Germaine, then secretary of state for the American department, Mr Ramsay was appointed chaplain to Admiral Barrington, at that time going out to take a command in the West Indies. Under this gallant officer, and afterwards under Lord Rodney, he was present at several engagements, where he displayed a fortitude and zeal for the honour of his country which would not have disgraced the oldest admiral. To the navy, indeed, he seems to have been strongly attached; and, at an early period of his life, he wrote an Essay on the Duty and Qualifications of a Sea-officer, with such a knowledge of the service as would have done honour to the pen of the most experienced commander. Although caressed by the admirals under whom he served, Mr Ramsay once more quitted the naval service, and retired to his pastoral charge in the island of St Christopher's. There, however, though the former animosities against him had entirely subsided, and though his friendship was now solicited by every person of consequence in the island, he remained but a little time. Sick of the life of a planter and of the prospect of slavery around him, he resigned his livings, and bidding adieu to the island, returned to England with his wife and family in the end of the year 1781. Immediately on his arrival, he was, through the interest of his steady friend Sir Charles Middleton, presented to the livings of Teston and Nettlestead, in the county of Kent. Here he was soon determined, by the advice of those whom he most respected, to publish an Essay, which had been written many years before, on the Treatment and Conversion of African Slaves in the British Sugar Colonies. This publication involved him in controversies which embittered his life. The agitation given to his mind, and the fatigues he underwent in his endeavours to rescue from misery the most helpless portion of the human race, contributed to shorten a life which had been in no common degree useful. He had for some time been afflicted with a pain in his stomach, for which he was prevailed upon, though with great reluctance, to try the effects of air and exercise, by attempting a journey of a hundred miles. But in London, being seized with a violent vomiting of blood, he was unable to proceed and unfit to be removed hence; and, in the house of Sir Charles Middleton, he ended his days, on the 20th of July 1789. His works, besides those to which we have already alluded, consist of a volume of Sea-Sermons, and a Treatise on Signals.

RAMSBURY, a town of the county of Wilts, in the hundred of its own name, and 70 miles from London, is situated on the river Kennet. It once had a market, which, however, has declined. The population amounted in 1801 to 1963, in 1811 to 2095, in 1821 to 2335, and in 1831 to 2290.

RAMSEY, a market-town of the county of Huntingdon, and hundred of Hurstingtone, sixty-eight miles from London. Near to it is the lake or mere of the same name, which abounds with fish, chiefly eels and perch. There are the remains of an abbey, once distinguished for its extent and wealth, which is said to have been founded in the reign of the Saxon king Edgar, the son of Athelstane. There is a market, which is held on Saturday. The population amounted in 1801 to 1894, in 1811 to 2390, in 1821 to 2814, and in 1831 to 3006.

RAMSEY, a town in the parish of St Maugholds, in the Isle of Man. It is situated on the north-east coast of the island, about sixteen miles from Douglas. Though the harbour is small, there is good anchorage in a spacious bay near it, where there is a lighthouse, and the whole is defended by a fort. It contains about 500 houses and 2000 inhabitants.

RAMSEY, a small island on the shore of the county of Pembroke, in South Wales. It is nearly three quarters of a mile in length and half a mile in breadth, and forms the north point of St Bride's Bay. It was formerly much frequented by persons passing to Ireland, being the shortest water distance between the two islands; as from St Bride's to Carnaroot Point, on the south-east angle of Ireland, is only sixteen leagues.

RAMSGATE, a large town and port, originally a hamlet, in the parish of St Lawrence, in the Isle of Thanet, in Kent, seventy-three miles from London, and seventeen from Canterbury. It is situated in a pleasant valley on the shore, with extensive views of the sea from the North and South Foreland, and of the shipping in the Downs. It has owed its rise to the construction of a most costly pier, by which a harbour has been created, which serves as a refuge for ships in stormy weather. It is capable of containing 500 sail of vessels. The pier extends 800 feet into the sea, and its top, which is twenty-six feet broad, furnishes a fine promenade. A new inner harbour is in progress, and will speedily be opened. Ramsgate, like Margate, has become a favourite place of resort for sea-bathing; and though it has long been so, the number of visitors has vastly increased since the introduction of steam-vessels, by which passengers may in a few hours be conveyed to and from the metropolis. The accommodations for bathers are good, and there are abundance of hotels and lodging-houses to be procured at a moderate rate. There are a fine assembly-room, numerous libraries, and a handsome chapel, with meeting-houses for the various dissenting sects. It has some trade to the Baltic; and many of the lower classes are occupied as fishermen, pilots, and watermen. It is in the liberty of the cinque port of Sandwich. The population amounted in 1801 to 3110, in 1811 to 4222, in 1821 to 6031, and in 1831 to 7985.

RAMTRUT, a deity worshipped by the Ranazins of Hindustan, where he has a celebrated temple at Onor. He is represented as more resembling a monkey than a man.

RAMUS, PETER, was one of the most celebrated professors of the sixteenth century. He was born in Picardy in 1515. A thirst for learning prompted him, when very young, to repair to Paris, and he was admitted as a servant in the college of Navarre. Spending the day in waiting on his masters, and the greater part of the night in study, he made such surprising progress, that, when he took his degree as master of arts, he offered to maintain a doctrine quite opposite to that of Aristotle. This raised him many enemies; and the first two books he published, *Institutiones Dialecticæ* and *Aristotelicæ Animadversiones*, occasioned great disturbances in the university of Paris. The opposition against him was not a little heightened by his deserting the Catholic religion, and professing that of the Reformed. Being thereby forced to retire from Paris, he visited the universities of Germany, and received great honours wherever he went. He returned to France in 1571, and lost his life miserably during the massacre of St Bartholomew's day. He was a great orator, a man of general learning, and endowed with fine moral qualities. He published many books, which Teissier enumerates. Ramus's merit in his opposition to Aristotle, and his firmness in undermining his authority, is unquestionably very great. But it has been doubted, and with much reason, whether he was equally successful in his attempts to form a new logical institute. The following general outline of his plan is given in Dr Enfield's History of Philosophy. "Considering dialectics as the art of deducing conclusions from premises, he endeavours to improve this art, by uniting it with that of rhetoric. Of the several branches of rhetoric, he considers invention and disposition as belonging equally to logic. Making Cicero his chief guide, he divides his treatise on dialectics into two parts, the first of which treats of the invention of arguments, the second of judgments. Arguments he derives not only from what the Aristotelians call middle terms, but from any kind of proposition, which, connected with another, may serve to prove any assertion. Of these he enumerates various kinds. Judgments he divides into axioms, or self-evident propositions, *dianoëa*, or deductions by means of a series of arguments. Both these he divides into various classes; and illustrates the whole by examples from the ancient orators and poets.

"In the logic of Ramus, many things are borrowed from Aristotle, and only appear under new names; and many others are derived from other Grecian sources, particularly from the dialogues of Plato, and the logic of the Stoics. The author has the merit of turning the art of reasoning from the futile speculations of the schools to forensic and common use; but his plan is defective in confining the whole dialectic art to the single object of disputation, and in omitting many things, which respect the general culture of the understanding and the investigation of truth. Notwithstanding the defects of his system, we cannot, however, subscribe to the severe censure which has been passed upon Ramus by Lord Bacon and others; for much is, we think, due to him for having with so much firmness and perseverance asserted the natural freedom of the human understanding. The logic of Ramus obtained great authority in the schools of Germany, Great Britain, Holland, and France; and long and violent contests arose between his followers and those of the Stagyrite, till his fame vanished before that of Descartes."

RAN, in the old English writers, means open or public robbery, so manifest as not to be denied. Ran *dicitur aperta rapina quæ negari non potest.* (Lamb. 125, *Leg. Canut.* cap. 58.) Hence it is now commonly said of one who takes the goods of another injuriously and violently, that he has snatched or taken all that he could *rap* and *ran*.

RANAI, or **ORANAI**, one of the Sandwich Islands, in the North Pacific Ocean, about nine miles from Mowee. The population is estimated at 20,000. The island produces few plantains or bread-fruit trees; but abounds in yams, sweet potatoes, and other esculent roots and vegetables. Long. 185. 23. E. Lat. 20. 51. N.

RANDAZZO, a city of the district Demone, in the intendency of Messina, in Sicily. It stands on the side of Mount Ætna, looking over a rich and extensive plain, near a curious lake abounding in spunges, the collecting of which forms a part of the employment of the inhabitants. It is 120 miles from Palermo, and moderately healthy. The population amounts to 4700.

RANDERS, a city of Denmark, the capital of a bailiwick of the same name, in the province Aarhuus. It is situated at the mouth of the river Guden, and was once larger, and fortified. It now contains 515 houses and 4570 inhabitants, who make some cloths, and have breweries and distilleries. Long. 9. 58. 22. E. Lat. 56. 27. 48. N.

RANDIER, a town of Hindustan, in the province of Gujerat, and district of Broach, which is said to have been in ancient times a large city. It is situated opposite to Surat, on the north side of the Tuptee river. Long. 73. 3. E. Lat. 21. 16. N.

RANDOLPH, THOMAS, an English poet in the seventeenth century, was born in Northamptonshire in 1605. He was educated at Westminster and Cambridge, and very early distinguished by his excellent genius; for about the age of nine or ten years he wrote the History of the Incarnation of our Saviour in verse. His subsequent writings established his character, and gained him the esteem and friendship of some of the greatest men of that age, particularly of Ben Jonson, who adopted him as one of his sons in the muses. He died in the year 1634, and was honourably interred. His principal works are, 1. The Muses' Looking-glass, a comedy; 2. Amyntas, or the Impossible Dowry, a pastoral, acted before the king and queen; 3. Aristippus, or the Jovial Philosopher; 4. The Conceited Pedlar; 5. The Jealous Lovers, a Comedy; 6. Hey for Honesty, down with Knavery, a Comedy; and several other poems.

RANDOM SHOT, in *Gunnery*, is a shot made when the muzzle of a gun is raised above the horizontal line, and is not designed to shoot directly or point black. The utmost random of any piece is about ten times as far as the bullet will go point blank. The bullet will go farthest when the piece is mounted at an angle of about forty-five degrees above the level range.

RANGALORE, a town and fortress of Hindustan, in the province of the Northern Circars, and district of Cicacole. Long. 83. 20. E. Lat. 18. 20. N.

RANGAMUTTY, a town and district of Hindustan, in the north-western extremity of Bengal, situated about the twenty-sixth degree of north latitude, and formerly included in the extensive kingdom of Kamroop. After its subjugation by the Mahommedans, about the middle of the seventeenth century, it was annexed to the collectorship of Rungpore. It has for its boundaries Bootan on the north, the Garrow Hills on the south, Assam on the east, and Cooch Bahar and Rungpoor on the west. It is a wild uncultivated country, stretching on both sides of the Brahmaputra, easterly, to the confines of Assam. Many parts of the country, the area of which is 2620 square miles, might be rendered extremely productive, although at present they yield little more than a few elephants, which are caught annually in the neighbouring forests. The chief river is the Brahmaputra, which nearly intersects the country; and the principal towns are Rangamutty and Goalporah. The former is situated near the hills, between two tributary streams of the Brahmaputra. It has declined from its ancient prosperity. Long. 90. E. Lat. 26. 9. N.

RANGE, in *Gunnery*, the path of a bullet, or the line it describes from the mouth of the piece to the point where it lodges. If the piece lie in a line parallel to the horizon, it is called the *right* or *level range;* if it be mounted to 45°, it is said to have the *utmost range;* and all others between 0° and 45° are called the *intermediate ranges.*

RANGER, a sworn officer of a forest, appointed by the king's letters patent, and whose proper business it is to walk through his charge, to drive back the deer out of the purlieus, and to present all trespasses within his jurisdiction at the next forest court.

RANGOON, a city and principal sea-port of the Burman empire, in the province of Pegu. It is situated on the Rangoon river, one of the mouths of the great Irrawaddy, about twenty-four miles from its mouth. The river is broad, deep, and navigable. At its entrance it is nearly a mile in width, and is distinguished by a clump of trees called the Elephant, which stands on the western point. It gradually narrows to about a quarter of a mile opposite Rangoon. There is a depth of from six to eight fathoms water in the river, and no shoals; and there are four fathoms water on the bar at half flood. About three miles below the town is the mouth of the Syriam or Pegu river, where it joins the Rangoon. The country above is level, and agreeably variegated with clumps of trees; although it appears to be much depopulated, from the frequent wars between the Burmese and Peguers. The town, with the exception of the public offices, and one or two houses, is built of wood, extends along the bank of the river about a mile, and is about half or three quarters of a mile in breadth. It is built in the form of a square, surrounded by a stockade fifteen feet high, and on the north side it is farther strengthened by an indifferent fosse, across which a wooden bridge is thrown. The fort or stockade is an irregular square, the north and south faces of which were found to measure 1145 yards, the east 598, and the west 187. On the north face there are two gates and a sally-port, on the south three gates and three sally-ports, on the east two gates, and on the west one gate and one sally-port. The stockade is fifteen feet high, and is composed of heavy beams of teak timber. The city and its suburbs are divided into eight wards, superintended by an officer, whose business it is to maintain, watch, and ward within his division. The palisaded fort or stockade is a town composed of three wide and clean streets running east and west, and three smaller ones crossing them, and fronting the gates of the south face. The most populous part of the town is the suburb called Tackally, immediately on the west face of the stockade. Wooden stages are erected within the stockade for musketeers to stand on in case of attack. A battery of twelve pieces of cannon, raised on the banks, commands the river; but it has fallen into disrepair. The town has by no means an imposing appearance. The wooden buildings along the banks of the river resemble barns, though the great temple of Shoe Dagoon, in the midst of its intermediate spires, forms a splendid object. This temple is a well-known place of pilgrimage; it is frequented by many strangers during the vernal festival in March, when, as it is usual in the East to connect commerce and religion, a great fair is held near it. It is the only temple frequented as a common place of worship by the inhabitants of Rangoon and its vicinity. The principal part of the city is situated within the stockade; the streets are wide and at right angles; and one or two houses only are built of brick and chunam, the chief of which is the custom-house. The dwellings of the common people are constructed of posts driven into the ground, at the distance of two or three feet, from which there is a bamboo grating forming the floor. The roof is covered with the leaves of the palmyra, or long grass twisted round and sewed to slips of bamboo. The houses of the priests are large buildings of teak, with substantial tiled roofs; the floors are commonly eight or twelve feet from the ground, and many of them are carved. In these are contained the marble or gilded wooden images of Gaudma, seated on an oak, in which their sacred books are contained. The suburb of Tackally, inhabited by the lower classes, is more populous than the town itself. Almost all the houses here, as in other parts, are composed of the cheapest and frailest materials, and are peculiarly liable to destruction by fire. In March 1826, Mr Crawford, who was sent on an embassy to Ava, saw the whole suburb burned to the ground in a few hours, from the accident of a pot boiling over. It was reconstructed in less than a month, and the houses were far more numerous than before the accident. The great pagoda or golden temple is situated two and a half miles in the rear of Rangoon; the road to it is through one of the northern gates, by a causeway across the fosse. The road then ascends between two rows of smaller pagodas, until the eminence is reached upon which the temple is situated, occupying the highest of three platforms. The building is octagonal at the base and spiral at the top, and is estimated at 330 feet in height. It is highly gilt on the top, and is an umbrella of open iron work, surmounted by a vane, and a small globe of glass. Bells are hung round the lower part. There are no apertures in the building, which is solid throughout. It has small niches all around, that formerly contained images of marble and wood. But these were mostly removed by the English when they occupied the town during the Burmese war. The smaller pagodas were also mostly pillaged by the soldiery. On the southern side of the pagoda is a beautiful pavilion, gilt and painted, containing an image of Gaudma, of gigantic dimensions. The river Rangoon is extremely commodious for ship-building, which is carried on to a great extent. The spring-tides rise to the perpendicular height of twenty feet. The banks are soft, and so flat that there is need of little labour for the formation of docks, and vessels of any burden may be built. It is estimated that vessels can be built at Rangoon for one third less than at Bombay. This capital of the Burmese empire is the resort of traders from all nations; and it is also an asylum for less respectable characters, such as insolvent debtors from different settlements of India, foreigners of desperate fortunes, who are received in the most friendly manner by the Burmans, and generally support themselves by some petty traffic. Malabars, Moguls, Persians, Parsees, Armenians, Portuguese, French, and English, men of all countries and of all complexions, are here seen mingled together on the exchange; and all meet with the most perfect toleration for their religion, provided they do not meddle with the worship of the Burmese divinity, Guadma, or with the ceremonies of any other sect. A considerable portion of the inhabitants are Chinese, who are merchants, shopkeepers, artisans, and constitute the most industrious portion of the community. A share of the trade is also engrossed by the Parsees, Armenians, and a small portion of the Mahommedans, who are also selected by government to fill offices of trust that relate to the trade and the transactions of foreigners.

The imports from the British settlements consist chiefly of coarse piece-goods, glass, hardware, and broad cloth. The returns are chiefly made in timber, with which Madras is mostly supplied from Rangoon. The trade is carried on in boats, about ten or twelve of which are annually fitted out, and about thirty more from various towns on the Irrawaddy river. These proceed by the way of the Bassein river, through the channels which divide the great Negrais from the continent, along the coast of Arracan, to Luckipore, Dacca, Calcutta, Bogwandola, and even to Patna and Benares. They carry each a crew of from twenty to twenty-five men; and on an average 4000 rupees in bullion, the remainder of the cargo consisting of sheathing boards, sticks of copper from China, sticklac, cutch, ivory, and wax.

The inhabitants are stout and athletic, the men being about five feet eight inches in height, with straight muscular limbs; the women rather diminutive, but well formed in every respect, except the nose, which is flat. Both sexes are of a copper colour; they are lively and inquisitive; almost all of them read and write, and have no prejudices that obstruct the progress of improvement. The women are not immured at home like those of Hindustan, but superintend the domestic economy, and weave the clothes worn by the men. Their own dress is scanty, and scarcely affords them a decent covering. They are not strict in their morals; and the men are in the practice of selling their wives and their daughters. The population is estimated at 30,000; but Crawford, on a census which he directed to be made whilst in the country, states it at 181,000. Long. 96. 9. E. Lat. 16. 47. N.

RANK, the order or place assigned to a person, suitably to his quality or merit.

RANK is a straight line formed by the soldiers of a battalion or squadron, drawn up side by side. This order was established for the marches, and for regulating the different bodies of troops and officers which compose an army.

Rank and Precedence, in the army and navy, are estimated as follows:

Engineers' Rank. Chief, as colonel; director, as lieutenant-colonel; sub-director, as major; engineer in ordinary, as captain; engineer extraordinary, as captain-lieutenant; sub-engineer, as lieutenant; practitioner engineer, as ensign.

Navy Rank. Admiral, or commander-in-chief of his majesty's fleet, has the rank of a field-marshal; admirals, with their flags on the main-topmast-head, rank with generals of horse and foot; vice-admirals, with lieutenant-generals; rear-admirals, as major generals; commodores with broad pendants, as brigadier-generals; captains of post-ships, after three years from the date of their first commission, as colonels; other captains, as commanding post-ships, as lieutenant-colonels; captains not taking post, as majors; lieutenants, as captains.

Rank between the Army, Navy, and Governors.

ARMY.	NAVY.	GOVERNORS.
General-in-chief.	Admiral-in-chief.	Commander-in-chief of the forces in America.
Generals of horse.	Admiral with a flag at the main-topmast.	Captain-generals of provinces.
Lieutenant-generals.	Vice-admirals.	Lieutenant-generals of provinces.
Major-generals.	Rear-admirals.	Lieutenant-governors and presidents.
Colonels.	Post-captains of three years.	Lieutenant-governors not commanding.
Lieutenant-colonels.	Post-captains.	Governors of charter colonies.
Majors.	Captains.	Deputy-governors.
Captains.	Lieutenants.	Established by the king, 1760.

Ranks and Files are the horizontal and vertical lines of soldiers when drawn up for service.

RANNY BEDNORE, a port and town of Hindustan, in the Balaghaut ceded territories. It is sixty miles north-east from Chitteldroog. Long. 75. 42. E. Lat. 14. 33. N.

RANNYPOOR, a town of Hindustan, province of Malwah, in the Mahratta territories. It is forty-four miles north-west from Chatterpoor. Long. 79. 16. E. Lat. 25. 13. N.

RANS DES VACHES, or RAAS DES VACHES, a celebrated melody of the cow-herds in Switzerland. There seem to be several melodies of that name, employed to assemble the cows in the evening, and to lead them home from their Alpine pastures. The great violinist Viotti wrote down one of these, which he heard amongst the valleys of Switzerland; and used to perform it with such effect in London as to draw tears from his auditors. It has been frequently related, on unquestionable authority, that Swiss soldiers on foreign service, when they happened to hear the *rans des vaches* performed, were so overpowered by its effect as to be rendered incapable of attending to their duty. We know a British officer in the army who witnessed a remarkable instance of this effect in the military band attached to an English regiment. In Rogers' Pleasures of Memory there is an elegant allusion made to the nostalgia or *home-sickness* produced by the *rans des vaches* upon Swiss soldiers in foreign lands.

RANSOM, a sum of money paid for the redemption of a slave, or the liberty of a prisoner of war. In our lawbooks, ransom also means a sum paid for the pardon of some great offence, and to obtain the offender's liberty.

RANTAMPORE, a fortress of Hindustan, and the capital of a district of the same name, in the province of Ajmeer, and in the middle of the Arrabarne Hills. It is said to have been built in the thirteenth century, and is esteemed one of the largest and strongest fortresses in India; but as it has never been visited by any Europeans, its strength is not accurately known. The travelling distance is 120 miles south-west from Agra, and 260 miles from Oojain. Long. 76. 25. E. Lat. 26. 2. N.

RAPE, in *Law*, the carnal knowledge of a woman forcibly and against her will. This, by the Jewish law, was punished with death, in case the damsel was betrothed to another man; and in case she was not betrothed, then a heavy fine of fifty shekels was to be paid to the damsel's father, and she was to be the wife of the ravisher all the days of his life, without that power of divorce which was in general permitted by the Mosaic law.

The Roman law punishes with death and confiscation of goods the crime of ravishment, under which it includes both the offence of forcible abduction, or taking away a woman from her friends, and also the present one of forcibly dishonouring her; either of which, without the other, is in that law sufficient to constitute a capital crime. The stealing away a woman from her parents or guardians, and debauching her, is equally penal by the emperor's edict, whether she consent or be forced; and this in order to take away every opportunity of offending in this way from women, whom the Roman law supposes never to go astray without the seduction and arts of the other sex; and therefore, by restraining and making so highly penal the solicitations of the men, they meant to secure effectually the honour of the women. But our English law does not entertain quite such sublime ideas of the honour of either sex, as to lay the blame of a mutual fault upon one of the transgressors only; and therefore it is a necessary ingredient in the crime of rape, that it must be against the woman's will.

Rape was punished by the Saxon laws, particularly those of Athelstane, with death; which was also agreeable to the old Gothic or Scandinavian constitution. But this was afterwards thought too hard; and in its stead another severe but not capital punishment was inflicted by William the Conqueror, namely, castration and loss of eyes, which continued till after Bracton wrote, in the reign of Henry III. But in order to prevent malicious accusations, it was then the law (and, it seems, still continues to be so in appeals of rape), that the woman should, immediately afterwards, go to the next town, and there make discovery to some credible persons, of the injury she had suffered, and afterwards should acquaint the high constable of the hundred, the coroners, and the sheriff, with the outrage. This seems to correspond in some degree with the laws of Scotland and Aragon, which require that complaint must be made within twenty-four hours; though afterwards, by statute Westm. 1, c. 13, the time of limitation in England was extended to forty days. At present there is no time of limitation fixed; for, as it is usually now punished by indictment at the suit of the king, the maxim of law takes place, that *nullum tempus occurrit regi*; but the jury will rarely give credit to a stale complaint. During the former period also it was held for law, that the woman, by consent of the judge and her parents, might redeem the offender from the execution of his sentence, by accepting him for her husband; if he also was willing to agree to the exchange, but not otherwise.

In the 3d Edward I. by the statute Westm. 1, c. 13, the punishment of rape was much mitigated; the offence itself, of ravishing a damsel within age, that is, twelve years old, either with or without her consent, or of any other woman against her will, being reduced to trespass, if not prosecuted by appeal within forty days, and subjecting the offender only to two years' imprisonment, and a fine at the king's will. But this lenity being productive of the worst consequences, it was, in ten years afterwards, 13 Edward I., found necessary to make the offence of forcible rape felony by statute Westm. 2, c. 34. And by statute 18 Elizabeth, c. 7, it is made felony without benefit of clergy; as is also the abominable wickedness of carnally knowing or abusing any woman-child under the age of ten years, in which case the consent or non-consent is immaterial, as by reason of her tender years she is incapable of judgment and discretion. Sir Matthew Hale is indeed of opinion that such profligate actions committed on an infant under the age of twelve years, the age of female discretion by the common law, either with or without consent, amount to rape and felony, as well since as before the statute of Queen Elizabeth. But that law has in general been held only to extend to infants under ten; though it should seem that damsels between ten and twelve are still under the protection of the statute Westm. 1, the law with respect to their seduction not having been altered by either of the subsequent statutes.

A male infant, under the age of fourteen years, is presumed by law to be incapable of committing a rape, and therefore, it seems, cannot be found guilty of it. For though in other felonies *malitia supplet ætatem;* yet, as to this particular species of felony, the law supposes an imbecility of body as well as mind.

The civil law seems to suppose a prostitute or common harlot incapable of any injuries of this kind; not allowing any punishment for violating the chastity of her who has indeed no chastity at all, or at least has no regard to it. But the law of England does not judge so hardly of offenders, as to cut off all opportunity of retreat even from common strumpets, and to treat them as incapable of amendment. It therefore holds it to be felony to force even a concubine or harlot, because the woman may have forsaken that unlawful course of life; for, as Bracton well observes, *licet meretrix fuerit antea, certe tunc temporis non fuit, cum reclamando nequitiæ ejus consentire noluit.*

RAPHAEL, or RAFFAELLE, D'URBINO, the greatest, most sublime, and most excellent painter that has appeared since the revival of the fine arts, was the son of an indifferent painter named *Sanzio*, and was born at Urbino on Good Friday 1482. The popes Julius II. and Leo X., who employed him, loaded him with wealth and honour; and it is said that Cardinal de St Bibiana had such a value for him that he offered him his niece in marriage. His genius is admired in all his pictures; his contours are free, his designs correct, his figures elegant, his expressions lively, his attitudes natural, his heads graceful; in fine, everything is grand, beautiful, just, natural, and adorned with grace. These various perfections he derived not only from his excellent abilities, but from his study of antiquity and anatomy, and from the friendship which he contracted with Ariosto, who contributed not a little to the improvement of his taste. His pictures are to be found principally in Italy and in Paris. That of the Transfiguration, preserved at Rome in the church of St Peter Monterio, passes for his masterpiece. Raphael had a handsome person, was well proportioned, and had great sweetness of temper; he was polite, affable, and modest.

Nevertheless, he lived in the utmost splendour; most of the eminent masters of his time were ambitious of working under him; and he never went out without a crowd of artists and others, who followed him purely from respect. He was not only the best painter in the world, but perhaps the best architect too, on which account Leo X. charged him with building St Peter's church at Rome; but he was too much addicted to pleasure, which occasioned his death at the early age of thirty-seven. See PAINTING.

RAPHAIM, or REPHAIM, a name signifying *Giants*, as they really were, and an actual people too, situated in Basan or Batanea, beyond Jordan, and separated from the Zanzummim by the river Jabbok. This is also the name of a valley near Jerusalem.

RAPHANIDOSIS, a particular kind of punishment inflicted at Athens upon adulterers.

RAPIER, formerly signified a long old-fashioned sword, such as those worn by the common soldiers; but it now denotes a small sword, as contradistinguished to a back-sword.

RAPIN, RÉNÉ, a Jesuit and eminent French writer, was born at Tours in 1621. He taught polite literature in the society of the Jesuits with great applause, and was justly esteemed one of the best Latin poets and greatest wits of his time. He died at Paris in the year 1687. His principal works were, 1. A great number of Latin poems, which have rendered him famous throughout all Europe, amongst which are his *Hortorum libri quatuor*; 2. Reflections on Eloquence, Poetry, History, and Philosophy; 3. Comparisons between Virgil and Homer, Demosthenes and Cicero, Plato and Aristotle, Thucydides and Titus Livius; 4. The History of Jansenism; and, 5. Several works on religious subjects. The best edition of his Latin poems is that of Paris in 1723, in three vols. 12mo.

RAPIN DE THOYRAS, *Paul de*, a celebrated historian, was the son of James de Rapin, lord of Thoyras, and was born at Castres in 1661. He was at first educated under a tutor in his father's house, and afterwards sent to Puylaurens, and thence to Samur. In 1679 he returned to his father, with a design to apply himself to the study of the law, and was admitted an advocate; but some time afterwards, reflecting that his being a Protestant would prevent his advancement at the bar, he resolved to quit the profession of the law, and to apply himself to that of the sword. His father, however, would not consent to the change. The revocation of the edict of Nantes in 1685, and the death of his father, which happened two months afterwards, made him resolve to come to England; but as he had no hopes of any settlement there, his stay was but short. He therefore went to Holland, and enlisted himself in the company of French volunteers at Utrecht, commanded by M. Rapin, his cousin-german. He attended the Prince of Orange into England in 1688; and the following year Lord Kingston made him an ensign in his regiment, with which he proceeded to Ireland, where he gained the esteem of his officers at the siege of Carrickfergus, and soon received a lieutenant's commission. He was present at the battle of the Boyne, and was shot through the shoulder at the siege of Limerick. He was soon afterwards made captain of the company in which he had been ensign; but, in 1693, he resigned his company to one of his brothers, in order to become tutor to the Earl of Portland's son. In 1699, he married Marianne Testard; but this marriage neither abated his care of his pupil, nor prevented his accompanying him in his travels. Having finished this employment, he returned to his family, which he had settled at the Hague; and there he continued some years. But as he found his family increase, he resolved to retire to some cheap country; and accordingly removed, in 1707, to Wesel, where he wrote his History of England, and some other works. Though he was of a strong constitution, yet seventeen years' application, for so long was he engaged in composing his great work, entirely ruined his health. He died in 1725. Rapin wrote, in French, 1. A Dissertation on the Whigs and Tories; 2. His History of England, printed at the Hague in 1726 and 1727, in nine vols. 4to, and reprinted at Trevoux in 1728, in ten vols. 4to. This last edition is more complete than that of the Hague. It has been translated into English, and improved with notes, by Mr Tindal, in two vols. folio. This performance, although the work of a foreigner, is deservedly esteemed as the fullest and most impartial collection of English political transactions extant.

RAPPERSCHWEIL, a small city of Switzerland, in the canton of St Gall. It is fortified, and has a citadel, but the defences are at present in bad repair. It is situated near the head of the lake of Zurich, over an arm of which there is perhaps the longest bridge in the world, being 4800 feet in length, and only twelve feet in breadth. It is built of wood, and has no rail or balustrade on either side, so that the first entrance upon it is rather terrific to travellers in a carriage. The town is old and ill built, but without the walls the suburbs are delightful, and the soil in its immediate vicinity is very fruitful. Some machinery for spinning cotton has of late been erected. The population is about 1550 persons, but rapidly increasing.

RAPPOLSTEIN, a town of France, in the department of the Upper Rhine, which, before the revolution, had the title of a barony. Long. 7. 28. E. Lat. 48. 15. N.

RAREE, a town of Hindustan, on the sea-coast of the province of Bejapoor, seventeen miles north by west from Goa. Long. 73. 30. E. Lat. 15. 50. N.

RAREFACTION, in *Physics*, the act by which a body is rendered rare; that is, brought to occupy more room, or appear under a larger bulk, without accession of any new matter. This is very frequently the effect of heat, as has long been universally known. In many cases, however, philosophers have attributed it to the action of a repulsive principle. But, from the numerous discoveries concerning the nature and properties of the electric fluid and fire, there is the greatest reason to believe that this repulsive principle is no other than elementary fire.

RASAY, one of the Western Islands or Hebrides, is about thirteen miles in length and two in breadth. It has plenty of limestone and freestone, feeds great numbers of black cattle, but has neither deers, hares, nor rabbits. The only appearance of a harbour in Rasay is at Clachan Bay, where the proprietor of the island resides. Rasay presents a bold shore, which rises to the height of mountains; and here the natives have with incredible labour formed many little cornfields and potato-grounds. These heights decrease at the southern extremity, where there are some farms and a good-looking country.

RAS EL KHYMA, a town of Arabia, on the Persian Gulf, situated on a sandy peninsula, the isthmus of which is defended by a battery, while the sea-line is also fortified by batteries of one gun each at regular intervals. It has a suburb of bamboo huts, roofed with date-tree leaves.

RASK, ERASMUS, an eminent scholar and philologist, was born at Brendekild, in the island of Fyen, in the year 1784. He studied at the university of Copenhagen, and early distinguished himself by his singular talent for the acquisition of languages. In the year 1808, he was appointed assistant keeper of the University Library, and some years afterwards made professor of Literary History. In 1811, he published, in the Danish language, his Introduction to the Grammar of the Icelandic and other Ancient Northern Languages, the materials of which were entirely derived from the immense mass of manuscript and printed works which had been accumulated by his predecessors in the same field of research. This grammar appears to have given a fresh impulse to the study of the ancient northern languages, even in Germany. The reputation which Rask acquired by it recommended him to the Arna-Magnæan Institution, by which he was employed as editor of the Icelandic Lexicon of Biorne Haldorsen, which had long remained in manuscript. To this work, which appeared in 1814, Bishop Müller contributed a preface, in which he pronounces a just eulogium on the talents and the spirit of research displayed by the youthful editor. About the same time, Rask, who had never been in Iceland, paid a visit to that country, where he remained from 1813 to 1815, during which time he made himself completely master of the language, and familiarized himself with the literature, manners, and customs of the natives. To the interest with which they inspired him, may probably be attributed the establishment at Copenhagen, early in 1816, of the Icelandic Literary Society, which was mainly instituted by his exertions, and of which he had the honour to be the first president.

Whilst thus employed, however, he was about to enter upon a more ample field of enterprise. In October 1816, he left Denmark on a literary expedition, which had been fitted out for the double purpose of prosecuting inquiries into the languages of the East, and collecting manuscripts for the University Library at Copenhagen. The king of Denmark having liberally provided him with the requisite means, he proceeded first to Sweden, where he remained two years, in the course of which he made an excursion into Finland, for the purpose of studying the language of that country. Here he published, in Swedish, his Anglo-Saxon Grammar, in 1817; and during the same year there appeared at Copenhagen, in Danish, an Essay on the Origin of the Ancient Scandinavian or Icelandic Tongue, in which he traced the affinity of that remarkable idiom to the other European languages, particularly to the Latin and the Greek. In 1818, he published a second edition, very much improved, of his Icelandic Grammar, translated by himself into Swedish; and in the course of the same year he also brought out the first complete editions of Snorro's Edda, and Sæmund's Edda, in the original text, along with Swedish translations of both Eddas, the originals and the versions occupying each two volumes. From Stockholm he proceeded, in 1819, to St Petersburg, where he wrote in German an interesting paper on the Languages and Literature of Norway, Iceland, Sweden, and Finland, which was published in the sixth number of the Vienna Jahrbucher. From Russia, which he traversed, he proceeded through Tartary into Persia, and resided for some time at Tauris, Teheran, Persepolis, and Shiraz. It may be mentioned here, as an instance of his remarkable facility in acquiring languages, that, in about six weeks, he made himself sufficiently master of the Persian to be able to converse freely in that language with the natives. In 1820, he embarked at Abuschekr, in the Persian Gulf, for Bombay, which he reached in safety; and during his residence there he wrote, in English, a Dissertation on the Authenticity of the Zend Language, which he addressed to the governor, the Hon. Mountstuart Elphinstone, and which was afterwards published in the third volume of the Transactions of the Literary Society of Bombay. The same production, with corrections and additions, was afterwards deemed worthy of insertion in the Transactions of the Royal Asiatic Society. From Bombay he proceeded through India to Ceylon, where he arrived in 1822, and soon afterwards wrote, in English, a Dissertation respecting the best Method of expressing the Sounds of the Indian Languages in European Characters, which was printed in the Transactions of the Literary and Agricultural Society of Colombo. Professor Rask, having at length completed his researches on the scale prescribed, set out for Europe, and reached Copenhagen in the beginning of May 1823, after an absence of nearly seven years. He brought home with him a considerable collection of rare and curious oriental manuscripts, Persian, Zend, Pali, Cingalese, and others, which now enrich the university and royal libraries of the Danish capital.

Notwithstanding all his labours and exertions, this indefatigable scholar scarcely allowed himself an interval of repose. Between the period of his return from the East and that of his death, which occurred far too soon for the interests of philology, Professor Rask published in his native language a Spanish Grammar in 1824, an Italian Grammar and a Frisic Grammar in 1825, a Treatise respecting the Ancient Egyptian Chronology in 1827, the Ancient Jewish Chronology previous to Moses in 1828, and an Essay on Danish Orthography in the same year. He likewise edited an edition of Schneider's Danish Grammar for the use of Englishmen in 1829, and superintended the English translation of his Anglo-Saxon Grammar in 1830. This last work supplies what had long been a desideratum in English literature. Before its appearance, persons whose taste might dispose them to investigate our early vernacular remains, had no guides to direct them, and each had to form for himself a Grammar and a Dictionary of the Saxon. Hickes' was full of blunders, and in these Elstob, Lye, Manning, and others had religiously followed him, superadding their own contingents respectively. By the publication of Rask's Saxon Grammar, however, we were to a certain degree freed from this lamentable state of things, and facilities were afforded for the acquisition of the language, which previously had no existence. The attentive student will at once perceive the important light which he has thrown upon its principles, by what he has advanced regarding accentuation, in all which the soundness of his views is fully supported by the manuscripts. He has divided nouns into simple and complex, and adjectives into definite and indefinite; a division which is new to us in this country, and, by its simplicity of arrangement, forms a striking contrast to the endless subdivisions, exceptions, and annotations of Hickes. But it is in the investigation of the verbs that Rask appears to the greatest advantage. His classification of them is simple and obvious; nor can there be a better proof of his accuracy than the perfect order and regularity which it enables us to detect in numerous formations previously considered as irregular. His observations on prefixes and postfixes are written with less care, and he has also treated the important branch of syntax in too slight and perfunctory a manner; omissions which excite some surprise, in a scholar possessing such an entire mastery over the Anglo-Saxon.

We must return to the author himself, however, one of whose last literary efforts we have thus incidentally noticed. In private life the character of Professor Rask was such as to command admiration and respect. His manners, though somewhat retiring, were mild and gentle, and his morals unimpeachable. His mode of living was simple in the extreme, and his temperance that of an anchoret. The habits of study and application which he had acquired in his youth were never laid aside. In company he was diffident, and always expressed himself with modesty; but when the subject involved any thing relative to his own history or pursuits, he evinced a reluctance to converse, which seemed to grow upon him with years, and almost amounted to a morbid sensibility. His facility in the acquisition of languages was extraordinary; he appeared to gain a knowledge of them by a sort of intuition, and his mind seemed to recollect rather than to learn. In 1822, he was master of no less than twenty-five languages and dialects. His knowledge of English was extensive and correct. He spoke and wrote it with such fluency and precision, that Englishmen to whom he was introduced were accustomed to ask him how long he had been in England, considering that such an acquaintance could only be gained by a residence in the country where it was spoken. Rask, in his personal appearance, was thin and spare, but well made; his habits of temperance, regularity, and exercise, had contributed to give him all the appearance of a healthy man, and he seemed destined to attain a ripe old age. He was capable of enduring much fatigue, and even the privation of necessary rest; changes of climate seemed to produce no impression upon his constitution;

the scorching sun of India, and the biting frosts of Iceland, were equally braved and disregarded. But, with all this apparent superiority to ordinary infirmities, he fell a victim to consumption, brought on, it is believed, by those habits of intense application, and abstinence from proper nutriment, to which we have already alluded; and he died at that period of life (forty-eight) when the faculties of the human mind have little more than attained their maturity, leaving behind him a name that will not soon be forgotten.

The acquirements of Professor Rask were multifarious and extraordinary, and such as justly entitled him to our respect and admiration. There never perhaps existed any scholar whose study of language had been directed to a wider circle, and assuredly none who had made the structure of language so much an object of attention. He was the great comparative anatomist of philology; not building up theories out of scattered fragments, collected as it were by accident, but drawing his conclusions from the most profound and elaborate research, and, by comparison, comprehension, and exhaustion, initiating us into those curious inquiries which have for the most part been perfunctorily handled by the majority of critics. Not that Rask's writings have enabled the world to form an accurate estimate of his extraordinary learning. To have written the best Icelandic, and the best Anglo-Saxon Grammar; to have tracked, through Hebrew or hieroglyphical records, the chronology of the Egyptian kings; to have edited Eddas or Sagas, and carried off prizes for essays on this or the other limited inquiry; all these constituted little compared to what this extraordinary man was capable of effecting, had it pleased God to prolong his life. He was one of the few men qualified to write on philology, with a sufficient knowledge of the subject in all its bearings; who had seen with his own eyes, and heard with his own ears, the tribes and the tongues which overspread the surface of the globe; who, if he had not girdled the whole earth, had at least explored those tracts in which so many nations were cradled; and who, travelling throughout the East in quest of philological knowledge, carried with him a mind so well trained, and exercised, and cultivated, that nothing could be wasted upon it. Of this we have ample evidence furnished to us at every stage in his protracted expedition. His progress was like that of Fame in Virgil, continually gaining fresh accessions of knowledge, and increasing in intellectual stature, but, unlike the impersonation of the poet, never raising aloft his head so as to plunge it into the region of the clouds. His primary object was the collection of sufficient materials to serve as the basis of a most enlarged induction; his next was to employ analysis or resolution in decomposing, separating, and classifying these materials, so as to render them disposable for the purposes of general investigation; and his last, by synthetical reasoning, to lay a solid foundation for the science of philology, and to deduce those general laws of connection, resemblance, or filiation, which may be discovered in every branch of the great family of languages. He lived to accomplish the first, and he had even entered upon his analytical labours, when exhausted nature sunk under the toil, and the grave swallowed up the fruits of all his researches. Rask was no theorist; and, if his life had happily been prolonged, he would have finally settled the question, which has long been agitated, viz. whether induction be really applicable as an instrument of investigation and discovery in the science of philology. (A.)

RASTADT, a city of the grand duchy of Baden, in Germany, the capital of a bailiwick of its own name. It is situated on the river Murg, just before that stream joins the Rhine. There is a fine palace of the prince, now used as a college or gymnasium, a nunnery, an hospital, 568 houses, and 4400 inhabitants. Peace was made here in 1715; and in 1797 and 1798 a congress was held to negotiate a peace between the German empire and France, but it came to no pacific termination. It has some few small manufactures of cloth, steel wares, hosiery, and linen goods. Long. 8. 3. 5. E. Lat. 48. 50. 5. N.

RASTALL, John, a printer and miscellaneous writer, was born in London, probably about the end of the fifteenth century, and educated at Oxford. Returning from the university, he settled in the metropolis, and commenced printer, "then esteemed," says Wood, "a profession fit for any scholar or ingenious man." He married the sister of Sir Thomas More, with whom, we are told, he was very intimate, and whose writings he strenuously defended. From the title-page of one of his books, he appears to have lived in Cheapside, at the sign of the Mermaid. He died in the year 1536; and left two sons, William and John; the first of whom became a judge in Queen Mary's reign, and the other a justice of peace. This John Rastall, the subject of the present article, was a zealous Papist; but Bale says that he changed his religion before his death. He wrote, 1. *Natura naturata*. This Pits calls a copious and ingenious comedy, describing Europe, Asia, and Africa; with cuts. What sort of a comedy this was, it is not easy to conceive. Probably it is a cosmographical description, written in dialogue, and therefore styled a *comedy*. 2. The Pastyme of the People; the cronycles of diverse realmys, and most especially of the realm of England, brevely compiled and emprinted in Cheapesyde, at the sign of the mearmaid, next Pollysgate, *cum privilegio*, folio. 3. *Ecclesia Johannis Rastall*, 1542, was one of the prohibited books in the reign of Henry VIII. 4. *Legum Anglicanarum vocabula explicata*, French and Latin, London, 1567, 8vo; and some other works.

RASTRICK, a township of the parish of Halifax, in the west riding of Yorkshire and wapentake of Morley, 192 miles from London. It has risen into importance during the last thirty years, from the great extension of its woollen trade. The population amounted in 1801 to 2053, in 1811 to 2442, in 1821 to 2796, and in 1831 to 3021.

RAT. See Mammalia.

Rat Island, the small detached part of the island of Lundy, off the north coast of Devon.

RATAFIA, a fine spirituous liquor, prepared from the kernels and other parts of several kinds of fruits, particularly cherries and apricots. Ratafia of cherries is prepared by bruising the cherries, and putting them into a vessel wherein brandy has long been kept; then adding to them the kernels of cherries, with strawberries, sugar, cinnamon, white pepper, nutmeg, cloves, and to twenty pounds of cherries ten quarts of brandy. The vessel is left open ten or twelve days, and then stopped close for two months before it be tapped. Ratafia of apricots is prepared in two ways, namely, either by boiling the apricots in white wine, adding to the liquor an equal quantity of brandy, with sugar, cinnamon, mace, and the kernels of apricots, infusing the whole for eight or ten days, then straining the liquor, and putting it up for use; or by infusing the apricots, cut in pieces, in brandy, for a day or two, passing it through a straining bag, and then putting in the usual ingredients.

RATCH, or Rash, in clock-work, a sort of wheel having twelve fangs, which serve to lift up the detents every hour, and make the clock strike.

RATCHETS, in a watch, are the small teeth at the bottom of the fusee or barrel, which stops it in winding up.

RATES, in the navy, mean the orders or classes into which the ships of war are divided, according to their force and magnitude.

Ships of the first rate mount a hundred guns, having forty-two pounders on the lower deck, twenty-four pounders on the middle deck, twelve-pounders on the upper deck, and six-pounders on the quarter-deck and forecastle. They are manned with 850 men, including officers, seamen, marines, and servants.

Ships of the second rate carry ninety guns upon three decks, of which those on the lower battery are thirty-two-pounders; those on the middle eighteen-pounders; on the upper deck twelve-pounders; and those on the quarter-deck six-pounders, which usually amount to four or six. Their complement of men is 750, in which there are six lieutenants, four master's mates, twenty-four midshipmen, and four surgeon's mates, fourteen quarter-masters and their mates, eight boatswain's mates and yeomen, six gunner's mates and yeomen, with twenty-two quarter-gunners, two carpenter's mates with ten assistants, and one steward and steward's mate.

Ships of the third rate carry from sixty-four to eighty cannon, which are thirty-two, eighteen, and nine-pounders. The eighty-gun ships, however, begin to grow out of repute, and to give way to those of seventy-four, seventy, &c. which have only two whole batteries; whereas the former have three, with twenty-eight guns planted on each, the cannon of their upper deck being the same as those on the quarter-deck and forecastle of the latter, which are nine-pounders. The complement in a seventy-four is 650, and in a sixty-four 500 men; these have in peace four lieutenants, but in war five, and, when an admiral is aboard, six. They have also three master's mates, sixteen midshipmen, three surgeon's mates, ten quarter-masters and their mates, six boatswain's mates and yeomen, four gunner's mates and yeomen, with eighteen quarter-gunners, one carpenter's mate with eight assistants, and one steward and steward's mate under the purser.

Ships of the fourth rate mount from sixty to fifty guns, upon two decks and the quarter-deck. The lower tier is composed of twenty-four pounders, the upper tier of twelve-pounders, and the cannon on the quarter deck and forecastle are six-pounders. The complement of a fifty-gun ship is 350 men, in which there are three lieutenants, two master's mates, ten midshipmen, two surgeon's mates, eight quarter-masters and their mates, four boatswain's mates and yeomen, one gunner's mate and one yeoman, with twelve quarter-gunners, one carpenter's mate and six assistants, a steward and steward's mate.

All vessels of war under the fourth rate are usually comprehended under the general name of *frigates*, and never appear in the line of battle. They are divided into the fifth and sixth rates; the former mounting from forty to thirty-two guns, and the latter from twenty-eight to twenty. The largest of the fifth rate have two decks of cannon, the lower battery being of eighteen-pounders, and that of the upper deck of nine-pounders; but those of thirty-six and thirty-two guns have one complete deck of guns, mounting twelve-pounders, besides the quarter-deck and forecastle, which carry six-pounders. The complement of a ship of forty-four guns is 280 men, and that of a frigate of thirty-six guns 240 men. The first has three and the second two lieutenants; and both have two master's mates, six midshipmen, two surgeon's mates, six quarter-masters and their mates, two boatswain's mates and one yeoman, one gunner's mate and one yeoman, with ten or eleven quarter-gunners, and one purser's steward.

Frigates of the sixth rate carry nine-pounders, those of twenty guns having three-pounders on their quarter-deck, with 200 men for their complement; and those of twenty-four 160 men. The former has two lieutenants, the latter one; and both have two master's mates, four midshipmen, one surgeon's mate, four quarter-masters and their mates, one boatswain's mate and one yeoman, one gunner's mate and one yeoman, with six or seven quarter-gunners, and one purser's steward.

The sloops of war carry from eight to eighteen cannon, the largest of which have six-pounders; and the smallest, that is, those of eight or ten guns, four-pounders. Their officers are generally the same as in the sixth rates, with little variation; and their complements of men vary from 60 to 120, in proportion to their force or magnitude. Bomb-vessels are on the same establishment as sloops; but fire-ships and hospital-ships are on that of fifth rates.

RATEEN, or Ratten, in commerce, a thick woollen stuff, quilled, and woven in a loom with four treddles, like serges and other stuffs that have the whale or quilling. There are some rateens dressed and prepared like cloths; others left simply in the hair, and others where the hair or knap is frized. Rateens are chiefly manufactured in France, Holland, and Italy, and are mostly used in linings. The frize is a sort of coarse rateen, and the drugget is a rateen half linen half woollen.

RATHENAU, a city of Prussia, in the province of Potsdam, and circle of West Havell. It stands on the river Havell, is surrounded with walls, and has a good market-place, in which there is a statue of the elector Frederick William, placed to commemorate a victory gained by him near this place over the Swedes in the year 1675. It contains 620 houses, and about 4500 inhabitants.

RATIO, in *Arithmetic* and *Geometry*, is that relation of homogeneous things which determines the quantity of one from the quantity of another, without the intervention of a third.

The numbers, lines, or quantities, A and B, being proposed, their relation one to another may be considered under one or other of these two heads: 1. How much A exceeds B, or B exceeds A; which is found by taking A from B, or B from A, and is called *arithmetical reason* or *ratio*. 2. How many times, or parts of a time, A contains B, or B contains A; which is called *geometrical reason* or *ratio*, or, as Euclid defines it, the *mutual habitude*, or *respect*, of two magnitudes of the same kind, according to quantity, that is, how often the one contains or is contained in the other; and this is found by dividing A by B, or B by A. But observe, that that quantity which is referred to another quantity is called the *antecedent of the ratio;* and that to which the other is referred is called the *consequent of the ratio.* In the ratio of A to B, A is the antecedent, and B the consequent. Therefore any quantity as antecedent, divided by any quantity as a consequent, gives the ratio of that antecedent to the consequent.

Thus the ratio of A to B is $\frac{A}{B}$, but the ratio of B to A is $\frac{B}{A}$; and, in numbers, the ratio of 12 to 4 is $\frac{12}{4}=3$, or triple; but the ratio of 4 to 12 is $\frac{4}{12}=\frac{1}{3}$, or subtriple.

And here observe, that the quantities thus compared must be of the same kind; that is, such as by multiplication may be made the one to exceed the other, or as these quantities are said to have a ratio between them, which, being multiplied, may be made to exceed one another. Thus a line, how short soever, may be multiplied, that is, produced so as to exceed any given right line; and consequently these may be compared together, and the ratio expressed. But as a line can never, by any multiplication whatever, be made to have breadth, that is, to be equal to a superficies, however small, so these can never be compared together, and consequently have no ratio or respect to one another, according to quantity; that is, how often the one contains or is contained in the other.

RATION, in an army, a portion of ammunition, bread, drink, and forage, distributed to each soldier for his daily subsistence. The horse have rations of hay and oats when they cannot go out to forage.

RATIONALE, a solution or account of the principles of some opinion, action, hypothesis, or phenomenon.

RATIOS of musical intervals. See articles Music and Temperament.

RATISBON, or, as called by the Germans, Regens-

BURG, a city of the modern kingdom of Bavaria, the capital of the circle of that name. This city in ancient times, though under the protection of the elector of Bavaria, was considered as an imperial city, and the diets of the German empire were frequently held within it. It was then the see of an archbishop, and remarkable for its zealous adherence to the Catholic church. It was the scene of one of the most bloody conflicts during the Thirty Years' War, when the army of the imperial general Wallenstein was intrenched before it, and the Swedish monarch Gustavus Adolphus made repeated but ultimately unsuccessful attempts to storm the works, and lost so many men that he was compelled to retreat. It suffered much during the war between the French and Austrians in 1809.

Ratisbon was a place of much greater relative importance in former times than it is at present, having then the exclusive right to all the trade by the river Danube, both upwards as far as Ulm, and downwards as far as Vienna.

The city stands on the river Danube, at the spot where the river Regen, from which its German name is derived, falls into that great stream. The bridge over the Danube connects the several parts of the city. It is still in an imperfect degree fortified, but is totally indefensible against any armed force. The buildings are of antique models, particularly the ancient council-house, in which the representatives of all the states of Germany were accustomed to assemble. The cathedral is a large Gothic building; as are the church of St Emeran and the Lutheran church of the Holy Trinity, the latter of which was the college of the Jesuits till the abolition of the order.

The population, which in 1811 amounted to 18,843 persons, has much increased, and was found in 1837 to be 26,550. Of these, about one third are Lutherans; and two thirds, comprehending almost the whole of the labouring classes, are Roman Catholics. The former party have a gymnasium, and the latter a lyceum. There is a learned society, who have a botanical garden and a respectable library, with a museum of mathematical and philosophical instruments, and a picture-gallery. There are manufactures of morocco leather, many tanneries, soap-makers, wax and tallow chandlers, with large breweries and distilleries. On the banks of the Danube are some establishments for building barques and boats for navigating that river. The transit trade between eastern and western Germany gives employment to several respectable mercantile houses. A project, now considerably advanced, gives hope to the inhabitants of this city of a much greater portion of transit commerce. The Royal Bavarian Canal is hastening to its completion, and will open a communication by water between the Rhine and the Danube, the whole length being within the dominions of Bavaria. It commences at the river Mayn, which empties itself into the Rhine, and will terminate in the Danube, near this city. It is hoped that the timber of Bavaria will thus find a market in Hungary, and the surplus corn of that kingdom a constant vent on the banks of the Rhine, especially in Holland.

RATLINES, or, as the sailors call them, *ratlins*, those lines which make the ladder-steps to go up the shrouds and pattocks, hence called the *ratlins of the shrouds*.

RATTIBOR, a city, the capital of a circle of the same name, in the Prussian government of Oppeln, in Silesia. It stands on the left bank of the Oder, is surrounded with walls, and contains six Catholic and one Lutheran church, three hospitals, 4300 houses, and 4100 inhabitants. It has considerable trade in linen and woollen goods, in hosiery, and in timber, and has several distilleries and breweries.

RATTOLAW, a seaport of Hindustan, in the province of Gujerat, and gulf of Cambay, is situated on a navigable river. It was ceded to the East India Company by the Guicowar, the Mahratta chief, in 1803. It is forty-four miles south-west from the city of Cambay. Long. 72. 15. E. Lat. 22. 3. N.

RAUJESHY, a district in Bengal, situated principally between the twenty-fourth and twenty-fifth degrees of north latitude. It is bounded on the north by Dinagepoor and Mymunsingh; on the south by Birbhoom and Kishenagur; on the east by Dacca, Jelalpoor, and Mymunsingh; and on the west by Monghir and Birbhoom. It is the most unwieldy zemindary in Bengal, comprehending an area of 12,909 square miles, and is intersected in its whole length by the Ganges and its lesser branches, with many navigable rivers and fertilizing streams. In answer to the inquiries of the Marquis Wellesley in the year 1801, the population was returned at 1.500,000.

RAUKOKE, one of the Kurile Islands, which is small and lofty, with a rocky shore.

RAUN, a town of some strength, situated upon the river Miza, and remarkable for a bloody skirmish between the Prussians and Austrians, in August 1744. The king of Prussia, intending to get possession of Beraun, sent thither six battalions, with eight cannon, and 800 hussars; but General Festititz being there with a great party of his corps, and M. Luchesi with 1000 horse, they not only repulsed the Prussians, but attacked them in their turn, and, after a warm dispute, obliged them to retire with considerable loss.

RAVA, a town of Asiatic Turkey, situated on the Euphrates, about half-way between Kerkesieh and Anna. It contains about 200 houses in the midst of extensive ruins; but many of these houses are uninhabited. On the opposite side of the river are the ruins of a castle, on the summit of a rock.

RAVAILLIAC, or RAVAILLAC, FRANÇOIS, the assassin of Henry IV. of France, was a native of Angoulême, and, at the time of his execution, about thirty-two years of age. Ravaillac was the son of parents who lived upon alms. His father was one of those inferior retainers of the law to whom the vulgar give the name of pettifoggers, and his son had been bred up in the same line. The latter had set up a claim to an estate, but the cause went against him; and this disappointment affected his mind deeply. He afterwards taught a school, and, as he himself said, received charitable gifts, though but of very small value, from the parents of those whom he taught. Yet his distress was so great that he had much ado to live. When he was seized for the murder of the king, he was very loosely guarded; and all were permitted to speak with him who pleased. He was removed next day from the house of Espernon to the Conciergerie, the proper prison of the parliament of Paris. When he was first interrogated, he answered with great boldness, that he had done it, and would do it if it were to be done again. When he was told that the king, though dangerously wounded, was living, and might recover, he said that he had struck him home, and that he was sure he was dead. In his subsequent examinations he owned that he had long had an intention to kill the king, because he suffered two religions in his kingdom; and that he endeavoured to obtain an audience of him, in order to admonish him. He also said that he understood the king's great armament to be against the pope; and that, in his opinion, to make war against the pope was to make war against God. We have no distinct account of the last three examinations; but he is said to have persisted in the most solemn asseverations that he had no accomplices, and that nobody had persuaded him to the fact. He appeared surprised at nothing so much as at the universal abhorrence of the people, which, it seems, he did not expect. They were forced to guard him strictly from his fellow-prisoners, who would otherwise have murdered him. The butchers of Paris desired to have him put into their hands, affirming that they would flay him alive, and that he should still live twelve days. When he was put to the torture, he broke out into horrid execrations, and always insisted that he did the fact from his own motive, and that he could accuse nobody. On the day of his execution, after he had made the *amende* before the church of Nôtre Dame, he was carried to the Grève; and, being placed upon a scaffold, was tied to a wooden engine in the shape of a St Andrew's cross. The knife with which he did the murder being fastened in his right hand, it was first burned in a slow fire; then the fleshy parts of his body were torn with red-hot pincers, and melted lead, oil, pitch, and rosin poured into the wounds. The people refused to pray for him; and when, according to the sentence that had been pronounced upon him, he came to be dragged to pieces by four horses, one of those that were brought appearing to be but weak, a spectator offered his own, with which the criminal was much moved. He was very earnest for absolution, which his confessor refused, unless he would reveal his accomplices. "Give it me," said he, "upon condition that I have told the truth;" which the priest eventually did. His body was so robust that it resisted the force of the horses; and the executioner was at length obliged to cut him into quarters, which the people dragged through the streets. Such was the miserable fate of this fanatical assassin, who deprived France of one of her best and greatest kings. He was believed by the populace to have been set on by the Jesuits, although, whilst suffering the most horrible torments, he declared that he had no accomplices, and had done the deed from motives of his own.

RAVELIN, in *Fortification*, was anciently a flat bastion placed in the middle of a curtain; but it is now a detached work, composed only of two faces, which form a salient angle without any flanks, and are raised before the counterscarp of the place. See FORTIFICATION.

RAVENNA, a delegation of the States of the Church, in Italy, in the northern part of the ancient Romagna. It is 935 square miles in extent, and contains four cities, eight market-towns, many villages, and 123,760 inhabitants. It is a level district on the sea-coast, with numerous saline lakes, but towards the west there are some gentle undulations. It is moderately fertile, and is drained by the rivers Lamone, Lanterno, and their tributary streams. The capital is the city of the same name, which is of high antiquity. It was formerly on the sea-shore, but, by the recession of the water, is now three miles from it. It is in a marshy situation, surrounded by walls of no great strength. It is the see of a bishop, has a cathedral, twenty-one parish churches, twelve monasteries, five nunneries, a public library, an hospital, and some schools. It contains in the city 16,000 inhabitants, but, including the suburbs and some adjacent villages, the population amounts to 23,930. It was formerly the capital of the kingdom of the Ostrogoths, and, in later times, of an exarchate. There are now to be seen the remains of some old Gothic castles. Long. 12. 5. 31. E. Lat. 44. 25. 5. N.

RAVENSBURG, a city of the kingdom of Wirtemberg, in the circle of the Danube, and the capital of a bailiwick of the same name. It stands on the river Schussen, and is surrounded with walls, defended by several ancient towers. It contains 870 houses, with 3760 inhabitants, one half Catholics and the other Protestants. It has several saw-mills, and manufactories of cottons, hosiery, iron and wood ware; and it grows good wine. Long. 9. 32. E. Lat. 47. 46. 55. N.

RAVEY, the ancient Hydraotes, a celebrated river of Hindustan, and the third river of the Punjab. It rises in the eastern mountains of Cashmere, near a famous place of Hindu worship, not far from the sources of the Sutulege, the Chunaub, and the Beyah rivers. It afterwards runs in a south-westerly direction until it passes the city of Lahore, sixty miles above which it is 120 yards broad, and extremely rapid, yet navigable during the rains for boats of a considerable size. It flows in the same direction after passing the city of Lahore, and it is joined about twenty-eight miles above the city of Moultan by the Jhylum and the Chunaub rivers, forming a stream in some places several miles in breadth, and scarcely inferior to the Indus itself. Immediately after their junction it is one mile, one furlong, and eighty-five yards, but lower down the stream is contracted in its breadth to less than 350 yards. Seventy miles below Moultan the Ravey joins the Indus after a course, including its windings, of 500 miles. The water is light and wholesome.

RAVILPANDY, a large and populous town of Hindustan, in the district of the Punjab, situated about half way between the Indus and the Hydaspes rivers. The houses are flat-roofed, and the surrounding country is open and well cultivated. This place was visited by Mr Elphinstone in 1809. It belonged to Jewun Sing, a Sikh chief.

RAVREE, a town of Hindustan, in the Western Ghauts, and province of Bejapoor. It was the first stronghold seized by Sevajee, the great founder of the Mahratta power. It is forty-five miles south-south-west from Poonah. Long. 73. 32. E. Lat. 18. 2. N.

RAWAAD, a small town of Hindustan, in the province of Lahore, in the Sikh territories, 120 miles north-west from the city of Lahore. Long. 72. 12. E. Lat. 33. 5. N.

RAWAK ISLE, a small island in the Eastern Seas, off the north coast of Waygiou, with which it forms a harbour. The channel is here a mile broad, with a depth of from ten to fifteen fathoms, and a mud bottom. Sago, in cakes, is sold here in large quantities. Fish and turtle may also be had. Long. 131. 15. E. Lat. 0. 3. N.

RAWANKRAD, a celebrated lake in the mountains of Thibet, on the north of the great Himalayah range. It is the source of the river Sutulege, and is connected with the lake Mansarowar. The lake is long and narrow, and is divided by an island. It derives its supplies from several small rivers that flow from the mountains, and also from the melting of the snows. The situation is about the thirty-first degree of north latitude, and near it may be seen Mount Cailas, a well-known scene of Hindu fable, covered with perpetual snow.

RAWCLIFFE, a town of the west riding of Yorkshire, in the parish of Snaith, and wapentake of Osgoldcross, 176 miles from London. It has some trade by the river Aire, which is navigable beyond it. The population amounted in 1801 to 920, in 1811 to 1143, in 1821 to 1496, and in 1831 to 1450.

RAWICZ, or RAWITSCH, a city of the Prussian province of Posen, in the circle of Kobben. It is surrounded with walls, is well built and paved, and, including the suburbs, contains 1100 houses, with 8640 inhabitants, who are occupied in making linen, woollen, and cotton goods, mostly by machinery, and in tanning and currying leather. Of the inhabitants, 1500 are Jews.

RAY, JOHN, a celebrated naturalist, and the son of Mr Roger Ray, a blacksmith, was born at Black Notly, in Essex, in 1628. He received the rudiments of learning at the grammar-school of Braintree; and in 1644 was admitted into Catharine Hall, Cambridge, whence he afterwards removed to Trinity College in that university. He took the degree of master of arts, and became at length a senior fellow of the college; but his intense application to his studies having injured his health, he was obliged at his leisure hours to exercise himself by riding or walking in the fields, which led him to the study of plants. He noted from Johnson, Parkinson, and the *Phytologia Britannica*, the places where curious plants grew; and in 1658 he rode from Cambridge to the city of Chester, whence he proceeded to North Wales, visiting many places, and amongst others the famous hill of Snowdon, and returning by Shrewsbury and Gloucester. In 1660 he published his *Catalogus Plantarum circa Cantabrigiam nascentium*, and the same

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year he was ordained deacon and priest. In 1661 he accompanied Mr Francis Willoughby and others, in search of plants and other natural curiosities, to the north of England and Scotland; and the next year he made a western tour from Chester, and through Wales, to Cornwall, Devonshire, Dorsetshire, Hampshire, Wiltshire, and other counties. He afterwards travelled with Mr Willoughby and other gentlemen through Holland, Germany, Italy, France, and other foreign parts, made several tours in England, and was admitted fellow of the Royal Society. In 1672 his friend Mr Willoughby died, in the thirty-seventh year of his age, at Middleton Hall, his seat at Yorkshire, to the infinite and unspeakable loss and grief of Mr Ray himself, his friends, and all good men. As there existed the closest and most sincere friendship between Mr Willoughby and Mr Ray from the time of their being fellow-students, Mr Willoughby not only confided in Mr Ray in his lifetime, but also at his death; for he made him one of the executors of his will, and charged him with the education of his sons, Francis and Thomas, leaving him at the same time an annuity of L.60 per annum. The eldest of these young gentlemen not being four years of age, Mr Ray, as a faithful trustee, undertook their instruction, and for their use compiled his *Nomenclator Classicus*, which was published the same year. Francis, the eldest, dying before he became of age, the younger became Lord Middleton. Not many months after the death of Mr Willoughby, Mr Ray lost another of his best friends, Bishop Wilkins, whom he visited in London on the 18th of November 1672, and found almost expiring from a total suppression of urine. As it is natural for the mind, when hurt in one part, to seek relief in another, so Mr Ray, having lost some of his best friends, and being in a manner left destitute, conceived thoughts of marriage; and, accordingly, in June 1673, he espoused a gentlewoman of about twenty years of age, the daughter of Mr Oakley of Launton, in Oxfordshire. Towards the end of this year came forth his Observations made in foreign countries, to which was added, his *Catalogus Stirpium in exteris Regionibus observatarum;* and about the same time appeared his Collection of unusual or local English words, which he had made in his travels through the counties of England. After having published many books upon subjects foreign to his profession, he at length resolved to appear in the character of divine, as well as in that of natural philosopher; and with this view he published his excellent demonstration of the being and attributes of God, entitled The Wisdom of God manifested in the Works of the Creation, 1697, 8vo. The rudiments of this work were read in some college lectures; and another collection of the same kind he enlarged and published under the title of Three Physico-theological Discourses concerning the Chaos, Deluge, and Dissolution of the World, 1692, in 8vo. Ray died in 1705. He was modest, affable, and communicative, and distinguished by his probity, charity, sobriety, and piety. He wrote a great number of works, the principal of which, besides those already mentioned, are, 1. *Catalogus Plantarum Angliæ;* 2. *Dictionariolum Trilingue secundum locos communes;* 3. *Historia Plantarum, Species hactenus editas, aliasque insuper multas noviter inventas et descriptas complectens,* three vols.; 4. *Methodus Plantarum nova, cum Tabulis,* 8vo, and several other works on plants; 5. *Synopsis Methodica Animalium Quadrupedum et Serpentini generis,* 8vo; 6. *Synopsis Methodica Avium et Piscium;* 7. *Historia Insectorum, opus posthumum;* 8. *Methodus Insectarum;* 9. Philosophical Letters.

RAYNAL, William Thomas, better known as the Abbé Raynal, was born about the year 1712, and having received his education amongst the celebrated order of the Jesuits, became one of their number. Their value and excellence chiefly consisted in assigning to each member his proper employment. Amongst them Raynal acquired a taste for literature and science; and by them he was afterwards expelled, no doubt on account of his impiety. Soon after this event he justified his expulsion by associating with Voltaire, D'Alembert, and Diderot, who employed him to furnish the articles on theology for the *Encyclopédie;* but having no relish, and probably as little qualification, for such work, he devolved it on the Abbé Yvon, whom Barruel allows to have been an inoffensive and upright man.

The first work of Raynal, which is justly regarded as an eminent performance, is his Political and Philosophical History of the European Settlements in the East and West Indies. The style of this work is rambling but animated; it contains many just reflections both of a political and philosophical nature, intermixed, however, with much vague and declamatory speculation. It has been translated into every European language. This performance, we believe, was followed by a small tract in the year 1780, entitled the Revolution of America, in which he pleaded the cause of the colonists with much zeal, censured the conduct of the British government, and discovered some acquaintance with the principles of the different factions; circumstances which induced a belief that he had been furnished with materials by those who knew the merits of the dispute much better than any foreigner could reasonably be supposed to do.

The French government instituted a prosecution against him on account of his history of the East and West Indies; but with so little severity was it conducted, that sufficient time was allowed him to retire to the dominions of his Prussian majesty, by whom he was protected, notwithstanding he had treated the character of that sovereign with very little ceremony. Even the most despotic princes showed him much kindness, although he always animadverted without reserve on their conduct; and he even lived in the good graces of the Empress of Russia. At one period the British House of Commons showed him a very singular mark of respect. The speaker having been informed that Raynal was a spectator in the gallery, public business was instantly suspended, and the stranger was conducted to a more honourable situation. But when a friend of Dr Johnson's asked him respecting the same personage, "Will you give me leave, doctor, to introduce to you the Abbé Raynal?" he turned on his heel, and said, "No, sir."

A love of liberty was the principal trait in Raynal's character, of which he gave no proper or accurate definition in his earlier writings; but when he beheld the abuse of liberty in the progress of the French Revolution, he nobly attempted to retrieve his errors. In the month of May 1791, he addressed to the Constituent Assembly an eloquent, argumentative, and impressive letter, in which he proved that it was not the business of the assembly to abolish every ancient institution; that the genius of the French people is such, that they never can be happy or prosperous except under a well-regulated monarchical government; and that, if they wished not the nation to fall under the worst kind of despotism, they would increase the power of the king.

Besides the works already mentioned, he was the author of a History of the Parliament of England; a History of the Stadtholderate; the History of the Divorce of Catharine of Aragon by Henry VIII.; and a History of the Revocation of the Edict of Nantes, in four volumes. He was deprived of all his property during the Revolution, and died in poverty in the month of March 1796, in the eighty-fourth year of his age.

Ray, in *Optics*, a beam of light emitted from a radiant or luminous body. See Optics.

RAYLEIGH, a town of the county of Essex, in the hundred of Rochford, thirty-five miles from London. It stands on a creek of the Thames called Hadley Bay, in consequence of which it has a good trade in corn. The population amounted in 1801 to 897, in 1811 to 1131, in 1821 to 1203, and in 1831 to 1339.

RAYPOOR, a town of Hindustan, in the Sikh territories, and province of Lahore, on the banks of the Beyah and Hydaspes. It is celebrated as the birthplace of Nanac, the founder of the Sikhs.

RAYSINGPOOR, a small village of Hindustan, in the Gujerat peninsula, near the Gulf of Cutch. It is situated on the banks of the Phooljee river, and in its vicinity are gardens in which cardamums are raised.

RAYUN, a town of Persia, in the province of Kerman, situated at the foot of lofty mountains, and surrounded by numerous gardens.

RE, an island on the coast of France, in the department of La Vendée, and the arrondissement of Rochelle. It stands about seven miles from the mainland, has a very irregular shape, is eleven miles in length, and in the widest part three miles in breadth. The chief town is St Martins, which has 3000 inhabitants, and is defended by a strong citadel. The soil is fertile, yielding abundance of grapes, which are mostly used to make brandy; and on the shore much salt is made. There are two other towns, called La Flotte and Ars, of more than 3000 inhabitants each; and the whole population of the island amounts to 18,540. It was attacked by the English in the reign of Charles I., after the Duke of Buckingham's unsuccessful attempt to relieve Rochelle in 1627, but was able to resist. Long. 1. 33. 25. E. Lat. 46. 14. 47. N.

Re, in *Grammar*, an inseparable particle prefixed to the beginning of words, to double or otherwise modify their meaning; as in re-action, re-move, re-export, and the like.

RE-ACTION, in *Physiology*, is the resistance made by all bodies to the action or impulse of others which endeavour to change their state, whether of motion or rest.

READING, the art of delivering written language with propriety, force, and elegance.

"We must not judge so unfavourably of eloquence or good reading," says Fénélon, "as to reckon it only a frivolous art, that a declaimer uses to impose upon the weak imagination of the multitude, and to serve his own ends. It is a very serious art, designed to instruct people; to suppress their passions and reform their manners; to support the laws, direct public councils, and to make men good and happy."

Reason and experience equally demonstrate, that delivery in reading ought to be less animated than in interested speaking. In every exercise of the faculty of speech, and those expressions of countenance and gesture with which it is generally attended, we may be considered as being always in one of the two following situations: First, delivering our bosom sentiments on circumstances which relate to ourselves or others; or, secondly, repeating something that was spoken on a certain occasion for the amusement or information of an auditor. Now, if we observe the deliveries natural to these two situations, we shall find, that the first may be accompanied with every degree of expression which can manifest itself in us, from the lowest of sympathy to the most violent and energetic of the superior passions; whilst the latter, from the speaker's chief business being to repeat what he heard with accuracy, discovers only a faint imitation of those signs of the emotions which we suppose agitated him from whom the words were first borrowed. The use and necessity of this difference of manner is evident; and if we are attentive to these natural signs of expression, we shall find them conforming with the greatest nicety to the slightest and most minute movements of the breast.

This repetition of another's words might be supposed to pass through the mouth of a second or third person; and in these cases, since they were not ear and eye witnesses of him who first spoke them, their manner of delivery would want the advantage necessarily arising from an immediate idea of the original one; hence, for the reason stated, this would be of still less lively representation than that of the first repeater. But as, from a daily observation of every variety of speech and its associated signs of emotion, mankind soon become pretty well acquainted with them, and this in different degrees, according to their discernment, sensibility, &c. experience shows us that these latter repeaters, as we call them, might conceive and employ a manner of delivery which, though less characteristic perhaps, would on the whole be noways inferior to the first, as to the common natural expression proper for their situation. It appears, therefore, that repeaters of every degree may be esteemed upon a level as to animation, and that our twofold distinction above specified contains accurately enough the whole variety of ordinary delivery. We say ordinary, because there is another very peculiar kind of delivery sometimes used in the person of a repeater, and of which it will in this place be necessary to take some notice. What we mean here is mimicry; an accomplishment which, when perfectly and properly displayed, never fails of yielding a high degree of pleasure. But since this pleasure chiefly results from the principle of imitation respecting manner, and not from the purport of the matter communicated; and since, comparatively speaking, it is only attainable by few persons, and practised only on particular occasions; upon these accounts it must be refused a place amongst the modes of useful delivery taught us by nature, and must be esteemed a qualification purely anomalous.

These distinctions with regard to a speaker's situation of mind being premised, let us see to which of them an author and his reader may most properly be referred, and how they are circumstanced with regard to one another.

The matter of all books is, either what the author says in his own person, or an acknowledged recital of the words of others; and hence an author may be esteemed both an original speaker and a repeater, according as what he writes is of the first or second kind. Now a reader must be supposed either actually to personate the author, or one whose office is barely to communicate what he has said to an auditor. But in the first of these suppositions he would, in the delivery of what was the author's own, evidently commence mimic; which being, as above observed, a character not generally acknowledged in this department, ought to be rejected as on the whole improper. The other supposition therefore must be accounted right; and then, as to the whole matter of the book, the reader is found to be exactly in the situation of a repeater, save that he takes what he delivers from the page before him instead of his memory. It follows, then, in proof of our initial proposition, that if we are directed by nature and propriety, the manner of our delivery in reading ought to be inferior in warmth and energy to what we should use, were the language the spontaneous effusion of our own hearts in the circumstances of those out of whose mouths it is supposed to proceed.

Evident as the purport of this reasoning is, it has not so much as been glanced at by the writers on the subject we are now entered upon, or any of its kindred ones; which has occasioned a manifest want of accuracy in several of their rules and observations. Amongst the rest, this precept has long been reverberated from author to author as a perfect standard for propriety in reading: "Deliver yourselves in the same manner you would do, were the matter your own original sentiments uttered directly from the heart." As all kinds of delivery must have many things in common, the rule will in many articles be undoubtedly right; but, from what has been said above, it must as certainly be faulty in respect to several others; as it is evident nature never confounds by like signs two things so very different as a copy and an original, an emanation darted immediately from the sun, and its weaker appearance in the lunar reflection.

Reading, a borough and market town of Berkshire, in the hundred of its own name, thirty-eight miles from London, on the high road to Bath and Bristol. It is situated on the right bank of the Thames, where it is joined by the Kennet, in a fine situation rising gradually from the river, and is one of the most cheerful and well-built towns of its size in England. It has three parish churches, and various chapels for dissenters. The county sessions are held at it, and there is a house of correction. The chief trade is what is carried on by the rivers, which unite here, and into which several canals lead. There are some manufactures of silk ribbons, of sail-cloth, and blanketing; and some barge-building. It has a corporation, consisting of a mayor, twelve aldermen, and twelve burgesses, and returns two members to the House of Commons. There are markets on Wednesday and on Saturday, which are well supplied; and the place is well situated for the flour trade. The population amounted in 1801 to 9742, in 1811 to 10,788, in 1821 to 12,867, and in 1831 to 15,595.

RE-AGGRAVATION, in the Roman ecclesiastical law, the last monitory, published after three admonitions, and before the final excommunication. Previous to fulminating the last excommunication, they publish an aggravation and a re-aggravation. Fevret observes, that in France the minister is not allowed to come to re-aggravation, without the permission of the bishop or official, as well as that of the lay judge.

REALISTS, a sect of scholastic philosophers formed in opposition to the Nominalists. Under the realists are included the Scotists, Thomists, and all excepting the followers of Ocham. Their distinguishing tenet is, that universals are realities, and have an actual existence out of idea or imagination, or, as they express it in the schools, a *parte rei;* whereas the nominalists contend that they exist only in the mind, and are merely ideas, or manners of conceiving things. Odo, or Oudard, a native of Orleans, afterwards abbot of St Martin de Tournay, was the chief of the sect of the Realists. He wrote three books of dialectics, in which, on the principles of Boëthius and the ancients, he maintained that the object of that art was things, not words, and hence the sect took its rise and name.

REALITY, in the schools, a diminutive of *res*, thing, was first used by the Scotists, to denote a thing which may exist of itself; or which has a full and absolute being of itself, and is not considered as a part of any other.

REALM, a country which gives its head or governor the denomination of a *king*.

RE-ANIMATION means the reviving or restoring to life those who are apparently dead. Sudden death is dreaded by every human being, and it is one of those evils against which the Church of England prays in her litany. Accidents, however, cannot always be prevented; but, after they have happened, it is often possible to prevent their effects. By the establishment of what has with great propriety been called the *Humane Society*, this has been abundantly proved; for, in the course of twelve years immediately after its institution, it was the means of saving the lives of 850 persons, who otherwise would in all human probability have been lost to the community. Since that period it has saved many more; and various persons, even in the most distant parts of the kingdom, have done the same by following the directions prescribed. To preserve one human being from premature death, we must consider as of the utmost consequence, both as citizens and Christians; and how much more the preservation of thousands? It appears from the writings of Mead, Winslow, Bruhier, Fothergill, Haller, Lecat, Tissot, Van Engelen, Gummer, and others, that they had prepared the way for institutions similar to the Humane Society; for in their works they have elucidated the principles on which such institutions proceed, and furnished directions for the practice they favour.

REAR, a term frequently used in composition to denote something behind or backwards in respect of another. It is used in opposition to *van*.

Rear of an Army signifies, in general, the hindmost part of an army, battalion, regiment, or squadron; and also the ground behind either.

Rear-Guard is that body of an army which marches after the main body. The march of an army is always composed of an advanced guard, a main body, and a rear-guard; the first and last commanded by a general.

Rear Half-files are the three hindmost ranks of the battalion when it is drawn up six deep.

Rear-Line of an army encamped, is always twelve hundred feet at least from the centre line, both of which run parallel to the front line, as also to the reserve.

Rear-Rank is the last rank of a battalion when drawn up, and generally sixteen or eighteen feet from the centre line when drawn up in order.

REASON, a faculty or power of the mind. See the article METAPHYSICS.

REASONING, RATIOCINATION, the exercise of that faculty of the mind which is called *reason;* or it is an act or operation of the mind, deducing some unknown proposition from other previous ones that are evident and known. See the article LOGIC.

REAUMUR, RENE ANTOINE FERCHAULT, SIEUR DE, a person distinguished for his laborious researches in natural science, was born at Rochelle in 1683, being descended of a family belonging to the law. After having finished his early studies in the place of his birth, he began a course of philosophy at Poitiers, and one of civil law at Bourges; but he soon relinquished the latter to apply himself to mathematics, physics, and natural history. Having come to Paris, he was received into the Academy of Sciences in 1708. From that hour he was wholly employed in natural history, to which his inclination particularly led him; and his inquiries were not confined to any one part of the subject. His memoirs, his observations, his discoveries on the formation of shells, spiders, muscles, the marine flea, the berry which affords the purple colour, and on the cause of the numbness of the torpedo, excited the curiosity of the public, and early procured our author the character of an able, curious, and entertaining naturalist. Filled with zeal for the welfare and advantage of society, and for the progress and perfection of arts, he endeavoured in all his researches to promote the public good. The public were indebted to him for the discovery of the turquois mines in Languedoc. He also found out a substance, now used to give false stones a colour, which is obtained from a certain fish called in the French *able* or *ablete* on account of its whiteness, and which is the *bleak* or *blay* of our writers. His experiments on the art of turning iron into steel obtained him a pension of twelve thousand livres; and this reward was to be continued to the Academy to support the expense which might accrue in this art.

He continued his inquiries on the art of making tin and porcelain, and endeavoured to render our thermometers more useful than those of former times. He composed a curious history of rivers where gold-dust is found in France; and he gave so simple and so easy a detail of the art of gathering this dust, that persons have been employed for that purpose. He also made curious and important observations on the nature of flints; on the banks of fossil shells, whence is obtained in Touraine an excellent manure for land; and likewise on birds and their preservation, on their method of building nests, on insects, and a great number of other subjects, not less curious than useful.

He at first imagined that a certain varnish would keep eggs fresh; but the waste of time and money showed him the inconvenience of such a process. He afterwards adopted the method practised from time immemorial in Greece and the islands of the Archipelago, which is to steep or im-merse eggs in oil or melted fat; by which means, not being exposed to the air or to frost, they are well preserved, and contract no bad taste or smell. Another experiment, still more important, made by our author, was to introduce into France the art of hatching fowls and birds, as practised in Egypt, without covering the eggs. Active, sedulous, and attentive, he was early in his study, often at six in the morning. Exact in his experiments and observations, he let no circumstance escape him. His writings must be of great use to future philosophers. In society he was distinguished through life for his modest and agreeable behaviour. His probity, benevolence, goodness of heart, and other amiable qualities, as well natural as acquired, endeared him to his countrymen. He died in the seventy-sixth year of his age, on the 18th of October 1757, and left this world filled with sentiments of piety. His death was the consequence of a fall, which happened at the castle of Barnardière on the Maine, where he went to pass his vocation. He bequeathed to the Academy of Sciences his manuscripts and all his natural productions. His works are, 1. A very great number of memoirs, and observations on different parts of natural history, printed in the collections of the Academy of Sciences; and, 2. A large work printed separately in six vols. 4to, entitled a Natural History of Insects. This important work contains a description of vast numbers of caterpillars, moths, gall-insects, flies with two and four wings, lady-birds, and those ephemeron flies which live only in that form a few hours; and, lastly, of those singular and wonderful insects which are called *polypes*, which being cut into several pieces, each piece lives, grows, and becomes an insect, and affords to our eyes a great number of prodigies. The works of M. de Reaumur are exact, curious, interesting, and exceedingly ingenious. They are written with much candour, clearness, and elegance; but it must be acknowledged that his manner is somewhat too diffuse. We must not deceive the reader. He often raises our expectations, and does not give us all the satisfaction which we promise ourselves from his writings. His method of raising poultry, in particular, rather disappoints us. He spared neither care, time, nor expense, to render it practicable. He flattered himself and his countrymen with the greatest hopes; but, notwithstanding his assiduous industry and vast charges, it proved abortive. M. l'Advocat recommended him to obtain from Egypt better information on the subject, and if possible to procure a person versed in the art to instruct him in it; but his death prevented the completion of the scheme. If any native of Egypt had arrived, showed M. de Reaumur a better method than his own, and practised it with success, as in his country, the community would have been benefited; on the other hand, he would have seen, if it had failed, that the climate of France was not proper for such experiments. M. Maillet, consul at Cairo, to whom the regent had written to obtain the art, offered to send over a native of Egypt, if the government would pay the expense of his voyage, and allow him a pension of 1500 livres. M. Maillet judged rightly when he preferred this method of proceeding. M. de Reaumur was not ignorant of the design, but he flattered himself that his efforts would be successful without further aid, and thought he should acquire some honour. He certainly had great talents, industry, sagacity, and every other requisite which is necessary in such attempts; but it is morally impossible that a single man, in a different climate, can attain such knowledge in an art as those who live in a more favourable country, and have had the experience of many ages to profit by. Yet, however unsuccessful M. de Reaumur may have been, posterity is indebted to him for his repeated trials. He has removed some difficulties in the road, and those who travel it may discover what he only saw at a distance.

REBATE, or Rebatement, in *Commerce*, a term much used at Amsterdam for an abatement in the price of several commodities, when the buyer, instead of taking time, advances ready money.

Rebatement, in *Heraldry*, a diminution or abatement of the bearings in a coat of arms.

REBELLION, *Rebellio*, amongst the Romans, was where those who had been formerly overcome in battle, and yielded to their subjection, made a second resistance. But with us it is generally used for the taking up of arms traitorously against the king, whether by natural subjects or others when once subdued; and the word *rebel* is sometimes applied to him who wilfully breaks a law, as also to a villein disobeying his lord.

There is a difference between enemies and rebels. Enemies are those who are out of the king's allegiance; and therefore subjects of the king, either in open war or rebellion, are not the king's enemies, but traitors. Thus David prince of Wales, who levied war against Edward I., because he was within the allegiance of the king, had sentence pronounced against him as a traitor and a rebel. Private persons may arm themselves to suppress rebels.

REBUS, an enigmatical representation of some name or thing, by using figures or pictures instead of words or parts of words. Camden mentions an instance of this kind of wit in a gallant who expressed his love to a woman named *Rose Hill*, by painting in the border of his gown a rose, a hill, an eye, a loaf, and a well; which, in the style of the rebus, reads, "*Rose Hill I love well.*" This kind of wit was long practised by the great, who took the pains to find devices for their names. It was, however, happily ridiculed by Ben Jonson in the humorous description of Abel Drugger's device in the Alchemist, by the Spectator in the device of Jack of Newberry, at which time the rebus, being raised to sign-posts, was grown out of fashion at court.

Rebus is also used by the chemical writers, sometimes to signify sour milk, and sometimes for what they call the ultimate matter of which all bodies are composed.

Rebus, in *Heraldry*, is a coat of arms which bears an allusion to the name of the person; as three castles for Castleton, three cups for Butler, three conies for Conisby; a kind of bearings which are of great antiquity.

RECANATI, a city of Italy, in the delegation of Macerata, in the papal dominions. It is situated on a mountain overlooking the Adriatic Sea. It is the seat of a bishop in union with the city of Loretto, and has a cathedral, eight parish churches, eight monasteries, and four nunneries. It is well built, and has a haven at the mouth of the Potenza, with a population of 5990 persons. Long. 13. 27. 48. E. Lat. 43. 25. 40. N.

RECENSIO was an account taken by the censors, every lustrum, of all the Roman people. It was a general survey, at which the *equites*, as well as the rest of the people, were required to appear. New names were now put upon the censor's list, and old ones cancelled. The *recensio*, in short, was a more solemn and accurate sort of *probatio*, and answered the purpose of a review, by showing who were fit for military service.

RECHABITES, a kind of religious order amongst the ancient Jews, instituted by Jonadab the son of Rechab, comprehending only his own family and posterity. Their founder prescribed them three things: first, not to drink any wine; secondly, not to build any houses, but to dwell in tents; and, thirdly, not to sow any corn or plant vines.

RECHEAT, in hunting, a lesson which the huntsman plays on the horn, when the hounds have lost their game, to call them back from pursuing a counter scent.

RECHERCHE Archipelago, a group of islands stretching about 126 miles along the south coast of New Holland, between the thirty-third and thirty-fourth degrees of south latitude. Several of them are naked rocks; and from the coast of New Holland the access is extremely difficult, owing to the rocks and shoals that are interspersed.

RECIPROCAL, in general, is something that is mutual, or which is returned equally on both sides, or affects both parties alike.

Reciprocal, in *Mathematics*, is applied to quantities which, multiplied together, make unity. Thus $\frac{1}{x}$ and x, y and $\frac{1}{y}$, are reciprocal quantities. Likewise $\frac{1}{x}$ is said to be reciprocal of x, which is again the reciprocal of $\frac{1}{x}$.

Reciprocal Figures, in *Geometry*, those which have the antecedents and consequents of the same ratio in both figures.

Reciprocal Proportion is when, in four numbers, the fourth is less than the second by as much as the third is greater than the first, and *vice versa*. Great use is made of this reciprocal proportion by Sir Isaac Newton and others, in demonstrating the laws of motion.

Reciprocal Terms, amongst logicians, are those which have the same signification, and consequently are convertible, or may be used for each other.

RECITATIVO, or Recitative, in *Music*, a kind of singing, that differs but little from ordinary pronunciation; such as that in which the several parts of the liturgy are rehearsed in cathedrals; or that in which the actors commonly deliver themselves on the theatre at the opera, when they are to express some action or passion, relate some event, or reveal some design.

RECKLINGHAUSEN, a city of the Prussian province fo Westphalia, in the government of Munster, and the capital of a circle of the same name, which extends over 265 square miles, and contains 38,300 inhabitants. The city contains two churches, a convent, 420 houses, and 2500 inhabitants, but has very little trade. Long. 7. 4. 57. E. Lat. 51. 37. 25. N.

RECKONING, or a *Ship's Reckoning*, in *Navigation*, is the account by which at any time it may be known where the ship is, and on what course or courses she is to steer, in order to gain her port; and that account, when taken from the log-board, is called the *dead reckoning*.

RECLAIMING, or Reclaming, in our ancient customs, a lord's pursuing, prosecuting, and recalling his vassal, who had gone to live in another place without his permission.

Reclaiming is also used for the demanding of a person or thing, to be delivered up to the prince or state to which it properly belongs, when, by any irregular means, it has passed into the possession of another.

Reclaiming, in *Falconry*, is taming a hawk, and making her gentle and familiar.

A partridge is said to reclaim when she calls her young ones together, upon their scattering too much from her.

RECOGNIZANCE, in *Law*, is an obligation of record, which a man enters into before some court of record or magistrate, duly authorized, with condition to do some particular act, as to appear at the assizes, to keep the peace, to pay a debt, or the like.

RECOIL, or Rebound, the starting backwards of a fire-arm after an explosion. Mersenne tells us, that a cannon twelve feet in length, weighing 6400lbs. gives a ball of 24lbs. an uniform velocity of 640 feet per second. Putting, therefore, $W = 6400$, $w = 14$, $V = 640$, and $v =$ the velocity with which the cannon recoils; because the momentums of the cannon and ball are equal, we shall have $W v = w V$; and so $v = \frac{wV}{W} = \frac{24 \times 64}{6400} = 2\cdot4$; that is, it would recoil at the rate of $2\frac{4}{10}$ feet per second, if free to move.

RECOLLECTION, a mode of thinking, by which ideas sought after by the mind are found and brought to view. See the article Metaphysics.

RECONNOITRE, in military affairs, implies to view and examine the state of things, in order to make a report thereon.

RECORDE, Robert, a physician and mathematician, was descended of a respectable family in Wales, and lived in the time of Henry VIII. Edward VI. and Mary of England. The time of his birth is not exactly known, but it must have been about the beginning of the sixteenth century; for he was entered of the university of Oxford about 1525, and was elected fellow of All-Souls College in 1531. As he made physic his profession, he went to Cambridge, where he was honoured with the degree of doctor in that faculty in 1545, and was very much esteemed by all who were acquainted with him, for his extensive knowledge of many of the arts and sciences. He afterwards returned to Oxford, where he publicly taught arithmetic and mathematics, as he had done prior to his going to Cambridge, and that with great applause. It appears that he afterwards went to London, and acted as physician to Edward VI. and to Queen Mary, to whom some of his books are dedicated; yet he died in the King's-Bench prison, Southwark, where he was confined for debt in the year 1558, at a very immature age.

He published several works upon mathematical subjects, chiefly in the form of dialogue between master and scholar. Of these the following is a list, viz. 1. The Pathway to Knowledge, containing the first principles of geometry, as they may moste aptly be applied unto practice, bothe for the use of Instrumentes Geometricall and Astronomicall, and also for projection of Plattes, much necessary for all sortes of men, London, 1551, 4to; 2. The Ground of Arts, teaching the perfect worke and practice of Arithmeticke, both in whole numbers and fractions, after a more easie and exact forme then in former time hath been set furth, 1552, 8vo; 3. The Castle of Knowledge, containing the Explication of the Sphere both Celestiall and Materiall, and divers other things incident thereto, with sundry pleasaunt proofes and certaine newe demonstrations not written before in any vulgare woorkes, London, 1556, folio; 4. The Whetstone of Witte, which is the second part of Arithmetike, containing the extraction of rootes, the Cossike practice, with the rules of equation, and the woorkes of surde numbers, London, 1557, 4to.

Wood says that he was the author of several pieces on physic, anatomy, politics, and divinity; but it is uncertain whether these were ever published. Sherburne states that he also published *Cosmographiæ Isagoge*; that he wrote a book, *De Arte faciendi Horologium*, and another *De usu Globorum, et de statu Temporum*.

RECORDER, a person whom the mayor and other magistrates of a city or corporation associate to themselves for their better direction in matters of justice and proceedings in law; on which account this person is generally a counsellor, or other person well skilled in the law.

RECOVERY, in English law, a species of assurance by matter of record, concerning the original of which it must be remarked, that common recoveries were invented by the ecclesiastics to elude the statutes of mortmain; and afterwards they were encouraged by the finesse of the courts of law in 12 Edward IV., in order to put an end to all fettered inheritances, and bar not only estates-tail, but also all remainders and reversions expectant thereon.

RECREATION Island, a fertile island in the Southern Pacific Ocean, discovered by Roggewein in the year 1722. It is about twelve leagues in circuit. The inhabitants are warlike and robust. Long. 148. W. Lat. 18. S.

RECTANGLE, in *Geometry*, is the same with a right-angled parallelogram.

RECTIFICATION, in *Chemistry*, is nothing but the repetition several times of a distillation or sublimation, in order to render the substance purer, finer, and freer from aqueous and earthy parts.

Rectification, in *Geometry*, is the method of finding a right line equal to a curve. The rectification of curves is a branch belonging to the higher geometry, in which the use of the inverse method of fluxions is of singular utility.

RECTILINEAR, in *Geometry*, right-lined. Thus figures the perimeter of which consists of right lines, are said to be rectilinear.

RECTOR, a term applied to several persons whose offices are very different. The rector of a parish is a clergyman who has the charge and cure of a parish, and possesses all the tithes, &c. The same name is also given to the chief elective officer in several foreign universities, particularly in that of Paris, and also in those of Scotland; and it is likewise applied to the head master of large schools in Scotland, as in the High School of Edinburgh. Rector is further used in several convents to indicate the superior officer who governs the house; and the Jesuits give this name to the superiors of such of their houses as are either seminaries or colleges.

RECTORY is a parish-church, parsonage, or spiritual living, with all its rights, tithes, and glebes.

RECTORY, however, is sometimes used for the rector's mansion or parsonage-house.

RECUPERATORES, amongst the Romans, were commissioners appointed to take cognizance of private matters in dispute, between the subjects of the state and foreigners, and to take care that the former had justice done them. It came at last to be used for commissioners, to whom the prætor referred the determination of any affair between one subject and another.

RECUSANTS, such persons as acknowledge the pope to be the supreme head of the church, and refuse to acknowledge the king's supremacy. They are hence called Popish Recusants.

RED, one of the colours called *simple* or *primary*, being one of the shades into which the light naturally divides itself when refracted through a prism.

RED-*Book* of the Exchequer, an ancient record or manuscript volume, in the keeping of the king's remembrancer, and containing divers treatises relating to the times before the Conquest.

RED POINT, a cape on the east coast of New Holland, with four projecting hillocks upon it, and which has the appearance of a double saddle. Long. 150. 56. E. Lat. 34. 33. S.

RED RIVER is one of the principal confluents of the Mississippi, in North America. Its source is situated at the base of a range of the Rocky Mountains, called the Caous Mountains, near Santa Fe, in Mexico. A great number of streams descend this chain, and, flowing separately for some three or four hundred miles, at length unite and form the Red River. The country through which its upper branches flow is but little known. After the river enters Louisiana, its south bank forms for a great distance the boundary between the United States and Texas. Much of its course lies through noble prairies of a rich red soil covered with grass intermingled with vines, which bear, it is said, excellent grapes. About a hundred miles above Natchitoches the alluvion enlarges to a breadth of twenty or thirty miles, forming a sort of swampy bed through which the river flows in a number of channels. Great quantities of timber, brought down from the upper parts of the river, have for ages been accumulating in these channels, and to such an extent, that in some parts the stream may be crossed on horseback. Hence the name of Raft, which this swampy expansion bears throughout its whole extent. The river finds its way sometimes below these accumulations of timber, sometimes between them. Nearly seventy miles of the river are thus obstructed; and it is of incalculable injury to its navigation, for here small boats only can pass. For nearly a thousand miles above the Raft the soil is extremely rich, and the climate very salubrious; but, until this obstacle be removed, it will form an almost insurmountable barrier to its proper settlement. Below the Raft the river separates into a number of channels, and expands at intervals into a multitude of sheets of water. Its breadth enlarges as it approaches the Mississippi; but immediately below the Raft the channel becomes narrower than above it. From both sides it receives a vast number of tributaries. The whole length of this noble stream is estimated at 2500 miles, following its meanderings; and it enters the Mississippi in about 31° 15′ north latitude. It was supposed at one time to discharge itself into the Gulf of Mexico without joining the Mississippi. Much of the soil through which the Red River passes in its upper course is of a reddish colour, which is imparted to the waters, and hence the name of the stream. So impregnated is it with this ochreous earth, that at low water at Natchitoches it cannot be used for culinary purposes. The valley of Red River is three or four miles in breadth as far as the Kiamesia, which, following its windings, is about a thousand miles from its mouth. But it widens to from six to eighteen miles as it approaches the Mississippi, and is of an average breadth of twelve miles for a great distance above the confluence of the rivers. This alluvial tract is considered as equal to any in all the vast valley of the Mississippi. The staple production is cotton, of a quality superior to any raised in the United States except Sea Island. Its indigo and tobacco are the best raised in Louisiana; and sugar has been introduced, and found to thrive well.

RED RIVER is also the name of a number of other American streams. The most important is that which flows into Lake Winnipeg, in the northern part of North America. It is formed of two branches, the principal of which rises in Red Lake, and flows west by north for a hundred and fifty miles, when it is joined by the other branch. It then changes its direction to east of north, and flows for a hundred and eighty miles below its junction, when it falls into Lake Winnipeg.

RED SEA. This great inlet of the Indian Ocean, which divides Arabia from the opposite coast of Africa, extends in a north-west direction about 1400 miles from the Straits of Babelmandel, where it is not above thirty miles across to Suez, and only sixty miles distant from the Mediterranean, so that the maritime communication by this route between India and Europe is only divided by this narrow isthmus, which also forms the connecting link between the continents of Asia and Africa. This sea lies between the twelfth and thirtieth degrees of north latitude, and is nowhere broader than 200 miles, and scarcely ever of that width. The navigation of the Red Sea is difficult and dangerous, owing to the reefs and coral rocks both above and under the water; and also, for nine months of the year, in consequence of the violent winds which blow regularly from the north, and impede the passage from the Straits to Suez. There are few harbours to which vessels in distress can repair for shelter. On the eastern coast there is not a single harbour from Suez to Yambo, the port of Medina, nor thence to Jidda. Compodah is the next harbour, about 150 miles south of Jidda. But, in entering Yemen, there are the harbours of Mocha, Loheia, and Hodeida. The navigation to Suez, at the head of the gulf, is extremely difficult through the upper part of the Red Sea, the channel through which vessels have to pass being narrow, with rocks sunk beneath the surface. The only other ports on the western shore are Cosseir, the port and road of which are formed by reefs, which defend it from the north-east winds, and by a headland, which secures it against those blowing from the south-south-east, and which has only a depth of water of two fathoms and a half. Here the goods destined for Egypt are landed, conveyed by land to Keneh on the Nile, thence down the river to Alexandria. Suakim, about 500 miles south-east of Cosseir, is extremely difficult of entrance, not

Red Sea.

only on account of its narrowness at the mouth, which requires an extremely favourable wind, but from the rocks and shoals which lie off it in every direction. By this port hosts of pilgrims and slaves come from the interior of Africa for the purpose of crossing to Jidda and Mecca. Massuah is about 250 miles south-east of Suakim, and is the port of Abyssinia, by which its whole commerce is carried on. The Red Sea penetrating on the one side so deep into the land between the continents of Asia and Africa, and the great inlet of the Mediterranean on the other between Europe and Africa, appear to be admirably adapted for facilitating the commerce and maritime intercourse of the world; and though the intervention of the Isthmus of Suez detracts from their utility, yet, in ancient times, the great trade of Europe and India was carried on through this channel. By the Red Sea also the fleets of Solomon maintained an intercourse with the celebrated countries of Ophir and Tarshish; the situation of which is variously conjectured to be either on the coast of Africa beyond the straits, or on the western shores of Hindustan. The trade of the ancient world with India was carried on entirely by this route; and Alexandria became the great emporium of eastern produce, from which it was distributed by means of the Mediterranean all over Europe. This trade flourished greatly under the reign of the Ptolemies, who succeeded in establishing a regular communication both with Africa and with Hindustan. It was long a source of great commercial wealth, and was vigorously prosecuted during the whole period that the Roman empire subsisted. But it was long suspended by the overthrow of the Roman power, and during the irruptions of the barbarian hordes, who carried their devastations over the greater part of the civilized world. With literature and refinement commerce revived; and the Venetians established factories at Alexandria, by which they carried on the trade to India through the channel of the Red Sea. Since this period the discovery of the passage to India by the Cape of Good Hope has entirely superseded the route by the Red Sea, and changed the course of the trade to India. But in modern times the introduction of steam-navigation will probably revive the long-abandoned route to India by the Red Sea. The baffling winds which, for nine months in the year, impeded the passage up this sea, will now be overcome by the superior power of steam, nor will the calms which sometimes prevail oppose any further obstacle to its navigation; whilst the route, being so much shorter than by the long circuit round the Cape of Good Hope, may be accomplished in a much shorter time, and is on every account to be preferred.

The passage of the Israelites through the Red Sea has furnished matter for much curious research and ingenious speculation. Bruce, in his Travels, states, that at the place where he supposes the passage to have been made the sea is not quite four leagues in breadth, so that it might easily have been crossed in one night without any miracle. There are about fourteen fathoms water in the channel, and nine at the sides, with good anchorage everywhere; the farthest side is a low sandy coast, and a very easy landing place. "The draught of the bottom of the gulf," says he, "given by Dr Pococke, is very erroneous in every part of it. It was proposed to Mr Niebuhr, when in Egypt, to inquire, upon the spot, whether there were not some ridges of rocks where the water was shallow, so that an army at particular times might pass over; secondly, whether the Etesian winds, which blow strongly all summer from the north-west, could not blow so violently against the sea as to keep it back on a heap, so that the Israelites might have passed without a miracle. And a copy of these queries was left for me to join my inquiries likewise. But I must confess, however learned the gentlemen were who proposed these doubts, I did not think they merited any attention to solve them. If the Etesian winds, blowing from the north-west in summer, could keep the sea as a wall on the right or to the south, of fifty feet high, still the difficulty would remain of building the wall on the left hand, or to the north. Besides, water standing in that position for a day must have lost the nature of a fluid. Whence came that cohesion of particles that hindered that wall to escape at the sides? This is as great a miracle as that of Moses. If the Etesian winds had done this once, they must have repeated it many a time before and since from the same causes. Yet Diodorus Siculus says, the Troglodytes, the indigenous inhabitants of that very spot, have a tradition from father to son, from their very earliest and remotest ages, that once this division of the sea did happen there; and that, after leaving the bottom some time dry, the sea again came back and covered it with great fury. The words of this author are of the most remarkable kind. We cannot think this heathen is writing in favour of revelation. He knew not Moses, nor says a word about Pharaoh and his host; but records the miracle of the division of the sea in words nearly as strong as those of Moses, from the mouths of unbiassed undesigning pagans."

Redburn || Redundant.

REDBURN, a town of the county of Hertford, in the hundred of Cashio, twenty-six miles from London, and on the great northern road. It consists of a single street, about a mile in length. The population amounted in 1801 to 1153, in 1811 to 1333, in 1821 to 1784, and in 1831 to 2047.

REDDYGOODUM, a town of Hindustan, in the province of the Circars, and district of Condapilly. Long. 80. 41. E. Lat. 16. 53. N.

REDEMPTION, in *Law*, a faculty or right of re-entering upon lands which have been sold and assigned, upon reimbursing the purchase-money with legal costs.

REDEMPTION, in *Theology*, denotes the recovery of mankind from sin and death, by the obedience and sacrifice of Christ, who on this account is called the Redeemer of the World.

REDON, an arrondissement of the department of Isle Vilaine, in France, which is 533 square miles in extent, and is divided into seven cantons, and these into forty-six communes, containing 73,500 inhabitants. The capital is the city of the same name, situated on the river Vilaine. It is well built, and has a fine exchange, 710 houses, and 4120 inhabitants, with a considerable trade in serges and other woollen goods. Long 2. 11. W. Lat. 47. 49. 9. N.

REDOUBT, in *Fortification*, a small square fort, without any defence but in front; it is used in trenches, lines of circumvallation, contravallation, and approach, and also for the lodging of corps-de-garde, and for defending passages.

REDRUTH, a market-town and parish of the county of Cornwall, in the hundred of Penwith, 263 miles from London, and four from Truro. It is situated in the midst of one of the districts most rich in mineral ores, the working of which forms the chief occupation of the inhabitants. It has markets on Tuesday and Friday. The population amounted in 1801 to 4924, in 1811 to 5903, in 1821 to 6607, and in 1831 to 8191.

REDUCTION, in the schools, signifies a manner of bringing a term or proposition which was before opposite to some other, to be equivalent to it.

REDUCTION, in *Arithmetic*, that rule by which numbers of different denominations are brought into one denomination.

REDUCTION of Equations, in *Algebra*, is the clearing them from all superfluous quantities, bringing them to their lowest terms, and separating the known from the unknown, till at length only the unknown quantity is found upon one side, and the known ones on the other. The reduction of an equation is the last part of the resolution of the problem.

REDUNDANT, in *Music*. What the French call "une accord superflue," which we have translated a redundant chord, has by others been rendered a chord extremely sharp, as in the translation of Rameau's Principles of Composition. Their nature will be best understood by a few examples, and an account of the number of tones, semitones, or lesser intervals, contained in each.

The *second redundant* is composed of a major tone and a minor semitone, as from *fa* to *sol* sharp. Its proportion is as 64 to 75. The *third redundant* consists of two tones and a semitone, as *fa la* sharp. Its proportion is as 96 to 125. The *fourth redundant* is the same with the tritone.

From these examples compared with the same intervals in their natural state, the reader may form a general idea of what is meant by *redundant*.

REDUPLICATION of sounds in musical harmony. See the article Music, under section *Harmony*.

REE, Reis, or *Res*, a small Portuguese coin. See *Money-Table*.

REEF, a term in navigation. When there is a heavy gale of wind, the seamen commonly roll up part of the sail below, that by this means it may become the narrower, and not draw so much wind; and this contracting or taking up the sail they call a *reef*, or *reefing the sail*. So also, when a *top-mast is sprung*, as they call it, that is, when it is cracked, or almost broken in the cap, they cut off the lower piece that was nearly broken off, and setting the other part, now much shorter, in the step again, they call it a *reefed top-mast*.

REEF Island, a small island in the Eastern Seas, about fifty miles from the west coast of Sumatra, and called also Disastrous Island, from the number of shipwrecks which have taken place near it. Long. 101. 3. E. Lat. 4. S. It is also the name of a small island near the northern coast of the island of Celebes. Long. 122. 48. E. Lat. 0. 8. N.

REEL, in the manufactories, a machine employed for the purpose of reeling. There are various kinds of reels; some very simple, others very complex.

REELING, in the manufactories, the winding of silk, cotton, or the like, into a skain, or upon a button, to prevent its entangling. It is also used for the charging or discharging of bobbins or quills, to be employed in the manufacture of different stuffs, as thread, silk, cotton, and the like. Reeling is performed in different ways, and on different engines.

REEPHAM, a market-town of the county of Norfolk, in the hundred of Eynesford, 113 miles from London, and thirteen from Norwich. It was once much larger than at present, and had three churches. It stands on the river Eyne, and has a market, which is held on Saturday. The population amounted in 1801 to 284, in 1811 to 299, in 1821 to 345, and in 1831 to 452.

REES, a town of the Prussian government of Cleves, the capital of a circle of the same name, which extends over 166 square miles, comprehending seven cities and towns, thirty-seven villages, and 32,950 inhabitants. The town is situated on the river Rhine, and contains two churches, 470 houses, and 2800 inhabitants. Long. 6. 17. 14. E. Lat. 51. 45. 55. N.

REEVE, Clara, the ingenious authoress of *The Old English Baron*, was the daughter of the Reverend William Reeve, rector of Freston, and of Kerton, in Suffolk, and perpetual curate of St Nicholas. Her mother's maiden name was Smithies, daughter of Mr Smithies, goldsmith and jeweller to George I. The father of Miss Reeve was "an old Whig," and from him she learned all that she knew; he was her oracle, and used to make her read the parliamentary debates whilst he smoked his pipe after supper. Under the same paternal tuition, she also read Rapin's History of England, Cato's Letters, the Greek and Roman histories, and Plutarch's Lives, at an age when few people of either sex can read their own names. Mr Reeve, himself one of a family of eight children, had the same number of offspring; and hence it is probable that Clara's strong natural turn for study, rather than any degree of exclusive care which his partiality could bestow, enabled her to acquire such a stock of early information.

After the death of Mr Reeve, his widow resided in Colchester with three of his daughters; and it was here that Clara first became an authoress, by translating from the original Latin Barclay's fine old romance of Argenis, which was published in 1762, under the title of *The Phœnix*. It was not, however, until 1767, five years afterwards, that she produced her first and most distinguished work, which was published by Mr Dilly of the Poultry, under the title of *The Champion of Virtue*. The sum given for the copyright was only ten pounds; but in the following year the work came to a second edition, and was then first called *The Old English Baron*, for what reason we do not pretend to conjecture. This production is inscribed to Mrs Brigden, the daughter of Richardson, who is stated to have lent some assistance in the revision and correction of the work.

The success of The Old English Baron encouraged Miss Reeve to devote more of her leisure hours to literary composition, and accordingly she published in succession, The Two Mentors, The Progress of Romance, The Exile, The School for Widows, Plans of Education, and Memoirs of Sir Roger de Clarendon, a natural son of the Black Prince, with Anecdotes of many other eminent persons of the fourteenth century. To these works there remains to be added another, the interest of which turned upon supernatural appearances. In a preface to a subsequent edition of The Old English Baron, Miss Reeve informs the public that, in compliance with the suggestion of a friend, she had composed *Castle Connor*, an Irish story, in which apparitions were introduced. But the manuscript being intrusted to some careless or unfaithful person, fell aside, and was never recovered. The various novels produced by this lady are all marked by excellent good sense, pure morality, and a considerable command of those qualities requisite to constitute a good romance. They were, generally speaking, favourably received at the time; but none of them took the same strong possession of the public mind as The Old English Baron, upon which the fame of the author may be considered as now exclusively rested, and by which alone she will be known to posterity.

Miss Reeve led a retired life, affording no materials for biography, until the beginning of December 1803, when she died at Ipswich, her native city, at the advanced age of seventy-eight years, and was buried in the churchyard of St Stephens, according to her particular direction. Such are the only particulars that have been collected concerning this accomplished and excellent woman; and, in their simplicity, the reader may remark that of her life and her character. The following critical observations, confined entirely to her most celebrated work, which first established her fame, and upon which alone it will in all probability rest, are extracted from the biographical notice of Miss Reeve by Sir Walter Scott, to which we have also been indebted for the foregoing particulars of her life.

"The authoress has herself informed us that The Old English Baron is the 'literary offspring of The Castle of Otranto;' and she has obliged us by pointing out the different and more limited view which she had adopted, of the supernatural machinery employed by Horace Walpole. She condemns the latter for the extravagance of several of his conceptions; for the gigantic size of his sword and helmet; and for the violent fictions of a walking picture, and a skeleton in a hermit's cowl. A ghost, she contends, to be admitted as an ingredient in romance, must behave himself like ghosts of sober demeanour, and subject himself to the common rules still preserved in grange and hall, as circumscribing beings of his description.

"We must, however, notwithstanding her authority, enter our protest against fettering the realm of shadows by the opinions entertained of it in the world of realities. If we are to try ghosts by the ordinary rules of humanity, we bar them of their privileges entirely. For instance, why admit the existence of an aerial phantom, and deny it the terrible attribute of magnifying its stature? why admit an enchanted helmet, and not a gigantic one? why allow as an impressive incident the fall of a suit of armour, thrown down, we must suppose, by no mortal hand, and at the same time deny the same supernatural influence the power of producing the illusion (for it is only represented as such) upon Manfred, which gives seeming motion and life to the portrait of his ancestor? It may be said, and it seems to be Miss Reeve's argument, that there is a verge of probability, which even the most violent figment must not transgress; but we reply by the cross question, that if we are once to subject our preternatural agents to the limits of human reason, where are we to stop? We might, under such a rule, demand of ghosts an account of the very circuitous manner in which they are pleased to open their communications with the living world. We might, for example, move a *quo warranto* against the spectre of the murdered Lord Lovel, for lurking about the eastern apartment, when it might have been reasonably expected, that if he did not at once impeach his murderers to the next magistrate, he might at least have put Fitzowen into the secret, and thus obtained the succession of his son more easily than by the dubious and circuitous route of a single combat. If there should be an appeal against this imputation, founded on the universal practice of ghosts, in such circumstances, who always act with singular obliquity in disclosing the guilt of which they complain, the matter becomes a question of precedent; in which view of the case, we may vindicate Horace Walpole for the gigantic exaggeration of his phantom, by the similar expansion of the terrific vision of Fadoun, in Blind Harry's Life of Wallace; and we could, were we so disposed, have paralleled his moving picture, by the example of one with which we ourselves had some acquaintance, which was said both to move and to utter groans, to the great alarm of a family of the highest respectability.

"Where, then, may the reader ask, is the line to be drawn? or what are the limits to be placed to the reader's credulity, when those of common sense and ordinary nature are once extended? The question admits only one answer, namely, that the author himself, being in fact the magician, shall evoke no spirits whom he is not capable of endowing with manners and language corresponding to their supernatural character. Thus Shakspeare, drawing such characters as Caliban and Ariel, gave them reality, not by appealing to actual opinions, which his audience might entertain respecting the possibility or impossibility of their existence, but by investing them with such attributes as all readers and spectators recognised as those which must have corresponded to such extraordinary beings, had their existence been possible. If he had pleased to put into language the 'squeaking and gibbering' of those disembodied phantoms which haunted the streets of Rome, no doubt his wonderful imagination could have filled up the sketch which, marked by these two emphatic and singularly felicitous expressions, he has left as characteristic of the language of the dead.

"In this point of view, our authoress has, with equal judgment and accuracy, confined her flight within those limits on which her pinions could support her; and though we are disposed to contest her general principle, we are willing to admit it as a wise and prudent one, so far as applied to regulate her own composition. In no part of The Old English Baron, or of any other of her works, does Miss Reeve show the possession of a rich or powerful imagination. Her dialogue is sensible, easy, and agreeable, but neither marked by high flights of fancy nor strong bursts of passion. Her apparition is an ordinary fiction, of which popular superstition used to furnish a thousand instances, when nights were long, and a family, assembled round a Christmas log, had little better to do than to listen to such tales. Miss Reeve has been very felicitously cautious in showing us no more of Lord Lovel's ghost than she needs must; he is a silent apparition, palpable to the sight only, and never brought forward into such broad daylight as might have dissolved our reverence. And so far, we repeat, the authoress has used her own power to the utmost advantage, and gained her point by not attempting a step beyond it. But we cannot allow that the rule which, in her own case, has been well and wisely adopted, ought to circumscribe a bolder and more imaginative writer.

"In what may be called the costume, or keeping, of the chivalrous period in which the scene of both is laid, the language and style of Horace Walpole, together with his intimate acquaintance with the manners of the middle ages, form an incalculable difference betwixt The Castle of Otranto and The Old English Baron. Clara Reeve, probably, was better acquainted with Plutarch and Rapin than with Froissart or Olivier de la Marche. This is no imputation on the taste of that ingenious lady. In her days, Macbeth was performed in a general's full uniform, and Lord Hastings was dressed like a modern high chamberlain going to court. Or, if she looked to romances for her authority, those of the French school were found introducing, under the reign of Cyrus or of Faramond, or in the early republic at Rome, the sentiments and manners of the court of Louis XIV. In the present day more attention to costume is demanded, and authors, as well as players, are obliged to make attempts, however fantastic or grotesque, to imitate the manners on the one hand, and the dress on the other, of the times in which the scene is laid. Formerly, nothing of this kind was either required or expected; and it is not improbable that the manner in which Walpole circumscribes his dialogue (in most instances) within the stiff and stern precincts prescribed by a strict attention to the manners and language of the times, is the first instance of such restrictions. In The Old English Baron, on the contrary, all parties speak and act much in the fashion of the seventeenth century; employ the same phrases of courtesy; and adopt the same tone of conversation. Baron Fitzowen, and the principal characters, talk after the fashion of country squires of that period, and the lower personages like gaffers and gammers of the same era. And 'were but the combat in the lists left out,' or converted into a modern duel, the whole train of incidents might, for any peculiarity to be traced in the dialect or narration, have taken place in the time of Charles II., or in either of the two succeeding reigns. As it is, the story reads as if it had been transcribed into the language, and remodelled according to the ideas, of this latter period. Yet we are uncertain whether, upon the whole, this does not rather add to than diminish the interest of the work; at least it gives an interest of a different kind, which, if it cannot compete with that which arises out of a highly exalted and poetical imagination, and a strict attention to the character and manners of the middle ages, has yet this advantage, that it reaches its point more surely than had a higher, more difficult, and more ambitious line of composition been attempted.

"He that would please the modern world, yet present the exact impression of a tale of the middle ages, will repeatedly find that he will be obliged, in despite of his utmost exertions, to sacrifice the last to the first object, and eternally expose himself to the just censure of the rigid antiquary, because he must, to interest the readers of the present time, invest his characters with language and sentiments unknown to the period assigned to his story; and thus his utmost efforts only attain a sort of composition between the true and the fictitious, just as the dress of Lear, as performed on the stage, is neither that of a modern sovereign, nor the cerulean painting and bear-hide with which the Britons, at the time when that monarch is supposed to have lived, tattooed their persons, and sheltered themselves from cold. All this inconsistency is avoided by adopting the style of our grandfathers and great-grandfathers, sufficiently antiquated to accord with the antiquated character of the narrative, yet copious enough to express all that is necessary to its interest, and to supply that deficiency of colouring which the more ancient times do not afford.

"It is no doubt true that The Old English Baron, written in the latter and less ambitious taste, is sometimes tame and tedious, not to say mean and tiresome. The total absence of peculiar character (for every person introduced is rather described as one of a genus than as an original, discriminated, and individual person) may have its effect in producing the tedium which loads the story in some places. This is a general defect in the novels of the period, and it was scarce to be expected that the amiable and accomplished authoress, in her secluded situation, and with acquaintance of events and characters derived from books alone, should have rivalled those authors who gathered their knowledge of the human heart from having, like Fielding and Smollett, become acquainted, by sad experience, with each turn of 'many-coloured life.' Nor was it to be thought that she should have emulated in this particular her prototype Walpole, who, as a statesman, a poet, and a man of the world, 'who knew the world like a man,' has given much individual character to his sketch of Manfred. What we here speak of is not the deficiency in the style and costume, but a certain creeping and low line of narrative and sentiment; which may be best illustrated by the grave and minute accounting into which Sir Philip Harclay and the Baron Fitzowen enter, after an event so unpleasant as the judgment of heaven upon a murderer, brought about by a judicial combat, and that combat occasioned by the awful and supernatural occurrences in the eastern chamber, where we find the arrears of the estate gravely set off against the education of the heir, and his early maintenance in the baron's family. Yet even these prolix, minute, and unnecessary details are precisely such as would occur in a similar story told by a grandsire or grandame to a circle assembled round a winter's fire; and while they take from the dignity of the composition, and would therefore have been rejected by a writer of more exalted imagination, do certainly add in some degree to its reality, and bear in that respect a resemblance to the art with which De Foe impresses on his readers the truth of his fictions, by the insertion of many minute and immaterial or unnatural circumstances, which we are led to suppose could only be recorded because they are true. Perhaps, to be circumstantial and abundant in minute detail, and, in one word, though an unauthorized one, to be somewhat *prosy*, is a secret mode of securing a certain necessary degree of credulity from the hearers of a ghost-story. It gives a sort of quaint antiquity to the whole, as belonging to the times of 'superstitious elde;' and those whom we have observed to excel in oral narratives of such a nature, usually study to secure the attention of their audience by employing this art. At least, whether owing to this mode of telling her tale, or to the interest of the story itself, and its appeal to the secret reserve of superstitious feeling which maintains its influence in most bosoms, The Old English Baron has always produced as strong an effect as any story of the kind, although liable to the objections which we have freely stated, without meaning to impeach the talents of the amiable authoress." (A.)

REEVING, in nautical language, the putting a rope through a block. Hence to pull a rope out of a block, is called *unreeving*.

REFECTION, amongst ecclesiastics, a spare meal or repast, just sufficient for the support of life. Hence the hall in convents, and other communities, where the monks, nuns, and others, take their refections or meals in common, is called the *refectory*.

REFLECTION, the return or progressive motion of a moving body, occasioned by some obstacle which prevented it from pursuing its former direction.

Circular Instrument of REFLECTION, an instrument for measuring angles to a very great degree of accuracy. It was invented by the celebrated astronomer Mayer of Göttingen, principally with a view to do away the errors of the divisions of the limb; and has since been much improved by the Chevalier de Borda, and by Magellan. This instrument is particularly applicable to the measuring of the distances of the heavenly bodies, and was used by the French in their part of the operation undertaken for determining the difference of the meridians of Paris and Greenwich.

Reflection of Light. See OPTICS.

REFLECTION is also used figuratively, to signify an operation of the mind, by which it turns its view as it were inwards upon itself, and makes itself and its own operations the object of its disquisition; and by contemplating the manner, order, and laws, which it observes in perceiving ideas, comparing them together, reasoning, and judging, it frames new ideas of the relations discovered therein. See METAPHYSICS.

REFLEX, in *Painting*, means those places in a picture which are supposed to be illuminated by light reflected from some other body in the same piece.

REFLUX, the backward course of water, has the same meaning as the ebbing of the sea, and is opposed to the flood, flux, or flowing of the sea.

REFORM means a change from worse to better, a re-establishment or revival of former neglected discipline, or a correction of abuses.

REFORMATION is, in general, the act of reforming or correcting an error or abuse in religion, discipline, or the like. By way of eminence, the word is used for that great alteration and reformation in the corrupted system of Christianity, commenced by Luther in the year 1517.

The disposal of the world assumed by the pope.

Before the period of the Reformation, the pope had declared himself the sovereign of the whole world. All the parts of it which were inhabited by those who were not Christians, he accounted the same as if they were uninhabited; and if those who called themselves Christians resolved on occupying any of those countries, he gave them full liberty to make war upon the inhabitants without any provocation. The countries, if conquered, were to be parcelled out according to the pope's pleasure; and dreadful was the situation of that prince who refused to obey the will of the sovereign pontiff. In consequence of this extraordinary authority which the pope had assumed, he at last granted to the king of Portugal all the countries to the eastward of Cape Nun in Africa, and to the king of Spain all the countries to the westward of that point or headland. In this, according to the opinions of some, was completed in his person the character of Antichrist sitting in the temple of God, and showing himself as God (2 Thess. ii. 4). He had long before, say they, assumed in spiritual matters the supremacy belonging to the Deity himself; and now he assumed the same supremacy in temporal affairs, giving the extreme regions of the earth to whomsoever he pleased. The Reformation, therefore, they consider as the immediate effect of divine power taking vengeance on this and all other deviations from the system of truth; whilst others regard it merely as an effect of natural causes, which might have been foreseen and prevented, without abridging the papal power in any considerable degree.

Be this as it may, however, the partition above mentioned was the last piece of insolence which the pope ever had, Reformation begun by Luther.

or in all probability ever will have, it in his power to exercise, in the way of parcelling out the globe amongst his adherents. Everything was quiet, every heretic had been exterminated, and the whole Christian world supinely acquiesced in the enormous absurdities which were inculcated upon them; when, in 1517, a spirit of inquiry arose, and the empire of superstition began to decline. The person who made the first attack on the extravagant superstitions then prevalent was Martin Luther. By some it is pretended that the only motive which Luther had in beginning the Reformation was his enmity to the Dominicans, who had excluded his order, the Augustinians, from all share in the gainful traffic of indulgences. But this does not seem at all probable, for such a motive would not naturally lead him to deny the virtue of indulgences, whilst his conduct could not but exclude him for ever from any chance of a share in the traffic, which otherwise he might perhaps have obtained. Besides, this traffic was so contrary to the common principles of reason and honesty, that we cannot wonder at finding one man in the world who had sense enough to discern it, and virtue enough to oppose such a disgraceful practice. In all probability, however, the insignificance of the first reformer was the reason why he was not persecuted and exterminated at the very outset, as others had been before him. Another reason probably might be, that he did not at once attack the whole errors of Popery, but brought about his reformation gradually, probably as it occurred to himself.

Zuinglius in Switzerland.

The Reformation commenced in the city of Wittenberg in Saxony, but was not long confined either to that city or to the province in which it is situated. In 1520 the Franciscan friars, who had the care of promulgating indulgences in Switzerland, were opposed by Zuinglius, a man not inferior in understanding and knowledge to Luther himself. He proceeded with the greatest vigour to overturn the whole fabric of Popery; but his opinions were declared to be erroneous by the universities of Cologne and Louvain. Notwithstanding this, the magistrates of Zurich approved of his proceedings; and the whole of that canton, together with those of Berne, Basil, and Schauffhausen, embraced his opinions.

Reformation opposed in Germany.

In Germany, Luther continued to make great advances, without being in the least intimidated by the ecclesiastical censures which were thundered against him from all quarters. Continually protected by the German princes, either from religious or political motives, his adversaries could not accomplish his destruction as they had done that of others. Those princes who were upon bad terms with the court of Rome took advantage of the success of the new doctrines, and in their own dominions easily overturned a church which had lost all respect and veneration amongst the inferior ranks. The court of Rome had disobliged some of the smaller princes in the north of Germany, whom the pope probably thought too insignificant to be worth managing; and they, in revenge, universally established the Reformation in their own dominions. Melancthon, Carlostadt, and other men of eminence, also greatly forwarded the work of Luther; and in all probability the papal hierarchy would have soon come to an end, in the northern parts of Europe at least, had not the Emperor Charles V. given a severe check to the progress of the Reformation in Germany. In order to follow out the schemes dictated by his ambition, he thought it necessary to ingratiate himself with the pope; and the most effectual method of doing this seemed to be by the destruction of Luther. The pope's legates insisted that Luther ought to be condemned by the Diet of Worms, as a most notorious, avowed, and incorrigible heretic. This however appeared unjust to the members of the diet, and he was summoned to appear personally, which he accordingly did without hesitation. There is not the least doubt that his appearance there would have been his last in this world, if the astonishing respect that was paid him, and the crowds who came daily to see him, had not deterred his judges from employing summary means against the author of such a heresy. He was therefore permitted to depart with a safe-conduct for a certain time; after which he remained in the state of a proscribed or intercommuned criminal, to whom it was unlawful to perform any of the ordinary offices of humanity.

Form of worship first altered at Wittenberg.

During the confinement of Luther in a castle near Warburg, the Reformation advanced rapidly, almost every city in Saxony embracing the Lutheran opinions. At this time an alteration in the established forms of worship was first adventured upon at Wittenberg, by abolishing the celebration of private masses, and giving the cup as well as the bread to the laity in the Lord's Supper. In a short time, however, the new opinions were condemned by the university of Paris, and a refutation of them was attempted by Henry VIII. of England. But Luther was not to be thus intimidated. He published his animadversions on both with as much acrimony as if he had been refuting the meanest adversary; and a controversy managed by such illustrious antagonists attracted general attention, the Reformers daily gaining new converts both in France and England.

Disputes and divisions.

But whilst the efforts of Luther were thus everywhere crowned with success, the divisions began to prevail which have since so much agitated the reformed churches. The first dispute occurred between Luther and Zuinglius concerning the manner in which the body and blood of Christ were present in the Eucharist. Luther and his followers, although they had rejected the notion of transubstantiation, were nevertheless of opinion that the body and blood of Christ were really present in the Lord's Supper, in a way which they could not pretend to explain. Carlostadt, who was Luther's colleague, first suggested another view of the subject, which was afterwards confirmed and illustrated by Zuinglius, namely, that the body and blood of Christ were not really present in the Eucharist; and that the bread and wine were no more than external symbols to excite the remembrance of Christ's sufferings in the minds of those who received it. Both parties maintained their tenets with the utmost obstinacy, and, by their divisions, first gave their adversaries an argument against them, which to this day the Catholics urge with great force; alleging that the Protestants are so divided that it is impossible to know who is right or who is wrong; and arguing from these divisions, that the whole doctrine is false.

Civil war in Germany.

To these intestine divisions were added the horrors of a civil war, occasioned by oppression on the one hand, and by enthusiasm on the other. In 1525, a great number of seditious fanatics arose on a sudden in different parts of Germany; and having taken arms, they united their forces, and made war against the empire, laying waste the country with fire and sword, and committing everywhere the most barbarous cruelties. The greater part of this furious mob was composed of peasants and vassals, who groaned under heavy burdens, and declared that they were no longer able to bear the despotic government of their chiefs; and hence this sedition received the name of the Rustic War, or the War of the Peasants. At first this rabble declared, that they had no other motives than the redress of their grievances; but no sooner had the enthusiast Munster, the Anabaptist, placed himself at their head, than the face of things was entirely changed, and the civil commotions in Saxony and Thuringia rapidly increased. (See the article ANABAPTISTS.)

Reformation established in Saxony.

In the mean time Frederick, surnamed the Wise, elector of Saxony, and Luther's great patron, departed this life, and was succeeded by his brother John. Frederick, though he had protected and encouraged Luther, yet was at no pains to introduce the reformed religion into his dominions. But with his successor it proved otherwise; for he, being convinced that Luther's doctrine must soon be totally destroyed and suppressed unless it received a speedy and effectual support, ordered Luther and Melancthon to draw up a body of laws relating to the form of ecclesiastical government, the method of public worship, and other necessary matters, which were to be proclaimed by heralds throughout his dominions. This example was followed by all the princes and states of Germany who had renounced the papal supremacy; and a similar form of worship, discipline, and government, was thus introduced into all the churches which had dissented from that of Rome. This open renunciation of the ancient ecclesiastical jurisdiction changed the face of affairs; and the patrons of Popery intimated, in a manner not at all ambiguous, that they intended to make war upon the Lutheran party. On the other hand, the Lutherans, apprised of these hostile intentions, began to deliberate on a proper plan of defence against the attack with which they were threatened.

Resolutions of the Diet of Spires.

The Diet of the Empire assembled in the year 1526, at Spires, where the emperor's ambassadors were desired to use their utmost endeavours to suppress all disputes about religion, and to insist upon the rigorous execution of the sentence which had been pronounced against Luther and his followers at Worms. The greater part of the German princes, however, opposed this motion with the utmost resolution; declaring that they could neither execute the sentence, nor come to any determination with regard to the doctrines by which it had been occasioned, before the whole matter had been submitted to the decision of a council lawfully assembled; and further alleging, that the decision of controversies of this nature belonged properly to a general council, and to it alone. This opinion, after long and warm debates, was adopted by a majority, and at length consented to by the whole assembly. It was unanimously agreed to present a solemn address to the emperor, entreating him to assemble, without delay, a general council; whilst in the mean time it was also agreed, that the princes of the empire should, in their respective dominions, be at liberty to manage ecclesiastical affairs in the manner they should think most proper, yet so as to be able to give to God and the emperor a proper account of their administration whenever it should be required of them.

These resolutions proved exceedingly favourable to the cause of reformation. Neither had the emperor, for some time, any leisure to give disturbance to the reformed. The war, which about this time ensued between him and the pope, gave the greatest advantage to the friends of the reformed, and considerably augmented their number. Several princes, whom the fear of persecution and punishment had hitherto prevented from lending their assistance, publicly renounced the Catholic religion, and introduced amongst their subjects the same forms of religious worship, and the same system of doctrine, which had been received in Saxony. Others, though placed in such circumstances as discouraged them from acting in an open manner against the interests of the Roman pontiff, were, however, far from discovering the smallest opposition to those who withdrew the people from his despotic yoke; nor did they molest the private assemblies of those who had separated themselves from the communion of Rome. And, in general, all the Germans who, before these resolutions of the Diet of Spires, had rejected the papal discipline and doctrine, were now, in consequence of the liberty they enjoyed, wholly employed in bringing their schemes and plans to a certain degree of consistence, and in adding vigour and firmness to the cause in which they were engaged.

Revoked by the emperor.

But this tranquillity and liberty were not of long duration. In the year 1529, a new diet was assembled at the same place by the emperor, after he had quieted the troubles in various parts of his dominions, and concluded a peace with the pope. The power which had been granted to princes, of managing ecclesiastical affairs until the meeting of a general council, was now revoked by a majority of votes; and every change declared unlawful that should be introduced into the doctrine, discipline, or worship of the established religion, before the determination of the approaching council was known. This decree was considered as iniquitous and intolerable by the Elector of Saxony, the Landgrave of Hesse, and other members of the diet, who were persuaded of the necessity of a reformation. The promise of speedily assembling a general council they looked upon as an artifice of the Church of Rome, conceiving that a free and lawful council would be the last thing to which the pope would consent.

Origin of the name Protestants.

When, therefore, they found that all their arguments and remonstrances made no impression upon Ferdinand, the emperor's brother, who presided in the diet, Charles himself being then at Barcelona, they entered a solemn protest against this decree on the 19th of April, and appealed to the emperor and a future council. Hence arose the denomination of Protestants, which from this period has been given to those who separated from the communion of the Church of Rome. The princes of the empire who entered this protest, were John elector of Saxony, George elector of Brandenburg, Ernest and Francis dukes of Lunenburg, the Landgrave of Hesse, and the Prince of Anhalt; and they were seconded by thirteen imperial towns, viz. Strasburg, Ulm, Nuremberg, Constance, Windsheim, Memmingen, Nordlingen, Lindau, Kempton, Heilbron, Wissemburg, and St Gall.

The dissenting princes, who were besides the protectors and heads of the reformed churches, had no sooner entered their protest, than they sent proper persons to the emperor, who was then upon his passage from Spain to Italy, to acquaint him with their proceedings in this matter. The ministers employed in this commission executed it with the greatest intrepidity and presence of mind; but the emperor, exasperated at the audacity of those who presumed to differ from him, caused the ambassadors to be arrested. The news of this violent step made the Protestant princes conclude that their personal safety, and the success of their cause, depended entirely upon their own courage and their union. They therefore determined to enter into a solemn confederacy; and for this purpose they held several meetings at Rot, Nuremberg, Smalcald, and other places; but so different were their opinions and views, that for a time they could determine upon nothing.

Conference between Luther and Zuinglius.

One great obstacle to the intended confederacy was the dispute which had arisen between Luther and Zuinglius, concerning the real presence of Christ in the Lord's Supper. To terminate this dispute, if possible, Philip, landgrave of Hesse, in the year 1529 invited to a conference at Marpurg, Luther and Zuinglius, together with several other of the more eminent doctors who adhered to the respective parties of these contending chiefs. But this measure was not attended with the salutary effects which were expected from it. The divines disputed for four days in presence of the landgrave. Luther attacked Œcolampadius, and Zuinglius was attacked by Melancthon. Zuinglius was accused of heresy, not only on account of his explanation of the nature and design of the Lord's Supper, but also in consequence of the false notions which he was supposed to have adopted concerning the divinity of Christ, the efficacy of the Divine Word, original sin, and some other parts of the Christian doctrine. This illustrious reformer, however, cleared himself from the greater part of these charges with the most triumphant evidence, and in such a manner as appeared satisfactory even to Luther himself. But their dissension concerning the manner of Christ's presence in the Eucharist still remained; nor could either of the contending parties be persuaded to abandon, or even to modify, their opinions upon that matter. The only advantage, therefore, which resulted from the meeting was, that the jarring doctors formed a kind of truce, by agreeing to a mutual toleration of their sentiments, and leaving to the disposal of Providence the cure of their divisions.

The Confession of Augsburg.

In the mean time, news were received that the emperor designed to come into Germany, with a view to terminate all religious differences at the approaching Diet of Augsburg. Having foreseen some of the consequences of those disputes, and, besides, taken the opinion of men of wisdom, sagacity, and experience, he became at certain times more cool in his proceedings, and more impartial in his opinions respecting the contending parties and the merits of the cause. He, therefore, in an interview with the pope at Bologna, insisted, in the most serious and urgent manner, on the necessity of a general council. His remonstrances and expostulations, however, could not move the pontiff, who maintained with zeal the papal prerogatives; reproached the emperor with an ill-judged clemency; and alleged that it was the duty of that prince to support the church, and to execute speedy vengeance upon that obstinate heretical faction who had dared to call in question the authority of Rome. To this discourse the emperor paid no regard, looking upon it as a most iniquitous thing, and a measure directly opposite to the laws of the empire, to condemn unheard so many men who had always approved themselves good citizens, and in other respects deserved well of their country.

Hitherto indeed it was not easy for the emperor to form a clear idea of the matters in debate, since no regular system had as yet been composed, by which it might be known with certainty what were the true causes of Luther's opposition to the pope. The Elector of Saxony, therefore, ordered Luther, and other eminent divines, to commit to writing the chief articles of their religious system, and the principal points in which they differed from the Church of Rome. Luther, in compliance with this order, delivered to the elector at Torgau seventeen articles which had been agreed upon in a conference at Sulzbach in 1529, and hence these received the name of the Articles of Torgau. But though these were deemed by Luther a sufficient declaration of the sentiments of the reformers, yet it was judged proper to enlarge them, in order to give perspicuity to their arguments, and strength to their cause. In this work Melancthon was employed; but in it he showed a proper deference to the counsels of Luther, expressing his sentiments and doctrine with the greatest elegance and perspicuity, and thus came forth the famous Confession of Augsburg.

This Confession presented to the emperor.

On the 15th of June 1530, Charles arrived at Augsburg, and the diet was opened five days afterwards. The Protestants received a formal permission to present an account of their tenets to the diet on the 25th of the same month; and in consequence of this, at the time appointed, Christian Bayer, chancellor of Saxony, read aloud, in the German language, before the emperor and the princes assembled, the Confession of Augsburg above mentioned. It contained twenty-eight chapters, of which twenty-one were employed in representing the religious opinions of the Protestants, and the other seven in pointing out the errors and superstitions of the Church of Rome. The princes heard it with the deepest attention. It confirmed some in the principles which they had embraced; it surprised others, who had not given much consideration to the subject; and many, who before this time had little or no idea of the religious sentiments of Luther, were now not only convinced of their innocence, but delighted with their purity and simplicity. The copies of this Confession, after being read, were delivered to the emperor, being signed by John elector of Saxony, George marquis of Brandenburg, Ernest duke of Lunenburg, Philip landgrave of Hesse, Wolfgang prince of Anhalt, and by the imperial cities of Nuremberg and Reutlingen.

The creatures of the Church of Rome who were present at this diet employed John Faber, afterwards bishop of Vienna, together with Eckius, and another doctor, to draw up a refutation of the Protestant Confession; and this having been publicly read, the emperor required the Protestant members to acquiesce in it, and put an end to the religious disputes by an unlimited submission to the opinions and doctrines contained in this answer. But this demand was far from being complied with. The Protestants, on the contrary, declared that they were by no means satisfied with the reply of their adversaries, and earnestly desired a copy of it, that they might more fully demonstrate its extreme insufficiency and weakness. But this reasonable request was refused by the emperor, who interposed his supreme authority to prevent any further proceedings in this matter, and solemnly prohibited the publication of any new writings or declarations which might contribute to protract these religious debates. This, however, did not reduce the Protestants to silence. The divines of that communion who had been present at the diet endeavoured to recollect the arguments and objections employed by Faber, and had again recourse to the pen of Melancthon, who refuted them in an ample and satisfactory manner, in a piece which was presented to the emperor on the 22d of September, but which Charles refused to receive. This answer was afterwards enlarged by Melancthon, when he had obtained a copy of Faber's reply; and was published in the year 1531, with the other pieces that related to the doctrine and discipline of the Lutheran church, under the title of Defence of the Confession of Augsburg.

Refutati of this C fession.

Severe decree against Protestants.

Matters now began to draw towards a crisis. There were only three ways of bringing to a conclusion these religious differences: First, to grant the Protestants a toleration and privilege of serving God as they thought proper; secondly, to compel them to return to the Church of Rome by the violent methods of persecution; or, thirdly, that a reconciliation should be made, upon fair, and candid, and equitable terms, by engaging each of the parties to temper their zeal with moderation, to abate reciprocally the rigour of their pretensions, and to remit something of their respective claims. The third expedient was most generally approved of, being peculiarly agreeable to all who had at heart the welfare of the empire; nor did even the pope seem to look upon it with aversion or contempt. Various conferences therefore were held between persons eminent for piety and learning upon both sides; and nothing was omitted which might have the least tendency to calm the animosities and heal the divisions which reigned between the contending parties. But the differences were too great to admit of a reconciliation; and therefore the votaries of Rome had recourse to the powerful arguments of imperial edicts, and the force of the secular arm. On the 19th of November, a severe decree was issued by order of the emperor, in which everything was manifestly adapted to deject the friends of religious liberty, excepting only a faint and dubious promise of engaging the pope to assemble a general council about six months after the separation of the diet. In this decree the dignity and excellence of the Catholic religion were extolled beyond measure; a new degree of severity and force was added to that which had been published at Worms against Luther and his adherents; the changes which had been introduced into the doctrine and discipline of the Protestant churches were severely censured; and a solemn order was addressed to the princes, cities, and states, who had thrown off the papal yoke, to return to their allegiance to Rome, on pain of incurring the indignation and vengeance of the emperor, as the patron and protector of the church.

The lea of Smal cald.

Of this formidable decree the Elector of Saxony and the confederated princes were no sooner informed than they assembled in order to deliberate on the measures proper to be taken in such an emergency. In the years 1530 and 1531 they met, first at Smalcald, and afterwards at Francfort, where they formed a solemn alliance and confederacy, with the intention of defending vigorously their religion and liberties against the dangers and encroachments with which they were threatened by the edict of Augsburg, without attempting, however, any thing offensive against the votaries of Rome; they invited the kings of England, France, and Denmark, to join this confederacy, leaving no means unemployed that might strengthen and cement so important an alliance.

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Henry
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This confederacy was at first opposed by Luther, from an apprehension of the calamities and troubles which it might produce; but at last, perceiving the necessity of concert, he consented, though he uncharitably, as well as imprudently, refused to comprehend in it the followers of Zuinglius amongst the Swiss, as well as the German states and cities which had adopted the sentiments and confession of Bucer. In the invitation addressed to Henry VIII. of England, whom the confederate princes were willing to declare the head and protector of their league, the following things, amongst others, were expressly stipulated: That the king should encourage, promote, and maintain, the true doctrine of Christ as it was contained in the Confession of Augsburg, and defend the same at the next general council; that he should not agree to any council summoned by the bishop of Rome, but protest against it, and neither submit to its decrees, nor suffer them to be respected in his dominions; that he should never allow the Roman pontiff to have any pre-eminence or jurisdiction in his dominions, and should advance 100,000 crowns for the use of the confederacy, engaging to double the sum if necessary: all which articles the confederate princes were equally obliged to observe upon their part. To these demands the king replied, that he would maintain and promote the true doctrine of Christ; but, at the same time, as the true ground of that doctrine lay only in the Holy Scriptures, he would not accept at any one's hand what should be his own faith, or that of his kingdom; and therefore desired that they would send over two learned men to confer with him, in order to promote a religious union between him and the confederates. He, however, declared himself of their opinion with regard to the meeting of a free general council, and promised to join with them in all such councils for the defence of the true doctrine; but he thought the regulation of the ceremonial part of religion, being comparatively a matter of indifference, should be left to the choice of each sovereign for his own dominions. Subsequently the king gave them a second and more satisfactory answer; but after the execution of Anne Boleyn, this negotiation came to nothing. On the one hand, the king grew cold when he perceived that the confederates were no longer of use to him in supporting the validity of his marriage; and, on the other, the German princes became sensible that they could never succeed with Henry, unless they allowed him an absolute dictatorship in matters of religion.

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Whilst everything thus tended to an open war between the opposite parties, the Elector Palatine and the Elector of Mentz offered their mediation, and endeavoured to bring about a reconciliation. The emperor himself, for various reasons, was at this time inclined to peace. For, on the one hand, he stood in need of succours against the Turks, which the Protestant princes refused to grant as long as the edicts of Worms and Augsburg remained in force; and, on the other, the election of his brother Ferdinand to the dignity of king of the Romans, which had been carried by a majority of votes at the Diet of Cologne in 1531, was by the same princes contested, as being contrary to the fundamental laws of the empire. In consequence of all this, after many negotiations and projects of reconciliation, a treaty of peace was concluded at Nuremberg in 1532, between the emperor and the Protestant princes, on the following conditions, viz. That the latter should furnish a subsidy for carrying on the war against the Turks, and acknowledge Ferdinand as lawful king of the Romans; and that the emperor upon his part should abrogate and annul the edicts of Worms and Augsburg, and allow the Lutherans the free and undisturbed exercise of their religious doctrine and discipline, until a rule of faith should be fixed either in the free general council which was to be assembled in the space of six months, or in a diet of the empire.

A general
council
proposed.

Soon after the conclusion of the peace of Nuremberg, died John elector of Saxony, who was succeeded by his son John Frederick, a prince of invincible fortitude and magnanimity, but whose reign was little better than one continued series of disappointments and calamities. The religious truce, however, gave new vigour to the Reformation. Those who had hitherto been only secret enemies of the Roman pontiff, now publicly threw off his yoke; and various cities and provinces of Germany enlisted themselves under the religious banners of Luther. On the other hand, as the emperor had now no other hope of terminating the religious disputes except by the meeting of a general council, he repeated his request to the pontiff that such a council should be assembled. But Pope Clement VII., whom the history of past councils filled with the greatest uneasiness, endeavoured to retard what he could not with decency refuse. At last, in the year 1533, he made a proposal by his legate to assemble a council at Mantua, Piacenza, or Bologna; but the Protestants refused their consent to the nomination of an Italian council, and insisted that a controversy which had its rise in the heart of Germany should be determined within the limits of the empire. The pope, by his usual artifices, eluded compliance with this demand, and, in 1534, he was cut off by death, before any determination could be come to. His successor Paul III. seemed to show less reluctance to the assembling of a general council, and in 1535 expressed his inclination to convoke one at Mantua; and, the year following, he actually sent circular letters for that purpose throughout all the states and kingdoms under his jurisdiction. This council was summoned by a bull issued on the 2d of June 1536, to meet at Mantua in the following year. But several obstacles prevented its meeting; one of the most material of which was, that Frederick duke of Mantua had no inclination to receive at once so many guests, some of them very turbulent, into the place of his residence. On the other hand, the Protestants were firmly persuaded that, as the council was to be assembled in Italy, and by the authority of the pope alone, the latter must have an undue influence in that assembly; and, consequently, that all things would be carried by the votaries of Rome. For this reason they assembled in the year 1537 at Smalcald, where they solemnly protested against this partial and corrupt council, and, at the same time, had a new summary of their doctrine drawn up by Luther, in order to present it to the assembled bishops if it should be required of them. This summary, which received the title of the Articles of Smalcald, is commonly conjoined with the creeds and confessions of the Lutheran church.

Fruitless
attempts at
accommodation.

After the meeting of the general council in Mantua had thus been prevented, many schemes of accommodation were proposed both by the emperor and by the Protestants; but, by the artifices of the Church of Rome, all of them came to nothing. In 1541, the emperor appointed a conference to be held at Worms on the subject of religion, between persons of piety and learning chosen from the contending parties. This conference, however, was, for certain reasons, removed to the diet which was to be held at Ratisbon that year, and in which the principal subject of deliberation was a memorial presented by a person unknown, containing a project of peace. But the conference produced no other effect than a mutual agreement of the contending parties to refer their matters to a general council, or, if the meeting of such a council should be prevented, to the next German Diet.

Council of Trent. Plan of reformation proposed by the pope.

This resolution was rendered ineffectual by a variety of incidents, which widened the breach, and put off to a future day the deliberations which were designed to heal it. The pope ordered his legate to declare to the Diet of Spires, assembled in 1542, that he would, according to the promise he had already made, assemble a general council, and that Trent should be the place of its meeting, if the diet had no objection to that city. Ferdinand, and the princes who adhered to the cause of the pope, gave their consent to this proposal; but it was vehemently objected to by the Protestants, both because the council was summoned by the authority of the pope only, and also because the place was within the jurisdiction of his holiness; whereas they desired a free council, which should not be biassed by the dictates nor awed by the proximity of the pontiff. But this protestation produced no effect. Paul III. persisted in his purpose, and issued his circular letters for the convocation of the council, with the approbation of the emperor. In justice to this pontiff, however, it must be acknowledged, that he showed that he was not averse to every reformation. He appointed four cardinals, and three other persons eminent for their learning, to draw up a scheme for the reformation of the church in general, and of that of Rome in particular. The reformation proposed in this plan was indeed extremely superficial and partial; yet it contained some particulars which could scarcely have been expected from those who composed it. They complained of the pride and ignorance of the bishops, and proposed that none should receive orders but learned and pious men; and that care should therefore be taken to have proper masters for the instruction of youth. They condemned translations from one benefice to another, with grants of reservation, non-residence, and pluralities. They proposed that some convents should be abolished; that the liberty of the press should be restrained and limited; that the colloquies of Erasmus should be suppressed; that no ecclesiastic should enjoy a benefice out of his own country; that no cardinal should have a bishopric; that the questors of St Anthony and several other saints should be abolished; and, which was the best of all their proposals, that the effects and personal estates of ecclesiastics should be given to the poor. They concluded with complaining of the prodigious number of indigent and ragged priests who frequented St Peter's church; and declared, that it was a great scandal to see prostitutes lodged so magnificently at Rome, and riding through the streets on fine mules, whilst the cardinals and other ecclesiastics accompanied them in the most courteous manner. This plan of reformation was turned into ridicule by Luther and Sturmius; and indeed it left unredressed the greatest grievances of which the Protestants complained.

War between the emperor and the Protestants.

All this time the emperor had been labouring to persuade the Protestants to consent to the meeting of the council at Trent; but when he found them fixed in their opposition to the measure, he began to listen to the sanguinary measures of the pope, and resolved to terminate the disputes by force of arms. Upon this the Elector of Saxony and the Landgrave of Hesse, who were the chief supporters of the Protestant cause, took proper measures to prevent their being surprised and overwhelmed by a superior force; but, before the horrors of war commenced, Luther died in peace at Ayselben, the place of his nativity, in the year 1546.

The emperor and the pope had mutually resolved on the destruction of all who should dare to oppose the council of Trent. The meeting of this council was to serve as a signal for taking up arms; and accordingly its deliberations were scarcely commenced in 1546, when the Protestants perceived undoubted signs of the approaching storm, and of a formidable union between the emperor and pope, which threatened to overwhelm them at once. This year indeed there had been a new conference at Ratisbon upon the old subject of accommodating differences in religion; but from the manner in which the debates were carried on, it appeared plainly that these differences could only be decided in the field of battle. The council of Trent, in the mean time, promulgated their decrees; whilst the reformed princes, in the Diet of Ratisbon, protested against their authority, and were on that account proscribed by the emperor, who raised an army to reduce them to obedience.

Elector o
Saxony
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The Elector of Saxony and the Landgrave of Hesse led their forces into Bavaria against the emperor, and cannonaded his camp near Ingolstadt. It was supposed that this would bring on an engagement, which would probably have been advantageous to the cause of the reformed; but this was prevented, chiefly by the perfidy of Maurice duke of Saxony, who invaded the dominions of his uncle. Divisions were also fomented amongst the confederate princes, by the dissimulation of the emperor, and France failed in paying the subsidy which had been promised by its monarch; all which so discouraged the heads of the Protestant party, that their army soon dispersed, and the Elector of Saxony was obliged to direct his march homewards. But he was pursued by the emperor, who made several forced marches, with a view to overpower the enemy before he could have time to recover his vigour. The two armies met near Mulberg, on the Elbe, on the 24th of April 1547; and, after a sanguinary action, the elector was entirely defeated and taken prisoner. Maurice, who had so basely betrayed him, was now declared Elector of Saxony; and by his entreatics, Philip, landgrave of Hesse, the other chief of the Protestants, was persuaded to throw himself on the mercy of the emperor, and to implore forgiveness. To this he consented, relying on the promise of Charles for obtaining pardon, and being restored to liberty; but, notwithstanding these expectations, he was unjustly detained prisoner, by a scandalous violation of the most solemn convention. It is said that the emperor retracted his promise, and deluded this unhappy prince by the ambiguity of two German words. History indeed can scarcely furnish a parallel to the perfidious, mean-spirited, and despotic behaviour of the emperor in the present case. After having received in public the humble submission of the prince on his knees, and set him at liberty in virtue of a solemn treaty, he caused him to be arrested anew without any reason, nay, without any pretence, and kept him a close prisoner for several years. When Maurice remonstrated against this new confinement, the emperor answered that he had never promised that the landgrave should not be imprisoned anew, but only that he should be exempted from perpetual imprisonment; and, to support this assertion, he produced the treaty.

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The affairs of the Protestants now seemed to be desperate. In the Diet of Augsburg, which was soon afterwards called, the emperor required the Protestants to leave the decision of these religious disputes to the wisdom of the council which was to meet at Trent. The greater part of the members consented to this proposal, being convinced by the powerful argument of an imperial army, which was at hand to dispel the darkness from the eyes of such as might otherwise have been blind to the force of Charles's reasoning. However, this general submission did not produce the effect which was expected from it. A plague which broke out, or was said to have done so, in the city, caused the greater part of the bishops to retire to Bologna, by which means the council was in effect dissolved; nor could all the entreaties and remonstrances of the emperor prevail upon the pope to re-assemble it without delay. During this interval, therefore, the emperor judged it necessary to fall upon some method of accommodating the religious differences, and maintaining peace until the council so long expected should finally be decided on. With this view he ordered Julius Pelugius, bishop of Naumberg, Michael Sidonius, a creature of the pope, and John Agricola, a native of Ayslében, to draw up a formulary which might serve as a rule of faith and worship, till the council should be assembled. But as this was only a temporary expedient, and had not the force of a permanent or perpetual institution, it thence obtained the name of the Interim.

The formulary rejected. Melancthon's scheme.

This project of Charles was formed partly with a design to vent his resentment against the pope, and partly to answer other political purposes. It contained all the essential doctrines of the Church of Rome, though considerably softened by the artful terms which were employed, and which were quite different from those employed before and after this period by the council of Trent. There was even an affected ambiguity in many of the expressions, which made them susceptible of different senses, and applicable to the sentiments of both communions. The consequence of all this was, that the imperial formulary was reprobated by both parties. However, it was promulgated with great solemnity by the emperor at Augsburg. The Elector of Mentz, without even asking the opinion of the princes present, gave a sanction to this formulary, as if he had been commissioned to represent the whole diet. Many remained silent through fear, and that silence was interpreted as a tacit consent. Some who had the courage to oppose it, were reduced by force of arms; and the most deplorable scenes of bloodshed and violence were enacted throughout the whole empire. Maurice, elector of Saxony, who had hitherto kept neutral, now assembled the whole of his nobility and clergy, in order to deliberate on this critical affair. At the head of the latter was Melancthon, whose word was respected as a law amongst the Protestants. But this man had not the courage of Luther, and was therefore on all occasions ready to make concessions, and to propose schemes of accommodation. In the present case he gave it as his opinion, that the whole of the book called Interim could not by any means be adopted by the Protestants; but at the same time he declared, that he saw no reason why this book might not be approved, adopted, and received, as an authoritative rule in things that did not relate to the essential parts of religion, and which he accounted indifferent. But this scheme, instead of cementing the differences, rendered them worse than ever; and produced a division amongst the Protestants themselves, which might have overthrown the Reformation entirely, if the emperor and the pope had seized the opportunity.

The council of Trent re-assembled.

In the year 1549, Pope Paul III. died, and was succeeded by Julius III. who, at the repeated solicitations of the emperor, consented to re-assemble the council of Trent. A diet was again held at Augsburg under the cannon of the imperial army, and Charles laid the matter before the princes of the empire. Most of those present gave their consent to it, and amongst the rest Maurice elector of Saxony, who consented on the following conditions, namely, that the points of doctrine which had already been decided there should be re-examined; that this examination should be made in presence of the Protestant divines; that the Saxon Protestants should have the liberty of voting as well as of deliberating in the council; and that the pope should not pretend to preside in that assembly, either in person or by his legatees. This declaration of Maurice was read in the diet, and his deputies insisted upon its being entered into the registers, which the Archbishop of Mentz obstinately refused. This diet was concluded in the year 1551; and, at its breaking up, the emperor desired the assembled princes and states to prepare all things for the approaching council, and promised to use his utmost endeavours to procure moderation and harmony, impartiality and charity, in the transactions of that assembly.

The emperor surprised, and forced to conclude a peace.

On the breaking up of the diet, the Protestants took such steps as they thought most proper for their own safety. The Saxons employed Melancthon, and the Wurtembergers Brengius, to draw up confessions of faith to be laid before the new council. The Saxon divines, however, proceeded no farther than Nuremberg, having received secret orders from Maurice to stop there; for the elector, perceiving that Charles had formed designs against the liberties of the German princes, resolved to take the most effectual measures for at once crushing his ambition. He therefore entered with the utmost secrecy and expedition into an alliance with the king of France and several of the German princes, for the security of the rights and liberties of the empire; after which, having assembled a powerful army in 1552, he marched against the emperor, who lay with a handful of troops at Inspruck, expecting no attack from any quarter. By this sudden and unforeseen accident Charles was so much dispirited, that he was willing to make peace almost on any terms. The consequence was, that he concluded a treaty at Passau, which by the Protestants is considered as the basis of their religious liberty. By the first three articles of this treaty, it was agreed that Maurice and the confederates should lay down their arms, and lend their troops to Ferdinand to assist him against the Turks, and that the Landgrave of Hesse should be set at liberty. By the fourth it was agreed that the rule of faith called the Interim should be considered as null and void; that the contending parties should enjoy the free and undisturbed exercise of their religion, until a diet should be assembled to determine amicably the present disputes, which diet was to meet in the space of six months; and that this religious liberty should continue always, in case it should be found impossible to come to an uniformity in doctrine and worship. It was also determined, that all those who had suffered banishment, or any other calamity, on account of their having been concerned in the league or war of Smalcald, should be reinstated in their privileges, possessions, and employments; that the imperial chamber at Spires should be open to the Protestants as well as to the Catholics; and that there should always be a certain number of Lutherans in that high court. To this peace Albert, marquis of Brandenburg, refused to subscribe, and continued the war against the Roman Catholics, committing such ravages in the empire that a confederacy was at last formed against him. At the head of this conspiracy was Maurice, elector of Saxony, who died of a wound received in a battle fought in 1553.

Treaty of Augsburg.

The assembling of the diet promised by Charles was delayed by various incidents; however, it met at Augsburg in 1555, where it was opened by Ferdinand in name of the emperor, and terminated those deplorable calamities which had so long desolated the empire. After various debates, the following acts were passed, on the 25th of September, viz. That the Protestants who followed the Confession of Augsburg should be for the future considered as entirely free from the jurisdiction of the Roman pontiff, and from the authority and superintendence of the bishops; that they were left at perfect liberty to enact laws for themselves relating to their religious sentiments, discipline, and worship; that all the inhabitants of the German empire should be allowed to judge for themselves in religious matters, and to join that church whose doctrine and worship they thought the purest and most consonant to the spirit of true Christianity; and that all those who should injure or persecute any person under religious pretences, and on account of their opinions, should be declared and proceeded against as public enemies of the empire, invaders of its liberty, and disturbers of its peace.

Account of the Reformation in Sweden.

Thus was the Reformation established in many parts of the German empire, where it continues to this day; nor have the efforts of the Catholic powers at any time been able to suppress it, or even to prevent it from gaining ground. It was not, however, in Germany alone that a reformation of religion took place. About the same time almost all the kingdoms of Europe began to open their eyes to the truth.

The reformed religion was propagated in Sweden, soon after Luther's rupture with the Church of Rome, by one of his disciples, named Olaus Petri. The zealous efforts of this missionary were seconded by Gustavus Vasa, whom the Swedes had raised to the throne instead of Christiern king of Denmark, who by his horrid barbarity lost the crown. This prince, however, was as prudent as he was zealous; and, as the minds of the Swedes were in a fluctuating state, he wisely avoided all kind of vehemence and precipitation in spreading the new doctrine. Accordingly, the first object of his attention was the instruction of his people in the sacred doctrines of the Holy Scriptures; and for this purpose he invited into his dominions several learned Germans, and spread abroad throughout the kingdom the Swedish translation of the Bible which had been made by Olaus Petri. Some time after this, in 1526, he appointed a conference at Upsal, between this reformer and Peter Gallius, a zealous defender of the ancient faith, in which each of the champions was to bring forth his arguments, that it might be seen on which side lay the truth. In this dispute Olaus obtained a signal victory, which contributed much to confirm Gustavus in his persuasion of the truth of Luther's doctrine, and to promote its progress in Sweden. The following year another event gave the finishing stroke to its propagation and success. This was the assembly of the states at Westeraas, where Gustavus recommended the doctrine of the reformers with such zeal, that, after warm debates fomented by the clergy, it was unanimously resolved that the reformation introduced by Luther should be adopted in Sweden. This resolution was principally owing to the firmness and magnanimity of Gustavus, who declared publicly, that he would lay down the sceptre and retire from the kingdom, rather than rule a people enslaved by the orders and authority of the pope, and more controlled by the tyranny of their bishops than by the laws of their monarch. From this time the papal empire in Sweden was entirely overthrown, and Gustavus declared head of the church.

Reformation in Denmark.

In Denmark, the Reformation was introduced as early as the year 1521, in consequence of the ardent desire discovered by Christiern II. of having his subjects instructed in the doctrines of Luther. This monarch, notwithstanding his cruelty, for which his name has been rendered odious, was nevertheless desirous of delivering his dominions from the tyranny of the Church of Rome. For this purpose, in the year 1520, he sent for Martin Reinard, one of the disciples of Carlostadt, and appointed him professor of divinity at Hafnia; and after the death of this man, which happened in 1521, he invited Carlostadt himself to fill that important place. Carlostadt accepted of this office, indeed, but in a short time returned to Germany; upon which Christiern used his utmost endeavours, but in vain, to engage Luther to visit his dominions. However, the progress of Christiern in reforming the religion of his subjects, or rather of advancing his own power above that of the church, was checked, in the year 1523, by a conspiracy, in consequence of which he was deposed and banished; his uncle Frederick, duke of Holstein and Sleswick, being appointed his successor.

Frederick conducted the Reformation with much greater prudence than his predecessor. He permitted the Protestant doctors to preach publicly the sentiments of Luther, but did not venture to change the established government and discipline of the church. However, he contributed greatly to the progress of the Reformation, by his successful attempts in favour of religious liberty, in an assembly of the states held at Odensee in 1527. Here he procured the publication of a famous edict, by which every subject of Denmark was declared free to adhere either to the tenets of the Church of Rome or to the doctrine of Luther. The papal tyranny was totally destroyed by his successor Christiern III. He began by suppressing the despotic authority of the bishops, and restoring to their lawful owners a great part of the wealth and possessions which the church had acquired by various stratagems. This was followed by a plan of religious doctrine, worship, and discipline, laid down by Bugenhagius, whom the king had sent for from Wittenberg for the purpose; and in 1539 an assembly of the states at Odensee gave their solemn sanction to all these transactions.

Reformation in France.

In France, also, the Reformation began very early to make some progress. Margaret queen of Navarre, and sister of Francis I. the perpetual rival of Charles V. was a great friend to the new doctrine; and it appears that, as early as the year 1523, there were, in several of the provinces of France, great numbers of people who had conceived the greatest aversion both to the doctrine and tyranny of the Church of Rome, amongst whom were many of the first rank and dignity, and even some of the episcopal order. But as their number increased daily, and troubles and commotions were excited in several places on account of the religious differences, the authority of the king intervened, and many persons eminent for their virtue and piety were put to death in the most barbarous manner. Indeed, Francis, who had either no religion at all, or, at best, no fixed and consistent system of religious principles, conducted himself towards the Protestants in such a manner as best answered his private views. Sometimes he resolved to invite Melancthon into France, probably with a view to please his sister the queen of Navarre, whom he loved tenderly, and who had strongly imbibed the Protestant principles. At other times he exercised the greatest cruelty towards the reformed; and once made the following absurd declaration, that if he thought the blood in his arm was tainted by the Lutheran heresy, he would have it cut off; and that he would not spare even his own children, if they entertained sentiments contrary to those of the Catholic church. About this time Calvin began to attract the attention of the public, but more especially that of the queen of Navarre. His zeal exposed him to danger; and as Francis was daily committing to the flames the friends of the reformation, he was placed more than once in the most perilous situation, from which he was only delivered by the interposition of the queen of Navarre. He therefore retired from France to Basil in Switzerland, where he published his Christian Institutions, and afterwards became so famous in the history of Protestantism.

Those amongst the French who first renounced the jurisdiction of the Church of Rome are commonly called Lutherans by the writers of those early times. Hence it has been supposed that they had all imbibed the peculiar sentiments of Luther. But this appears not to have been the case: for the vicinity of the cities of Geneva, Lausanne, and some others, which had adopted the doctrine of Calvin, produced a remarkable effect upon the French Protestant churches; insomuch that, about the middle of this century, they all entered into communion with the church of Geneva. The French Protestants were, by way of contempt, called Huguenots by their adversaries. Their fate was very severe, being persecuted with unparalleled fury; and though several princes of the blood, and many of the first nobility, had embraced their sentiments, yet in no part of the world did the reformers suffer so much. At last all commotions were quelled by the fortitude and magnanimity of Henry IV., who in the year 1598 granted all his subjects full liberty of conscience by the famous edict of Nantes, and seemed to have thoroughly established the Reformation throughout his dominions. During the minority of Louis XIV. however, this edict was revoked by Cardinal Mazarin, since which time the Protestants have often been cruelly persecuted; nor was the profession of the reformed religion in France at any time so safe as in most of the other countries of Europe.

In the other parts of Europe the opposition to the Church

Reformation in the Netherlands.

of Rome was but faint and ambiguous before the Diet of Augsburg. Prior to that period, however, it appears, from undoubted testimony, that the doctrine of Luther had made a considerable, though probably secret, progress throughout Spain, Hungary, Bohemia, Britain, Poland, and the Netherlands; and had in all these countries gained many friends, of whom several repaired to Wittenberg, in order to enlarge their knowledge by means of Luther's conversation. Some of these countries threw off entirely the yoke of Rome, and in others a prodigious number of families embraced the principles of the reformed religion. It is certain, indeed, and some Roman Catholics themselves acknowledge it without hesitation, that the papal doctrines and authority would at once have fallen into ruin in all parts of the world, had not the force of the secular arm been employed to support the tottering edifice. In the Netherlands particularly, the most grievous persecutions took place, so that by the Emperor Charles V. upwards of a hundred thousand were destroyed, whilst still greater cruelties were exercised upon the people by his son Philip II. The revolt of the United Provinces, however, and motives of real policy, at last put a stop to these furious proceedings; and although, in many provinces of the Netherlands, the establishment of the Catholic religion was still continued, the Protestants have been long free from the danger of persecution on account of their principles.

Reformation in Italy.

The Reformation made considerable progress in Spain and Italy soon after the rupture between Luther and the Roman pontiff. In all the provinces of Italy, but more especially in the territories of Venice, Tuscany, and Naples, the superstition of Rome lost ground, and great numbers of people of all ranks expressed an aversion to the papal yoke. In the year 1546, this occasioned violent and dangerous commotions in the kingdom of Naples; which, however, were at last quelled by the united forces of Charles V., and his viceroy Don Pedro di Toledo. In several places the pope put a stop to the progress of the Reformation, by letting loose the inquisitors, who spread dreadful marks of their barbarity throughout the greater part of Italy. These formidable ministers of persecution put so many to death, and perpetrated such horrid acts of cruelty and oppression, that most of the reformed consulted their safety by a voluntary exile, whilst others returned to the religion of Rome, at least in external appearance. But the inquisition, which frightened into the profession of Popery several Protestants in other parts of Italy, could never make its way into the kingdom of Naples; nor could either the authority or the entreaties of the pope engage the Neapolitans to admit even visiting inquisitors.

Reformation in Spain.

In Spain, several persons embraced the Protestant religion, not only from the controversies of Luther, but even from those divines whom Charles V. had brought with him into Germany in order to refute the doctrines of the Reformer. For these doctors had imbibed the pretended heresy instead of refuting it, and propagated it more or less on their return home. But the inquisition, which could obtain no footing in Naples, reigned triumphant in Spain, and by the most dreadful methods frightened the people back into Popery, and suppressed the desire of exchanging their superstition for a more rational plan of religion. It was indeed presumed that Charles himself died a Protestant; and it seems to be certain, that when the approach of death had dissipated those schemes of ambition and grandeur which had so long blinded him, his sentiments became much more rational and agreeable to Christianity than they had ever been before. All the ecclesiastics who had attended him, as soon as he expired, were sent to the inquisition, and committed to the flames, or put to death by some other method equally terrible. Such was the fate of Augustin Casal, the emperor's preacher; of Constantius Pontius, his confessor; of Egidius, whom he had named to the bishopric of Tortosa; of Bartolomeo de Caranza, a Dominican, who had been confessor to Philip and Mary; besides twenty others of less note.

Reformation in England.

In England, the principles of the Reformation began to be adopted as soon as an account of Luther's doctrines could be conveyed thither. In that kingdom there were still remains of the sect called Lollards, whose doctrine resembled that of Luther; and amongst whom, consequently, the sentiments of the Reformer gained great credit. Henry VIII., king of England, was at that time a violent partisan of the Church of Rome, and had a particular veneration for the writings of St Thomas Aquinas. Being informed that Luther spoke of his favourite author with contempt, he conceived a violent prejudice against the Reformer, and even wrote against him, as we have already mentioned. Luther did not hesitate about writing against his majesty, overcame him in argument, and treated him with very little ceremony. The first step towards public reformation, however, was not taken until the year 1529. Great complaints had been made in England, from a very early period, respecting the usurpations of the clergy; and the prevalence of the Lutheran opinions rendered these complaints more loud and general than before. The House of Commons, finding the occasion favourable, passed several bills restraining the impositions of the clergy; but what threatened the ecclesiastical order with the greatest danger, were the severe reproaches thrown out in the house, almost without opposition, against the dissolute lives, ambition, and avarice of the priests, and their continual encroachments on the privileges of the laity. The bills for regulating the clergy met with opposition in the House of Lords; and Bishop Fisher imputed them to want of faith in the Commons, and to a formed design, proceeding from heretical and Lutheran principles, of robbing the church of her patrimony, and overturning the national religion. The Commons, however, complained to the king, by their Speaker Sir Thomas Audley, of these reflections thrown out against them; and the bishop was obliged to retract his words.

Though Henry had not the least idea of rejecting any, even of the most absurd observances of the Catholic Church, yet as the oppressions of the clergy were very ill suited to the violence of his own temper, he was pleased with every opportunity of lessening their power. In the parliament of 1531, he showed his design of humbling the clergy in the most effectual manner. An obsolete statute was revived, from which it was pretended, that to submit to the legatine power which had been exercised by Cardinal Wolsey was criminal. By this stroke the whole body of clergy was at once declared guilty. They were too well acquainted with Henry's disposition, however, to reply, that their ruin would have been the certain consequence of their not submitting to Wolsey's commission, which had been given by royal authority. Instead of making any defence of this kind, they chose to throw themselves on the mercy of their sovereign; which, however, it cost them L.118,840 to procure. A confession was likewise extorted from them, that the king was protector and supreme head of the Church of England; though some of them had the dexterity to get a clause inserted, which invalidated the whole submission, namely, "in as far as is permitted by the law of Christ."

The king having thus begun to reduce the power of the clergy, kept no bounds with them afterwards. He did not indeed attempt any reformation in religious matters; nay, he persecuted most violently such as did in the least degree attempt anything of the kind. Indeed the most essential article of his creed seems to have been his own supremacy; for whoever denied this, whether Protestant or Papist, was sure to suffer the most severe penalties.

He died in the year 1547, and was succeeded by his only son, Edward VI. This amiable prince gave new spirit and vigour to the Protestant cause, and was its brightest ornament, as well as its most effectual support. He encouraged learned and pious men of foreign countries to settle in England, and addressed a particular invitation to Martin Bucer and Paul Fagius, whose moderation added a lustre to their other virtues; in hopes that, by the ministry and labours of these eminent men, in concert with those of the friends of the Reformation in England, he might purge his dominions from the fictions of Popery, and establish in their room the pure doctrines of Christianity. For this purpose, he issued the wisest orders for the restoration of true religion; but his reign was too short to accomplish fully such a glorious purpose. In the year 1553, he was taken from his loving and afflicted subjects, whose sorrow was great, and suited to their loss. His sister Mary, the daughter of Catharine of Aragon, from whom Henry had been divorced, blindly bigoted to the Church of Rome, and a princess whose natural character, like the spirit of her religion, was despotic and cruel, succeeded him on the throne, and imposed anew the arbitrary laws and the tyrannical yoke of Rome upon the people of England. Nor were the methods which she employed in the cause of superstition better than the cause itself, or tempered by any sentiments of equity or compassion. Barbarous tortures, and death in the most shocking forms, awaited those who opposed her will, or made the least stand against the restoration of Popery. And amongst many other victims, the learned and pious Cranmer, archbishop of Canterbury, who had been one of the most efficient instruments of the Reformation in England, fell a sacrifice to her fury. But this odious scene of persecution was happily concluded in the year 1558, by the death of the queen, who left no issue; and, as soon as her successor Elizabeth ascended the throne, all things assumed a new aspect. The glorious period of this reign was alike eminent for religious knowledge and for daring genius, for civil prosperity and for martial glory. Elizabeth, whose sentiments, and councils, and projects, breathed a spirit superior to the natural softness and delicacy of her sex, exerted this vigorous and masculine spirit in the defence of oppressed conscience and expiring liberty; broke anew the despotic yoke of papal authority and superstition; and, delivering her people from the bondage of Rome, established that form of religious doctrine and ecclesiastical government which still subsists in England. This religious establishment differed in some respects from the plan which had been formed by those whom Edward VI. had employed for promoting the cause of the Reformation, and approached nearer to the rites and discipline of former times; though it is widely different, and, in the most important points, entirely opposite to the principles of the Roman Catholic hierarchy.

Reformation in Ireland.

The cause of the Reformation underwent in Ireland the same vicissitudes and revolutions which had attended it in England. When Henry VIII. after the abolition of the papal authority, was declared supreme head of the Church of England upon earth, George Brown, a native of England, and a monk of the Augustinian order, whom that monarch had created, in the year 1535, Archbishop of Dublin, began to act with the utmost vigour in consequence of this change in the hierarchy. He purged the churches within his diocese from superstition in all its various forms; pulled down images; destroyed relics; abolished absurd and idolatrous rites; and, by the influence as well as authority he had obtained in Ireland, caused the king's supremacy to be acknowledged in that nation. Henry soon afterwards showed that this supremacy was by no means a vain title; for he banished the monks out of that kingdom, confiscated their revenues, and destroyed their convents. In the reign of Edward VI. still further progress was made in the removal of popish superstitions, by the zealous labours of Bishop Brown, and the auspicious encouragement he granted to all who exerted themselves in the cause of the Reformation. The death of this young prince, however, and the accession of Queen Mary, had nearly changed the face of affairs in Ireland as much as in England; but her designs were disappointed by a very curious adventure, of which the following account has been copied from the papers of Richard earl of Cork.

Curiou disapp ment.

"Queen Mary having dealt severely with the Protestants in England, about the latter end of her reign signed a commission for to take the same course with them in Ireland; and to execute the same with greater force, she nominates Dr Cole one of the commissioners. The doctor coming, with the commission, to Chester on his journey, the mayor of that city, hearing that her majesty was sending a messenger into Ireland, and he being a churchman, waited on the doctor, who in discourse with the mayor taketh out of a cloke-bag a leather box, saying unto him, Here is a commission that shall lash the heretics of Ireland, calling the Protestants by that title. The good woman of the house being well affected to the Protestant religion, and also having a brother named John Edmonds of the same persuasion, then a citizen in Dublin, was much troubled at the doctor's words; but watching her convenient time, while the mayor took his leave, and the doctor complimented him down the stairs, she opens the box, takes the commission out, and places in lieu thereof a sheet of paper with a pack of cards wrapt up therein, the knave of clubs being faced uppermost. The doctor coming up to his chamber, suspecting nothing of what had been done, put up the box as formerly. The next day going to the water-side, wind and weather serving him, he sails towards Ireland, and landed on the 7th of October 1558 at Dublin. Then coming to the castle, the Lord Fitzwalters being lord-deputy, sent for him to come before him and the privy-council; who, coming in, after he had made a speech relating upon what account he came over, he presents the box unto the lord-deputy; who causing it to be opened, that the secretary might read the commission, there was nothing save a pack of cards with the knave of clubs uppermost; which not only startled the lord-deputy and council, but the doctor, who assured them he had a commission, but knew not how it was gone. Then the lord-deputy made answer: Let us have another commission, and we will shuffle the cards in the meanwhile. The doctor being troubled in his mind, went away, and returned into England, and coming to the court obtained another commission: but staying for a wind on the water-side, news came to him that the queen was dead; and thus God preserved the Protestants of Ireland." Queen Elizabeth was so delighted with this story, which was related to her by Lord Fitzwalter on his return to England, that she sent for Elizabeth Edmonds, whose husband's name was Mattershad, and gave her a pension of forty pounds a year during her life.

Refor tion i Scotla

In Scotland, the seeds of the Reformation were very early sown, by several noblemen who had resided in Germany during the religious disputes there. But for many years it was suppressed by the power of the pope, seconded by severe laws and not a few executions. The most eminent opponent of the papal jurisdiction was John Knox, a disciple of Calvin, and a man of great zeal and invincible fortitude. On all occasions he raised the drooping spirits of the reformers, and encouraged them to go on with their work, notwithstanding the opposition and treachery of the queen-regent; until at last, in 1561, by the assistance of an English army sent by Elizabeth, Popery was in a manner totally extirpated from every part of the kingdom. From this period the form of doctrine, worship, and discipline established by Calvin at Geneva, has had the ascendency in Scotland.

For further information on the subject of the Reformation in general, we refer our readers to the works of Burnet and Brandt; to Beausobre's *Histoire de la Reformation dans l'Empire, et les Etats de la Confession d'Augsbourg, dépuis* 1517–1530, Berlin, 1785, in four vols. 8vo; and Mosheim's Ecclesiastical History. See also Sleidan ***De Statu Religi-***

onis et Reipublicæ, Carolo V. Cæsare, Commentarii; and Father Paul's History of the Council of Trent. The Life of Luther by D'Aubigné may likewise be perused with advantage.

REFRACTION, in general, is the deviation of a moving body from its direct course, occasioned by the different density of the media in which it moves; or it is a change of direction occasioned by a body's falling obliquely out of one medium into another. The word is chiefly made use of with regard to the rays of light. See OPTICS.

REFRACTION *of Altitude*, the arc or portion of a vertical circle, by which the altitude of a star is increased by the refraction of light.

REFRACTION *of Ascension and Descension*, an arc of the equator, by which the ascension and descension of a star, whether right or oblique, is increased or diminished by the refraction.

REFRACTION *of Declination* is an arc of a circle of declination, by which the declination of a star is increased or diminished by refraction.

REFRACTION *of Latitude*, an arc of a circle of latitude, by which the latitude of a star is increased or diminished by the refraction.

REFRACTION *of Longitude*, an arc of the ecliptic, by which the longitude of a star is increased or diminished by means of the refraction.

REFRACTION, *Terrestrial*, is that which makes terrestrial objects appear to be raised higher than they are in reality, in observing their altitudes.

REFRANGIBILITY OF LIGHT, the disposition of rays to be refracted. The term is chiefly applied to the disposition of rays to produce different colours, according to their different degrees of refrangibility. See OPTICS.

REFRIGERATIVE, in *Medicine*, a remedy which refreshes the inward parts by cooling them; as clysters, ptisans, and the like.

REFRIGERATORY, in *Chemistry*, a vessel filled with cold water, through which the worm or spiral tube passes in distillations; the use of which is to condense the vapours as they pass through the worm or pipe.

REFUGEES, a term at first applied to the French Protestants, who, by the revocation of the edict of Nantes, were constrained to fly from persecution, and take refuge in foreign countries. Since that time, however, it has been extended to all such as leave their country in time of distress.

REGALBUTO, a town of the island of Sicily, in the intendency of Messina, and district of Demone. It stands on a hill near the river of the same name, in a salubrious situation, 100 miles from Palermo, and contains 6800 inhabitants.

REGALIA, in *Law*, the rights and prerogatives of a king. Regalia is also used for the apparatus of a coronation.

REGALMUTO, a city of the intendency of Girgente, and district of Mazzara, in the island of Sicily. It stands upon a level plain, in a healthy and fertile situation, sixty-eight miles from Palermo, and contains 7200 industrious inhabitants, who obtain from a mountain near them salt, quicksilver, saltpetre, sulphur, gypsum, and some excellent stone for building.

REGAN, a neat little town of Persia, in the province of Kerman, situated in the district of Nurmansheer, on the eastern frontier. The town is surrounded by a mud-wall; the fort is quadrangular, and the walls are high and in good repair, being flanked with bastions. The cattle of the inhabitants are driven every night within the walls for protection. A guard is constantly kept at the only gate which the town has, to prevent the entrance of strangers, and also the predatory incursions of the surrounding tribes. It is eighty-nine miles east from Bumm.

REGARDANT, in *Heraldry*, signifies looking behind; and it is used for a lion or other beast, with his face turned towards his tail.

REGARDER, an ancient officer of the king's forest, who was sworn to make the regard of the forest every year; that is, to take a view of its limits, to inquire into all offences and defaults committed by the foresters within the forest, and to observe whether all the officers executed their respective duties.

REGATTA, a species of amusement peculiar to the republic of Venice. This spectacle had the power of exciting admiration, enthusiasm, and a sense of glory. The grand regatta was only exhibited on particular occasions, as the visits of foreign princes and kings at Venice.

REGEL, or RIGEL, a fixed star of the first magnitude, in Orion's left foot.

REGEN, one of the circles into which the kingdom of Bavaria is divided, and deriving its name from the chief river which flows through it. On the north it is bounded by the circle of the Upper Maine, on the north-east by Bohemia, on the south-east by the Lower Danube, on the south by the Issar, and on the south-west by the Lower Danube. It extends over 4282 square miles, and comprehends fifty-six cities and market-towns, and 3160 villages and hamlets. The population amounts to 364,470 persons. In the part which borders on Bohemia the country is mountainous, but to the south of the Danube it is generally either level or undulating. Some of the rivers run to the Maine, but the greater part of the streams find their way to the sea through the Danube. The soil to the north of the Danube is poor, but to the south of that stream is moderately productive of the common kinds of grain, and somewhat more of flax and hemp. The circle is divided into nineteen bailiwicks, several of which are under the authority of mediatized princes.

REGENERATION, in *Theology*, the act of being born again by a spiritual birth, or the change of heart and life experienced by a person who forsakes a course of vice, and sincerely embraces a life of virtue and piety.

REGENT, one who governs a kingdom during the minority or absence of the king.

REGENT also signifies a professor of arts and sciences in a college, having pupils under his care; but it is generally restricted to the lower classes, as to rhetoric, logic, &c. those of philosophy being called *professors.* In the English universities it is applied to masters of arts under five years standing, and to doctors under two, as non-regent is to those above that standing.

REGGIO, a province of the duchy of Modena, in Italy, 710 square miles in extent, and containing 161,600 inhabitants. The chief place is the city of the same name, on the navigable canal Tassoni, by which it is connected with the Po. It is surrounded with indefensible walls, and has a citadel not tenable against attacks. It is the seat of a bishop, and has a magnificent cathedral, twenty-two parish and twenty-six monastic churches, a Jesuits' college and episcopal seminary, and a fine theatre. It contains 1500 houses, and 18,600 inhabitants, who make many kinds of silk goods and some linens, and have an extensive trade in the raw produce of the district.

REGICIDE, KING-KILLER, a word chiefly used with us in speaking of the persons concerned in the trial, condemnation, and execution of Charles I.

REGIFUGIUM was a feast celebrated at Rome on the 24th of February, in commemoration of the expulsion of Tarquin the Proud, and the abolition of the regal power. It was also performed on the 26th of May, when the king of the sacrifices, or *Rex Sacrorum*, offered bean-flour and bacon in the place where the assemblies were held. The sacrifice being ended, the people hastened away with all speed, to denote the precipitate flight of Tarquin.

REGIMEN, the regulation of diet with a view to preserve or restore health. See Dietetics.

Regimen, in *Grammar*, that part of syntax, or construction, which regulates the dependency of words, and the alteration which one occasions in another.

REGIMENT is a body of men, either horse, foot, or artillery, commanded by a colonel, a lieutenant-colonel, and a major. Each regiment of foot is divided into companies, but the number of companies differs. In Britain our regiments have generally ten companies, one of which always consists of grenadiers. Regiments of horse commonly consist of six troops, but there are some which contain nine. Dragoon regiments have generally in time of war eight troops, but in time of peace six only. Each regiment has a chaplain, quarter-master, adjutant, and surgeon. (See the article Army.)

REGION, in *Geography*, a large extent of land, inhabited by many people of the same nation, and inclosed within certain limits or bounds.

Region, in *Physiology*, is taken for a division of our atmosphere, which is divided into the upper, middle, and lower regions.

The upper region commences from the tops of the mountains, and reaches to the utmost limits of the atmosphere. In this region reign perpetual and equable calmness, clearness, and serenity. The middle region is that in which the clouds reside, and where meteors are formed, extending from the extremity of the lowest to the tops of the highest mountains. The lowest region is that in which we breathe, which is bounded by the reflection of the sun's rays, or by the height to which they rebound from the earth. See Atmosphere.

Ethereal Region, in *Cosmography*, is the whole extent of the universe, in which is included all the heavenly bodies, and even the orb of the fixed stars.

Elementary Region, according to the Aristotelians, is a sphere terminated by the concavity of the moon's orb, comprehending the atmosphere of the earth.

Region, in *Anatomy*, a division of the human body, otherwise called *cavity*, of which anatomists reckon three, viz. the upper region, or that of the head; the middle region, or that of the thorax or breast; and the lower, being that of the abdomen or belly.

REGIS, Peter Sylvain, a French philosopher, and a great propagator of the doctrines of Descartes, was born in Agenois in the year 1632. He studied languages and philosophy under the Jesuits at Cahors; and as his views were then directed to the church, he was afterwards occupied in the study of divinity at the university of that town. His progress in learning was so uncommon, that at the end of four years he was offered a doctor's degree without the usual charges; but he did not think it became him to accept of it till he had also studied in the Sorbonne at Paris. He went thither, but was soon disgusted with theology; and as the philosophy of Descartes began at that time to make a noise, in consequence of the lectures of Rohault, he conceived a taste for, and gave himself up entirely to, the study of it. He frequented these lectures; and becoming an adept, went to Toulouse in 1665, and read lectures himself. Having fine parts, a clear and fluent manner, and a happy way of making himself understood, he attracted all sorts of people; the magistrates, the learned, the ecclesiastics, and the very women, who now all affected to abjure the ancient philosophy. In 1680 he returned to Paris, where the concourse which flocked to him was such that the sticklers for the peripatetic philosophy began to be alarmed. They applied to the Archbishop of Paris, who thought it expedient, in the name of the king, to put a stop to the lectures, which accordingly were discontinued for several months. The whole life of Regis was spent in propagating the new philosophy. In 1690 he published a formal system thereof, containing logic, metaphysics, physics, and morals, in three volumes 4to, written in French. It was reprinted the year after, at Amsterdam, with the addition of a discourse upon ancient and modern philosophy. He wrote afterwards several pieces in defence of his system, in which he had disputes with M. Huet, Duhamel, Malebranche, and others. His works, though abounding with ingenuity and learning, have been disregarded, in consequence of the great discoveries and advancement in philosophical knowledge which have since been made. He had been chosen member of the Academy of Sciences in 1699, and he died in 1707.

Besides his System of Philosophy, he wrote the following works: The Use of Reason and of Faith; an Answer to Huet's Censures of the Cartesian Philosophy; an Answer to Duhamel's Critical Reflections; some pieces against Malebranche, to show that the apparent magnitude of an object depends solely on the magnitude of its image traced upon the retina; and a small piece upon the question, Whether Pleasure constitutes our present Happiness?

REGISTER, a public book, in which are entered and recorded memoirs, acts, and minutes, to be had recourse to occasionally for knowing and proving matters of fact.

REGISTRAR, an officer in the English universities, who has the keeping of all the public records.

REGISTRATION, General, of Births, Baptisms, Marriages, Deaths, and Burials, in England and Wales. The first known public authority under which registers recording births or baptisms, marriages, deaths or burials, were systematically kept in England, was an injunction issued in September 1538 (30 Hen. VIII.), by Thomas Lord Cromwell, lord privy seal and vicegerent to the king, which enjoined, that in every parish a register-book should be kept in a coffer with two locks, by the parson, vicar, or curate, and churchwardens; and that every Sunday, in the presence of one of the churchwardens, the parson, &c. should enter in a register-book a written record of the dates and names of the weddings, christenings, and burials, of the preceding week; by neglect of which duty he incurred a fine of three shillings and fourpence, to be employed in the repair of the church.

In 1547, an injunction was issued by Edward VI. similar to that of 1538, excepting only that the penalty was directed "to be employed to the poore-box" of the parish.

Inquiry was directed, at the instance of Cardinal Pole, under Philip and Mary, in the years 1555 and 1557, whether the clergy had complied with these directions; and in the first year of Queen Elizabeth, 1559, a further injunction was issued, which differed from that of Edward VI. in 1547 only in directing that the penalty should be divided between the poor-box and the repair of the church. These injunctions were not very strictly observed, as appears by the preamble of a bill to "authorize every archbishop and bishop to erect one office of registership of all the church-books, to be kept in every diocese," which, in March 1563, was read a first time in the House of Commons, but did not pass.

The great importance of registration was in 1590 represented to the Lord-treasurer Burghley, who, impressed with the force of the representation, communicated a plan to the Archbishop of Canterbury. Nothing, however, appears to have been done in consequence until October 1597, when a constitution was made by the archbishop, bishops, and clergy of the province of Canterbury, and approved by the queen; which notices the very great utility of parish-registers, and gives minute directions for keeping them, and for the transmission of a transcript yearly to the diocesan registrar. It appears, too, that persons were appointed for the purpose of ascertaining if the several orders had been complied with; and that every minister, at institution, was required to declare that he would "keep the register-book according to the queen's majesty's injunctions."

In 1603, the first year of the reign of James I. another injunction was issued similar to that of 1597, with the important addition of a clause, appointing that the ancient registers, so far as they could be procured, but especially since the beginning of the reign of Elizabeth, should be copied into a parchment-book, to be provided by every parish; after which, nothing more appears to have emanated, either from the ecclesiastical or civil authorities, on this subject, till the time of the Long Parliament, when the following entry in the Journal of the House of Commons gives evidence of attention to the importance of registration.

"Anno 1644, Dec. 6. Ordered, that it be referred to the committee for bringing in the ordinance for the establishing the directory, to bring in a clause in that ordinance, for registering the time of baptizing of children, and their parents' names, and for registering of burials." In the same year an ordinance was made, directing, that in every parish or chapelry in England and Wales, the minister and other church-officers should keep a register of birth and baptism, of marriage, and of burial; and that all persons reasonably desiring it might search therein and obtain copies.

In August 1653, in pursuance of the recommendations of a law-reform committee appointed in the preceding year, and including many eminent persons, an act was passed, which directed that in every parish a register-book shall be provided for registering all marriages, births, and burials in the parish; and that the custody of such book, and the duty of registration, shall be given to a person, to be called the parish registrar, appointed by the parishioners chargeable to the poor, and approved by a justice of the peace. It was also enacted, that extra-parochial places, or small parishes, might be united, for the purposes of registration, to other parishes, by the justices at their sessions; and that all existing register-books should be kept by the registering officers appointed under that act.

This act was not confirmed at the Restoration, and the business of registration reverted to the clergy of the established church. During the reigns of Charles II. and James II. nothing was done with respect to registers, except that, by a clause in the act of 30 Car. II. c. 3, entitled "an act for burying in woollen," it was enacted that all clergymen "do, within their respective parishes, precincts, and places, take an exact account, and keep a register, of all and every person or persons buried in his or their respective parishes or precincts, or in such common burial-places as their respective parishioners are usually buried."

In the reign of William III. registration was rendered a source of revenue. The act of 6 and 7 William III. c. 6, granted duties on births, marriages, and burials, and compelled the clergy, under a penalty of L.100, to keep an exact register of all persons born, christened, married, or buried in their respective parishes, to which register the collector of the tax, and all persons concerned, might have free access without fee. It thus imposed on the clergyman the onerous duty of acting gratuitously as a civil functionary, and collecting information of all births within his parish, without distinction of sect, and irrespective of baptism, a duty the difficulty of which was rendered greater by the attempts of the parents to conceal the birth, in order to elude the payment of the tax. With a view to obviate this objection, an act was passed in the following year (7 and 8 William III. c. 35), which provided that parents should, within five days after birth, give notice of the day of the birth to the clergyman, under a penalty of forty shillings, and that the clergyman should, under a like penalty, register such birth, for which the parents were to pay sixpence; and by the 4th of Anne, c. 12, the clergy were relieved from the ruinous penalties incurred under the act of 6 and 7 William III. c. 6, in all cases where the duties had been really paid.

The 26th Geo. II. c. 33, an act "to prevent clandestine marriages," directed the church-wardens of every parish to provide books of vellum, or good and durable paper, for the registration of marriages. By the 23d of Geo. III. c. 67, a stamp-duty of threepence was imposed upon every registered entry of burial, marriage, birth, or christening, to be demanded by the clergyman from the undertaker, or from the parties married, or from the parents of the child whose birth or christening had been registered. By 25 Geo. III. c. 75, the provisions of that act were extended to dissenting ministers. These measures excited much objection, and were repealed in 1794.

The next legislative measure affecting registers was the 52d Geo. III. c. 146, entitled "an act for the better regulating and preserving parish and other registers of births, baptisms, marriages, and burials, in England." After reciting that "the amending the manner and form of keeping and of preserving registers of baptisms, marriages, and burials of his majesty's subjects in the several parishes and places in England, will greatly facilitate the proof of pedigrees of persons claiming to be entitled to real or personal estates, and be otherwise of great public benefit and advantage," it enacts, that, after the 31st of December 1812, registers of baptisms, marriages, and burials, according to the rites of the established church, shall be made and kept by the officiating minister of every parish and chapelry, in books to be provided by the king's printer, at the expense of the respective parishes, according to the forms contained in schedules annexed to that act. These schedules contain the following particulars: In case of *baptism*,—when baptized; child's Christian name; parents' Christian names and surnames; abode; quality, trade, or profession; by whom the ceremony was performed. In case of *marriage*,—the name and parish of the man; the same of the woman; when married; whether by banns or license; whether by consent of parents or guardians; when; by whom; signature of officiating minister of the parties married, and of two witnesses. In case of *burial*,—the name; abode; when buried; age; by whom the ceremony was performed.

The registers of baptism, marriage, and burial were to be kept in separate books, and signed within seven days after each ceremony had been performed. Annual copies were to be made, verified, and signed by the officiating minister, and attested by the church-wardens, and transmitted by them yearly to the registrar of the diocese; which registrar must report thereon to his bishop; must deposit such copies in a safe receptacle, arranged for reference; and cause alphabetical lists of persons and places to be made, kept, and opened for search.

It is to be observed that this act, which referred in its title to registers of births, made no provision for recording the date of birth. Neither did it provide a record of the date of death. It only provided records of the performance of the religious ceremonies of baptism, marriage, and burial, according to the rites of the Established Church. It therefore afforded an insufficient register, even for members of the Established Church, whilst for those who dissented from the Established Church, and therefore did not avail themselves of its ordinances for baptism or burial, it provided no register at all.

The inadequacy of this system, even if fully carried into effect, and the insufficient manner in which it was complied with, called loudly for investigation and remedy, and became the subject of inquiry before a select committee of the House of Commons, appointed in March 1833, who, having, as they state, received evidence on registration "from clergymen of the established church, and from parish-clerks; from gentlemen of the legal profession; from authors devoted to antiquarian research; from persons of different religious denominations, including Catholics, Dissenters, Jews, and Quakers; from gentlemen eminently scientific, and attached to statistical inquiries; from medical authorities, who have long desired ampler and more accurate information on the extent and causes of mortality; from an eminent foreigner, distinguished for extensive and accurate statistical intelligence; and others, whose wide-spread inquiries in foreign countries, and peculiar facilities of information, entitled them to respect;" unanimously agreed to a report, which expressed the following opinions as the conclusions at which they had arrived.

"1. That the subject is urgently important.

"2. That it involves matters of great public and national interest, as well as individual satisfaction, and rights and claims to property; and deserves the attention of the humblest artisan as well as of the most philosophical and statesman-like inquirer.

"3. That the existing law is imperfect and unjust, and requires not merely partial amendment, but real fundamental reform.

"4. That the present plan, even if improved and perfected, as applicable to the members of the established church, being founded on religious rights, is exclusive and intolerant, as it would not include a very considerable portion of the reflecting, intelligent, and influential population of the country, who are Protestant and Catholic dissenters from that church, and 1100 congregations who disapprove infant baptism, and must practically punish them (including, too, the community who may purchase or derive property from them) for claiming the rights of conscience, and believing what their judgments direct.

"5. That even to many pious and worthy clergymen of the established church the system is productive of pain and regret, as it often induces a compliance, from mere secular motives, with sacraments which they highly estimate and devoutly revere. But,

"6. That even as to the members of the church it is detrimental and absurd, since the registers are mere registers of baptisms and not of births, of burials and not of deaths; since they supply no adequate proof of pedigrees, or means of proving or tracing ancestral descent; since they are often falsified, stolen, burnt, inaccurately inscribed, and carelessly preserved; since the securities intended to be given by the last general register act (52 Geo. III.), by directing the yearly and universal transcription of the registers, their deposit with the diocesan records, and the preparation of indexes to facilitate searches, have all experienced only the most limited fulfilment, as, while one fourth of the parishes make no returns, the returns that have been sent are never indorsed, and are subject to fire and decay, and the directions of the act have not and cannot be enforced; and since the value of property is diminished by the difficulties incident to its transfer, and the insecurity by which it is so often held and acquired. And,

"7. That great trouble, vast expense, utter uncertainty, capricious charges, and local and general evils exist, while no means are supplied to obtain the information other countries possess, and justly value, as to the state of disease, the operation of moral and physical causes on the health of the people, the progress of population, and other matters on which accurate knowledge can scarcely be too highly appreciated or too intensely pursued."

The committee further recommended, that, as a remedy for the defects before mentioned, "a national civil registration of births, marriages, and deaths, should be established," including "all ranks of society, and religionists of every class."

In pursuance of these recommendations, measures for effecting a better registration were laid before parliament; and in August 1836 the act for registering births, deaths, and marriages in England, and the act for marriages in England, became law. Their operation was suspended for a limited time by the act of 7 Will. IV., chap. 1, and they were amended by the act of 1 Vict. chap. 22, and thus amended they came into operation on the 1st of July 1837.

New reg tration o Births, Deaths, Marriag

These acts leave untouched the act of 1812 so far as it relates to the registration of baptisms and burials, but repeal what relates to the registration of marriages, and provide a new registration of marriages, of *births*, and of *deaths*.

The circumstances recorded in the register-book under the new law are, in case of *birth*, the time and place; the name, if any; sex; name and surname of father; name and maiden surname of mother; rank or profession of father; signature, description, and residence of the informant; and the baptismal name, if added after registration of birth. In case of *death*, the time and place; name and surname; sex; age; rank or profession; *cause of death;* signature, description, and residence of the informant. Every entry must be signed by the informant and by the registrar, who discharges this duty without any immediate expense to the parties requiring registration, but is remunerated by a moderate fee on each entry paid quarterly out of the poor's rates. The *informant*, in a case of *birth*, must be one of the parents, or the occupier of the house or tenement in which the child was born; or, if it be a foundling, the overseer of the poor. In a case of *death*, it must be some person present at the death, or in attendance during the last illness; or, in default of such person, the occupier; or, in default of the occupier, an inmate of the house in which the death occurred; or, if there be an inquest, the coroner. Persons so qualified *must* inform under pain of indictment, and sign the register on being requested so to do; and without such signature no birth or death can be duly registered, and the entry cannot be given in evidence.

The new form for registration of marriages, applicable alike to all religious denominations, records the place and time of marriage; names and surnames of the parties; whether they are of full age or minors; their condition (that is, whether bachelor or spinster, widower or widow); their rank or profession; residence at the time of marriage; father's name and surname; rank or profession of father; by what rites and ceremonies, after what preliminary forms (that is, whether license, banns, or certificate), and by whom solemnized; and must also contain the signatures of the parties and of two witnesses.

One of the most important circumstances not previously recorded, for which provision is made in the new register, is the "cause of death," to which a column is assigned in the registers of death, and where it is exhibited in juxtaposition with the period, locality, sex, age, and occupation, thus affording valuable data of the highest importance to medical science. In order to attain the utmost accuracy in the returns of the causes of death, a printed circular has been sent by the registrar-general to all medical practitioners in England and Wales, wherein it is recommended, under the hand of the President of the Royal College of Physicians, the President of the Royal College of Surgeons, and the Master of the Society of Apothecaries, "that every practising member of any branch of the medical profession who may have been present at the death, or in attendance during the last illness, of any person, shall, immediately after such death, place in the hands of such other persons as were in attendance, of the occupier of the house in which the death occurred, and of some inmate who may probably be required to give information, *written statements of the cause of death*, which such persons may show to the registrar, and give as their information on that subject."

Gene Regis Office

The recent registration act is peculiarly distinguished from other previous measures on that subject, by the provision of a central office in London, called the General Register Office, for the deposit of certified copies of all registers, and general superintendence over everything relating to registration. It is presided over by an officer named the Registrar-General, appointed under the great seal, under whom in the office is an assistant registrar, a chief clerk, three first clerks, and forty-three others, who are appointed by the Lords of the Treasury, or by the Registrar-General with their approval. Instructions emanate from this office to all the local officers charged with the various duties of registration under this act, namely, superintendent registrars, with their deputies; registrars of births and deaths, with their deputies; and registrars of marriages; all of whom act within their respective districts under the directions of the Registrar-General, in whom is vested the power of dismissal.

Registrar-General.

The duties of the Registrar-General are to make regulations, subject to the approval of the Secretary of State, for the management of the General Register Office, and for the duties of all registrars and superintendent registrars; to appoint superintendent registrars for temporary districts; to examine and sanction the formation of registrars' districts, submitted by the various boards of poor-law guardians for his approval; to examine and sanction, if approved, the plans for local register offices, to be provided by the poor-law guardians, and submitted by them for his approval; to furnish the various books, forms, &c. requisite for registration, to the various parties requiring them; to register certified places of worship for solemnization of marriage; to decide, in cases of doubt, upon all caveats referred to him by the superintendent registrars, and to adjudicate on an appeal from the superintendent registrar's decision on a caveat; to hear and settle all matters of doubt, dispute, and complaint, respecting the business of registration, and the duties and conduct of the various officers employed therein; to annex extraparochial places to registrars' districts; to unite two or more superintendent registrars' districts, or to divide one superintendent registrar's district into two, with the approval of the Secretary of State; to appoint registrars or superintendent registrars if the guardians neglect to do so; and to send once in every year a report and abstract of all registered births, deaths, and marriages, for the preceding year, to the Secretary of State, to be laid before parliament.

Superintendent Registrars.

The superintendent registrar is a local officer created by the registration and marriage acts, acting solely within his district, which is either identical with a poor-law union, or consists, as in a few instances, of two or more unions formed into one district by the authority of the Registrar-General, or is a temporary district consisting of several temporary registrars' districts united by the Registrar-General where there is no poor-law board of guardians. In the latter case, the superintendent registrar is appointed by the Registrar-General. In the former, he is either the clerk of the guardians, who, as such, is entitled *ex officio* to take the office, or he is some person whom, the clerk not accepting, the guardians may have appointed, subject in either case to such qualifications as the Registrar-General may by any general rule require.

The principal duty of the superintendent registrar is to receive quarterly, from the registrars of births and deaths, and registrars of marriages, within his district, the certified copies of births, deaths, and marriages registered by them for the preceding quarter, and, having verified them by comparison with the original entries in the register-books, to certify their correctness, and transmit them to the Registrar-General; to receive also and transmit, but not also to verify, certified copies of marriages registered by all clergymen of the Established Church within his district, or by any registering officer of the Quakers, or secretary of a Jewish synagogue, if there be any within or assigned to his district. He has also the care of the register office of his district, where are deposited all register-books within the district when filled; and he is to make indexes of these, and permit searches, and give copies of entries in the register-books on payment of certain fixed fees. He may appoint registrars of marriage within his district; and, previous notice having been already given, he may grant certificates for marriage, and, within his district, licenses for marriage, provided such license be not for marriage to be solemnized according to the forms of the Established Church.

Registrars of Births and Deaths

The registrar of births and deaths is a local officer acting within his district, which has either been formed, with the approval of the Registrar-General, by a board of guardians established under the poor-law amendment act, or is a temporary district formed by the Poor-law Commissioners where there is no such board established. In the former case, the registrar is appointed by the board of guardians, in the latter by the Poor-law Commissioners, subject, in both cases, to such qualifications as the Registrar-General may by any general rule declare to be necessary.

His duties, which are the same in both cases, are to register, in the books provided for that purpose, every birth and death occurring within his district; and four times in every year to make, on forms furnished for that purpose, copies of all such entries of births and of deaths for the quarter immediately preceding; to certify that such copies are correct, and to deliver them to the superintendent registrar of his district, who, on comparing them with the register-book, which the registrar must also produce, will certify their correctness, and transmit them to the Registrar-General. He also delivers an account of the number of entries so copied, which the superintendent registrar verifies, and sanctions if correct, and which the registrar then presents, and obtains payment of the fees due thereupon from the guardians or overseers of the poor.

The registrar of marriages is a local officer appointed by the superintendent registrar, with the approval of the guardians, or, if there be no board of guardians, of the Poor-law Commissioners, and acts solely within his district, which is the same as that of the superintendent registrar by whom he was appointed.

His duty is to be present at marriages not according to the forms of the Church of England, solemnized either in registered places of worship within his district, or in the superintendent registrar's office; to register the same in a book provided for that purpose; and to deliver quarterly to the superintendent registrar certified copies of such registered entries, in like manner as is done by the registrar of births and deaths.

Marriages according to the forms of the Established Church are registered, as before, by the officiating clergyman, who delivers certified copies quarterly to the superintendent registrar of his district, to be transmitted to the Registrar-General. The marriages are also registered at the time *in duplicate*; and one of the books, when filled, is to be deposited immediately in the superintendent registrar's office.

Marriages according to the ceremonies of the Quakers and of the Jews are registered respectively in duplicate by the registering officer of the Quakers and the secretary of the synagogue, and certified copies are given quarterly to the superintendent registrar for transmission.

The number of persons by whom the registration of births, deaths, and marriages under the existing law is conducted (exclusive of the central establishment of the General Register Office) is as follows:—

There are 618 superintendent registrars, each of whom may appoint a deputy, with the approval of the Registrar-General, to act for him in case of his illness or absence. Of these, 562 have accepted the office as clerks of boards of guardians, or have been appointed by the guardians; and fifty-six are temporary, and have been appointed by the Registrar-General.

There are 2193 registrars of births and deaths, each of whom may appoint a deputy, with the approval of the guardians or of the Poor-law Commissioners. Of these, 1926 are appointed by the guardians established under the poor-law amendment act, and 267 are registrars of temporary districts, appointed by the Poor-law Commissioners.

The number of registrars of marriages who had been appointed and held such office on the 31st of December 1838 was 817, of whom 419 are also registrars of births and deaths. The foregoing, being in number 3209, act under the directions of the Registrar-General, and are removeable by him.

The number of other persons by whom registration of marriage is effected is as follows:—1*st*, 11,694 officiating ministers of the Established Church, to whom register-books have been furnished; 2*d*, ninety registering officers of Quakers; 3*d*, thirty-six secretaries of synagogues. All these are in communication with the Registrar-General with respect to the duties of registration.

Deposit, arrangement, examination, and indexing of certified copies.

One of the most important features of the new measures is the provision that certified copies shall be deposited quarterly in the General Register Office in London, there to be arranged and indexed for facility of reference; a provision by means of which henceforth a copy of an entry of any registered birth, death, or marriage, in any part of England or Wales, may be obtained by application at a single office, at the trifling cost of 3s. 6d., which includes the fee for search.

The certified copies thus transmitted from the clergy, registrars, registering officers, and secretaries (amounting together to more than 15,000 persons), are all made on separate leaves of durable paper, of an uniform size and peculiar texture, having a distinguishing water-mark for the prevention of forgery, and furnished by the Registrar-General to every one of the foregoing persons, on whom the duty of registration devolves. They are sent by the superintendent registrars by the general post, each class of return (*i. e.* birth, death, and marriage) being sent separate, and in a cover denoting by a mark the nature of the contents, and bearing the name of the district to which it belongs. Thus, on their reception at the General Register Office, the confusion which would otherwise ensue is avoided, by its being rendered possible to classify the certified copies to a considerable extent even before they are taken out of their covers.

They are then arranged and examined *seriatim*, and all defects are noted; and letters on the subject of such defects as are of any importance are addressed to the persons from whom the defective copies come, and who are required to furnish either other copies, or such explanations as may remove doubt. The copies are then paged, and inserted in books for reference.

Means of immediate reference to any one of the entries of births, deaths, and marriages deposited in the General Register Office, which will amount yearly to almost 1,000,000, are provided in the alphabetical indexes which are made there. This vast work, far exceeding in magnitude anything of a similar kind ever before attempted in this country, is performed in the following manner. The few particulars requisite for the index are copied from each entry *seriatim*, on forms prepared for that purpose, containing space for as many entries as there are in one page of a certified copy. These, after having been checked, are cut into separate slips, each containing the reference to one entry; and the slips are then sorted and arranged alphabetically on files, from whence they are then taken off one by one by the indexing clerks, and the contents of each copied into the index. In this manner nearly a million of names will be indexed alphabetically in the course of each year, the processes of transcribing, sorting, and indexing being performed by between thirty and forty persons. There is a separate index for each class of entries (births, deaths, and marriages), and for each quarter, or twelve separate indexes for the year. Any person, on payment of one shilling, may search these indexes, and, on finding the name sought, may obtain, for two shillings and sixpence, a copy of the entry of birth, death, or marriage referred to; which copy, being stamped with the official seal, will be "received as evidence of the birth, death, or marriage to which the same relates, without any further or other proof of such entry." Thus not only are means afforded of obtaining for legal purposes, by application at one central office, certified copies of registers from every part of England and Wales, but the copies so obtained have the additional advantage of being sufficient evidence, without an affidavit, of their being correct, which is often required for the confirmation of extracts given from church registers.

Paroc registe

It is stated in the preface to the Population Abstract for 1831, as the result of an inquiry respecting parochial registers in England, "that eight hundred and twelve English parish registers commence in the year 1538, about forty of which contain entries (copied probably from family bibles and tomb-stones), anterior to the date of Cromwell's injunction; 1822 parish registers commence from A. D. 1538 to 1558, when Queen Elizabeth required a protestation from the clergy; 2448 parish registers commence from A. D. 1558 to 1603, when the canons authorized by King James directed a copy of all extant parish registers to be made and preserved; and nearly one half of them (5082) have been preserved accordingly, and are now extant. Parish registers to the number of 969 commence between that time to the year 1650; 2757 from A. D. 1650 to 1700; 1476 parish registers from A. D. 1700 to the year 1750; the rest (six or seven hundred) since that time."

Non-p rochia gisters

In addition to the registers heretofore and now kept under the sanction of ordinances and acts of parliament, there is a vast number of non-parochial registers and records of marriages, births and baptisms, deaths, or burials, which have been kept in some instances from a very remote period by various dissenting congregations, and in many cases with great care and correctness, but in no form produced by authority, and under no legal sanction; and which were therefore not admitted in evidence as registers in courts of justice.

In September 1836, a commission was issued, which has been renewed in the present reign, directing certain commissioners to inquire into the state, custody, and authenticity of such registers or records; "and to inquire whether any or what measures could be beneficially adopted for collecting and arranging all or any of such registers or records, and for depositing the same, or copies thereof, in the office of the registrar-general of births, deaths, and marriages, or for otherwise preserving the same; and also to consider and advise the proper measures to be adopted for giving full force and effect in evidence, in all courts of justice, to all such registers as might be found accurate and faithful, and for facilitating the production and reception of the same." The commissioners have reported the result of their labours, from which report it appears, that about 7000 non-parochial registers have been transmitted to them for inspection from 3630 religious congregations, namely,

Foreign Protestant churches	37
Presbyterians, Independents, and Baptists	2264
Wesleyan Methodists	618
Moravians	10
Lady Huntingdon's Connection	44
Calvinistic Methodists	436
Swedenborgians	21
Total	3430

"Each of these registers," says the Report, "was authenticated by a certificate under the signature of the minister, or of some officer of the church or denomination, from whom it was received; and this certificate was generally accompanied by answers to the questions which had been circulated by the commissioners." After being "classed in lists according to the several counties in England and Wales, and entered in a book, with a careful annotation of any particulars applicable to their state or custody," they were "submitted to the inspection of the board, by whom the question as to their admissibility was discussed and recorded; and in every instance the chairman, or the commissioner representing the chairman, authenticated such inspection and examination, by affixing his initials to the first and last entry in each register; or if some parts of the register appeared to be copies, or not to bear marks of authenticity, he affixed his initials to such parts only as were deemed original or authentic." With respect to all such registers as have thus been examined and deemed authentic, wholly or in part, the commissioners recommend, "that they be kept together in some secure place of deposit, under the care of the Registrar-General, or of some other officer to be appointed for that purpose, that, under certain conditions, they be receivable in evidence in all courts of justice:" that the authorized custos of these registers shall permit searches, and grant certified extracts, on payment of moderate fees; and that on payment of a reasonable fee he shall produce any original register deposited with him, on *subpœna* or order of a competent tribunal: "that all criminal proceedings shall be by production of the original: that in all other cases, copies or extracts, certified by the officer having custody of the original, shall, after notice, be receivable as evidence of the birth, baptism, marriage, death, or burial to which it relates, subject to the following regulations: that in courts of law, or at quarter-sessions, any party intending to use any certified extract from any register before mentioned, in evidence, on the trial of any cause, or hearing of any appeal, shall give notice in writing to the opposite party, his attorney or agent, of his intention to use such certified extract as evidence at such trial or hearing, and at the same time shall deliver to him a copy of the extract, and of the certificate thereof, in order that there may be a full opportunity to ascertain whether the authenticity, genuineness, or correctness of the entry may be liable to objection; and in proof of such notice and delivery, or on admission of the receipt of such notice and copy, such certified extract shall be received in evidence at the trial or hearing, provided the judge or court shall be of opinion that such service had been made a reasonable time before such trial: that in case any party, instead of making proof by certified extract, intends to produce any original register in evidence, he shall nevertheless, within a reasonable time, give to the opposite party notice of his intention, together with a copy of a certified extract of the entry which he intends to offer in evidence." The recommendations respecting the admission of registers, or certified extracts, in courts of equity, and in ecclesiastical courts, are similar in character, containing only such variations as the different practice of those courts requires.

gistra-
n in
ance.

The registration of births, and deaths, and marriages in *France* is conducted under the provisions of the *Code Civil* of Napoleon. The *maire* of each *commune*, of which there are about 37,300 in France, is the registering officer charged with the duty of registering, in books provided for the purpose, all births, deaths, and marriages, occurring within his commune. Births and deaths are registered in duplicate, the former upon information, in the presence of two witnesses, and are signed in duplicate by the informant, the two witnesses, and the registering officer; in the case of deaths, one of the witnesses may be also the informant. Marriages are registered in the presence of four witnesses, and signed by the parties, the witnesses, and the registering officer. The register of births records the year, day, hour, and place of birth; the sex and name of the child; the names, surnames, professions, and residences of parents, witnesses, and informant; the date of registration, and the name and quality of the registering officer; and must be signed by him, by the witnesses, and by the informant. When the child is illegitimate, the name of the father cannot be given except by the authority of the father himself.

The register of deaths records the year, day, hour, and place of death; the name, surname, age, profession, and residence of the deceased person; the names, surnames, ages, professions, and residences of the parents of the deceased, and of the witnesses; and the name and surname of the husband or wife, if the deceased was married; also the date of registration, and the name and quality of the registering officer.

The register of marriages records the names, surnames, ages, professions, places of birth, and residences of the parties; the names, surnames, professions, and residences of their respective parents, and of the four witnesses, with the relation in which they stand to the parties; the consent of the parents; whether the marriage has been opposed; time and place of solemnization and registration; and the name and quality of the registering officer.

Registration of births is secured by a provision, which requires, under pain of fine and imprisonment, from the father of the child, or, in default of the father, from some person present and assisting at the birth, a declaration thereof, within three days afterwards, to the registering officer, to whom the child must also be shown.

The registration of deaths is secured by a provision rendering it penal for a burial to take place without the registering officer having first seen the body and registered the death.

The registers are closed at the end of every year, with formalities which preclude interpolation. Alphabetical indexes are annually formed in duplicate for each. One of the duplicate registers, with its index, remains in the commune to which it belongs; the other is transmitted to the tribunal of the district, where it is examined and placed under the superintendence of the *procureur du roi*, or the local officer of the crown. Abstracts are made by the registering officer of each commune, a copy of which is transmitted to the subprefect, who from thence frames an abstract for his arrondissement, a copy of which he sends to the prefect; he also from the abstracts of the arrondissement makes an abstract for his department; and copies of such abstracts are sent by the prefects of departments to be deposited in a central office at Paris.

The system of registration observed in France was introduced into Belgium, Geneva, and the Rhenish provinces of Prussia when under the dominion of France, and is still retained in those countries.

Registration in Austria.

In Austria, registers of births, deaths, and marriages are kept by each minister of the church for his parish, and also by the Jewish rabbin for those of their own persuasion.

The register of births records the year, month, and day of birth; the number of the house in which the birth occurred; the name of the child and its sex, and whether it be born in wedlock or illegitimate; the names and surnames of the parents; their religion; and the names, and surnames, and condition of the sponsors. In the case of illegitimate children, the name of the father cannot be entered unless he acknowledges the paternity.

The register of deaths records the year, month, and day of death; the number of the house in which it occurred; the name, religion, sex, and stated age of the deceased; and, when the information of a physician or surgeon can be supplied, the name of the fatal disease. For this purpose medical men are required to inform the minister, in writing, of the cause of death of such patients as they have attended.

The register of marriages records the year, month, and day of the marriage; the place of solemnization; the names and surnames of the parties; their religion, age, and whether single or widowed; and the names, and surnames, and condition of the witnesses.

Bishops, on every visitation of their dioceses, are obliged to call for the production of the registers of births, deaths, and marriages. The provincial authorities are also required to ascertain whether these registers are kept in all places as prescribed by law.

Annual abstracts must be made by the ministers and the rabbin, of which copies must be sent to the district of the conscriptions, and to the office of the circle.

Registration in Prussia.

In *Prussia*, except the Rhenish provinces, registration is committed to the clergyman of the parish amongst Christians, and to the elders amongst Jews. The clergyman is bound to enter the births, marriages, and deaths, of persons who are not of the established church, but who are "simply tolerated," on the declaration of the parties or their ministers, and to include these declarations in his annual returns. Duplicates of the registers are to be made, and at the end of each year deposited, when examined and verified, in the local civil court, being "the tribunal of the place."

(*Report by the Select Committee on Parochial Registration*, 1833; *History of Parish Registers in England*, by J. S. Burn, 1829; *Population Abstract for* 1831; *Report of the Commissioners appointed to inquire into the State, Custody, and Authenticity of Registers or Records of Births or Baptisms, Deaths or Burials, and Marriages, in England and Wales, other than Parochial Registers*, 1838; *Manuel des Officiers de l'Etat Civil pour la tenue des Registres*, par A. E. le Mott, Paris, 1827.) (Y. Y.)

REGNARD, John Francis, one of the best French comic writers after Molière, was born at Paris in the year 1647. He had scarcely finished his studies, when an ardent passion for travelling led him to traverse the greater part of Europe. Having settled in his own country, he was made a treasurer of France, and lieutenant of the waters and forests. He wrote a great many comedies; and, though naturally of a lively genius, died of chagrin in the fifty-second year of his age. His works, consisting of comedies and travels, were printed at Rouen, in 1732, in five vols. 12mo.

REGNIER, Mathurin, the first French poet who succeeded in satire, was born at Chartres in the year 1573. He was brought up to the church, a vocation for which his debaucheries rendered him very unsuitable; and these, by his own confession, were so excessive that at thirty he laboured under all the infirmities of age. Yet he obtained a canonry in the church of Chartres, with other benefices, and died in 1613. There is a neat Elzevir edition of his works, Leyden, 1652, in 12mo; but the most elegant is that with notes by Brossette, London, 1729, in 4to.

Regnier des Marets, *Seraphin*, a French poet, born at Paris in the year 1632. He distinguished himself early by his poetical talents, and in 1684 was made perpetual secretary to the French Academy on the death of Mezeray. It was he who drew up all the papers in the name of the academy against Furetière. The king gave him the priory of Grammont, and he had also an abbey. Regnier died in 1713, and his works, in French, Italian, Spanish, and Latin poems, are contained in two vols.; besides a French grammar, and an Italian translation of Anacreon's Odes, with some other translations.

REGRATOR signifies a person who buys and sells any wares or victuals in the same market or fair; and regrators are particularly described to be those who buy, or get into their hands, in fairs or markets, any grain, fish, butter, cheese, sheep, lambs, calves, swine, pigs, geese, capons, hens, chickens, pigeons, conies, or other dead victuals whatsoever, brought to a fair or market to be sold there, and do sell the same again in the same fair, market, or place, or in some other within four miles thereof.

Regrating is thus a kind of *huckstry*, by which victuals are made dearer; for every seller must gain something, and this consequently will enhance the price. In ancient times, both the engrosser and regrator were comprehended under the word *forestaller*. Regrators are punishable by loss and forfeiture of goods, and imprisonment, according to the first, second, or third offence. But the modern science of Political Economy has taught us to view the practices of regrating and forestalling with far other eyes than those of our forefathers.

REGULAR denotes anything that is agreeable to rule. Thus we say, a regular building, a regular verb, and the like.

A regular figure, in geometry, is one the sides, and consequently the angles, of which are equal; and a regular figure with three or four sides is commonly termed an *equilateral triangle* or *square*, as all others with more sides are called *regular polygons*.

Regular *Body*, called also *Platonic Body*, is a body or solid comprehended by like, equal, and regular plane figures, and the solid angles of which are all equal. The plane figures by which the solid is contained are the faces of the solid; and the sides of the plane figures are the edges or linear sides of the solid.

There are only five regular solids, viz. the tetrahedron, or regular triangular pyramid, having four triangular faces; the hexahedron, or cube, having six square faces; the octahedron, having eight triangular faces; the dodecahedron, having twelve pentagonal faces; and the icosahedron, having twenty triangular faces. Besides these five, there can be no other regular bodies in nature.

Regular, in a monastery, is a person who has taken the vows, and is so called because he is bound to observe the rules of the order he has embraced.

REGULUS, M. Attilius, served as consul during the first Punic war. He reduced Brundusium, and in his second consulship he took sixty-four and sunk thirty galleys of the Carthaginian fleet, on the coasts of Sicily. Afterwards he landed in Africa; and so rapid was his success, that in a short time he made himself master of about two hundred places of consequence on the coast. The Carthaginians sued for peace, but the conqueror refused to grant it; but soon afterwards he was defeated by Xanthippus, when thirty thousand of his men were left on the field of battle, and fifteen thousand taken prisoners. Regulus was amongst the number of the captives, and he was carried in triumph to Carthage. He was sent by the enemy to Rome to propose an accommodation and an exchange of prisoners; and if his commission proved unsuccessful, he was bound by the most solemn oaths to return to Carthage without delay. When he arrived at Rome, Regulus dissuaded his countrymen from accepting the terms which the enemy proposed; and when his opinion had had due influence on the senate, Regulus returned to Carthage agreeably to his engagements. The Carthaginians were told that their offers of peace had been rejected at Rome by means of Regulus; and for this reason they prepared to punish him with the greatest severity. His eye-brows were cut, and he was exposed for some days to the excessive heat of the meridian sun, and afterwards confined in a barrel, the sides of which were everywhere filled with large iron pikes, till he died in the greatest agonies. His sufferings were heard of at Rome; and the senate permitted his widow to inflict whatever punishment she pleased on some of the most illustrious captives of Carthage which were in their hands. She confined them also in presses filled with sharp iron points; and was so exquisite in her cruelty, that the senate interfered, and stopped the barbarity of her punishment. Regulus died about 251 years before Christ.

Regulus, in *Astronomy*, a star of the first magnitude, in the constellation Leo. It is also called, from its situation, *Cor Leonis*, or the *Lion's Heart*; by the Arabs, *Alhabor*; and by the Chaldæans, *Kalbelecced*, or *Karbeleceid*, from an opinion of its influencing the affairs of the heavens.

Regulus, in *Chemistry*, the metallic matter which falls to the bottom of the crucible, in the melting of ores or impure metallic substances. It is the finest or purest part of the metal; and, according to the alchemists, is denominated *regulus*, or little king, as being the first-born of the royal metallic blood.

REHEARSAL, in *Music* and the *Drama*, an essay or experiment of some composition, generally made in private, previous to its representation or performance in public, in order to render the actors and performers more perfect in their respective parts.

REHER, a town and district of Hindustan, in the province of Delhi. The town has much declined in consequence of the seat of government having been removed to Nijibabad. It is eighty miles north-north-west from Bareily. Long. 104. 35. E. Lat. 57. N. The district is situated between the twenty-eighth and twenty-ninth degrees of north latitude. It formerly constituted the northern limit of Kuttaher or Rohilcund, and was ceded to the British by the nabob of Oude in the year 1801. Both town and district are now included in the collectorship of Bareily.

REICHENBACH, one of the three provincial governments of Prussia, into which the province of Silesia is divided. It is composed of the southern part of the ancient lower Silesia, with the addition of the principality of Munsterberg and the county of Glatz. It is bounded on the north-east by Breslau, on the north-west by Leignitz, on the south-east by Oppeln and the Austrian province of Moravia, and on the south-west by Bohemia. In extent it is 2640 square miles, comprehending thirty-six cities and towns, and 905 villages, besides many hamlets. The population, according to the census of 1817, was 644,025, and had increased, at the enumeration of 1826, to 713,936, of which the Catholics and the Protestants were nearly equal in number. Divided into thirteen circles, it is the most densely peopled of any portion of the kingdom of Prussia, and the great district in which was carried on that large manufacture of linen for which Silesia was long celebrated. It is generally a hilly, and in some parts a mountainous district; and the soil, not being of great fertility, scarcely produces sufficient corn for the consumption of the inhabitants. The capital is the city of the same name, and stands on the river Peilau. It is surrounded with double walls and ditches, and contains two Catholic and three Lutheran churches, 460 houses, with 4350 inhabitants. It has considerable manufactories of linens and woollens, and some of cottons, besides several breweries and distilleries. Long. 16. 31. 7. E. Lat. 50. 59. 15. N.

REICHENBERG, a city of the Austrian kingdom of Bohemia, in the circle of Buntzlau. It is situated on the river Neisse, and has a cathedral church, a palace, and 1200 houses, inhabited by between thirteen and fourteen thousand persons, occupied in various branches of manufacture, but chiefly woollen cloth, for which it forms the chief market in an extensive district.

REID, Dr THOMAS, a distinguished philosopher, and in some measure the founder of a school, was the son of Lewis Reid, minister of the parish of Strachan, in the county of Kincardine, Scotland. His mother, the daughter of Mr Gregory of Kinnairdie, in Banffshire, was one of twenty-nine children, and sister to David, James, and Charles Gregory, who were at the same period professors of astronomy or mathematics in the universities of Oxford, Edinburgh, and St Andrews.

Dr Reid was born at the parsonage-house of Strachan in April 1710, and received the elementary parts of his education at the parish-school of Kincardine O'Neil. The parochial schools of Scotland are said to have been much superior at that period to what they are at present, and young men went from them well furnished with philological learning to the different universities. The early progress of young Reid must have been very extraordinary, since he was qualified to profit by the lectures of the professors at the age of twelve. He soon gave very striking proofs that he inherited the genius of his mother's family, and was conspicuous amongst the students of mathematics, in a college where that science has always been cultivated with zeal and success. He continued longer at the university than the usual term of years, having been appointed to the office of librarian, a situation which was every way agreeable to him, as it gave him ample opportunities of gratifying his passion for study. About this time he became intimately attached to John Stewart, afterwards professor of mathematics in Marischal College, a connection which greatly strengthened his predilection for mathematical studies.

He resigned the office of librarian in the year 1736, and accompanied Mr Stewart to England, when they paid a visit to London, Oxford, and Cambridge, and were introduced to several persons of the first literary distinction. On account of his relation to Dr David Gregory, he had ready access to the celebrated Martin Folkes, whose house might be said to contain many of the most interesting objects to be met with in the metropolis. He saw Dr Bentley at Cambridge, with whose erudition he was much delighted, as well as amused with his vanity; and he also conversed frequently with Saunderson, the blind mathematician. Dr Reid in his philosophical speculations refers to this gentleman's blindness, as a singular phenomenon in the history of the human mind.

Dr Reid maintained an uninterrupted friendship with the learned and amiable Mr Stewart until the year 1766, at which time the latter was carried off by a malignant fever. The circumstances attending the death of this excellent man deeply wounded the sensibility of Dr Reid; for his wife and daughter were carried off by the same disorder, and buried with him in the same grave.

The King's College of Aberdeen presented Dr Reid to the living of New Machar in the year 1737; but such was the zeal of the people against the law of patronage at that time, that he not only met with violent opposition, but was also exposed to personal danger. But his attention to the duties of his office was so exemplary, his temper so mild and forbearing, and his spirit of humanity so active, that in a short time he subdued their prejudices; and when at last called in the course of Providence to a different situation, the very people who had been guilty of gross and indecent outrages against him followed him, on his departure, with their benedictions and tears.

In the year 1740, he married Elizabeth, daughter of his uncle, Dr George Reid, physician in London, after which his popularity at New Machar very much increased. Her manners were so accommodating, and so numerous were her kind offices to the sick and the indigent, that the departure of the family from the neighbourhood was looked upon as a general misfortune. The manner in which several old men were accustomed to speak upon the subject is worthy of being kept in remembrance. "We fought," said they, "against Dr Reid when he came, and we would have fought for him when he went away."

The greater part of his time during his residence at New Machar was devoted to the most intense study, particularly directing his attention to the laws of external perception, and of the other principles which constitute the basis of human knowledge. He unbended his mind by the amusements of gardening and botany, of which he was extremely fond, even in old age.

The professors of King's College, in the year 1752, made choice of Dr Reid to be professor of philosophy, originating wholly from the high opinion they were led to entertain of his talents and erudition. We are not acquainted with the particular plan which he adopted and pursued in the course of his lectures; but his department at that period comprehended mathematics and physic, logic and ethics; a practice then followed in the other universities of Scotland, instead of appointing a professor for each distinct branch.

Dr Reid had not been long in Aberdeen, till, in conjunction with Dr John Gregory, he projected a literary society, which continued for a number of years, and met once a week. The writings of Reid, Gregory, Campbell, Beattie, and Gerard, evince the numerous advantages which the members derived from this institution, as they were in the habit of subjecting such works as they intended for publication, to the test of friendly criticism.

It is perhaps not too much to assert, that of all the publications which appeared about this time, the Inquiry into the Human Mind by Dr Reid discovered by far the greatest originality and profound thinking. It appears that he had conceived the plan, and deeply meditated upon it, long before its publication; yet, without the applause of his literary associates, it is more than probable that his native modesty would have prevented him from giving it to the world.

The publication of Mr Hume's Treatise of Human Nature, in 1739, led him to question the principles commonly received with regard to the human understanding. He admitted, when a youth, but without any attentive examination, the opinions on which Mr Hume's scepticism was raised; but when he carefully adverted to the consequences which these principles appeared to involve, he instantly began to suspect their truth. To subvert the sceptical theory of Mr Hume was the grand object of Dr Reid's Inquiry, which he submitted to the examination of Mr Hume himself. That philosopher, even after he had seen some parts of the work, discovers not a little of the Jewish spirit of unbelief that any good thing should come out of Nazareth; and considering his antagonist as a clergyman, and belonging to an order of men from whom prejudice would not allow him to expect any soundness of reasoning in matters of science, he betrays more than want of good humour, as Dr Reid's biographer expresses himself, when he says, in no very courteous language, in a letter to Dr Blair, "I wish that the parsons would confine themselves to their old occupation of worrying one another, and leave philosophers to argue with temper, moderation, and good manners." But though Mr Hume, as appears from the words just quoted, was very angry that a clergyman should become a philosopher, on a second perusal of the Inquiry, he seems to have held very different sentiments, when he wrote to the author himself in the following terms. "By Dr Butler's means, I have been favoured with the perusal of your performance, which I have read with great pleasure and attention. It is certainly very rare, that a piece so deeply philosophical is wrote [written] with so much spirit, and affords so much entertainment to the reader; though I must still regret the disadvantages under which I read it, as I never had the whole performance at once before me, and could not be able fully to compare one part with another. To this reason, chiefly, I ascribe some obscurities, which, in spite of your short analysis or abstract, still seem to hang over your system. For I must do you the justice to own, that when I entered into your ideas, no man appears to express himself with greater perspicuity than you do; a talent which, above all others, is requisite in that species of literature which you have cultivated....As I was desirous to be of some use to you, I kept a watchful eye all along over your style; but it is really so correct, and so good English, that I found not any thing worth the remarking. There is only one passage in this chapter, where you make use of the phrase *hinder to do* instead of *hinder from doing*, which is the English one; but I could not find the passage when I sought for it. You may judge how unexceptionable the whole appeared to me, when I could remark so small a blemish."

The impression made on the minds of speculative men by the publication of Dr Reid's Inquiry was as great as could reasonably be expected from the nature of his undertaking. It was not level to the comprehension of the multitude, nor even addressed to them; and as it examined opinions with the utmost freedom which had obtained the sanction of the highest authorities, it had little prospect of conciliating the favour of the learned. Some, however, there were, who perceived the extent of his views, and beheld in his pages the true spirit and language of inductive investigation, which made proselytes of many, who, again, warmly recommended the work to the attention of others. The Inquiry of Dr Reid was so much esteemed by the learned body of teachers then in the University of Glasgow, that they gave him an invitation to the vacant professorship of moral philosophy in the year 1763. It was no doubt with a considerable degree of reluctance that he resolved to leave Aberdeen; yet so numerous were the allurements which Glasgow presented to a man of his extensive erudition and deep research, that he gave it the preference. That seminary of learning could then boast of a Moor, a Simpson, a Black, a Leechman, the two Wilsons, father and son, and the acute, discriminating Millar, with all of whom he was more or less intimate, and whose fascinating conversation made him in some measure forget that he had long been acquainted with men of genius in the university of Aberdeen.

Dr Reid's merit as a public teacher arose principally from that fund of original philosophy which is characteristic of his writings, and from his invincible patience and perseverance in recommending such principles as he conceived to be of the last importance to human happiness. His style, too, was simple and perspicuous; his character was grave and possessed of authority; and his students felt such an interest in the doctrines which he inculcated, that he never failed to be heard with the most profound attention.

In the year 1773 his remarks on Aristotle's logic appeared in Lord Kames's Sketches of the History of Man. "In attempting," says he, "to give some account of the Analytics and of the Topics of Aristotle, ingenuity [ingenuousness] obliges me to confess, that though I have often purposed to read the whole with care, and to understand what is intelligible, yet my courage and patience always failed before I had done. Why should I throw away so much time and painful attention upon a thing of so little use? If I had lived in those ages when the knowledge of Aristotle's *Organon* entitled a man to the highest rank in philosophy, ambition might have induced me to employ upon it some years of painful study; and less, I conceive, would not be sufficient. Such reflections as these always got the better of my resolution when the first ardour began to cool. All I can say is, that I have read some part of the different books with care, some slightly, and some perhaps not at all. I have glanced over the whole often; and when any thing attracted my attention, have dipped into it till my appetite was satisfied."

But, in spite of his modest declarations, it is matter of doubt with some, whether any of his publications does him more honour than his perspicuous view of this complicated system. It is unquestionably superior to any other analysis of these writings that we have yet seen; an opinion amply confirmed by the sentiments of different literary characters who were intimately acquainted with the works of the great philosopher of antiquity.

Dr Reid declined reading lectures in the university for some years before his death; and he devoted this period to the task of preparing for the press his great work, which was published in two volumes 4to, the first in 1785, entitled Essays on the Intellectual Powers of Man; and the second in 1788, entitled Essays on the Active Powers of

Man. His Essay on Quantity, occasioned by reading a Treatise in which Simple and Compound Ratios are applied to Virtue and Merit, was composed previously to the year 1748, and published in the Philosophical Transactions of London for that year. This paper affords some light respecting the progress of his speculations about the period in question. The Inquiry into the Human Mind, of which we have already taken notice, appeared in 1764; and at this time he was complimented with the degree of Doctor in Divinity.

In the year 1796, the last of his life, he was prevailed upon to spend with his friends at Edinburgh a few weeks during the summer. From that visit he returned to Glasgow in his usual health and spirits, and for some time continued to devote a portion of his time to the exercise both of body and of mind. But about the end of September he was seized with a violent disorder, with which he maintained a severe struggle; and this, together with repeated strokes of the palsy, put a period to his long and useful life on the 7th of October, and in the eighty-seventh year of his age.

As to his bodily constitution, few men have ever been more indebted to nature than Dr Reid. In this respect he was athletic and vigorous, and his muscular strength was uncommonly great; advantages which were powerfully seconded by his temperance, exercise, and the unclouded serenity of his temper. Deep and collected thought was very conspicuous in his countenance, and all his looks were expressive of kindness and good will.

With respect to his character, his rectitude was inflexible and intrepid; his attachment to truth was pure; and he had an entire command over all his passions, which he acquired by the unwearied exertions of a long life. When, therefore, he found it necessary to dispute the conclusions of others in any of his writings, he never employed any expressions to irritate those whom he was anxious to convince; and the asperity of his opponents could not provoke him to repress his spirit of liberality and good humour; for he considered the intemperance with which controversy is carried on, as an enemy to the progress of useful knowledge, and as having done more harm to the practice than service to the theory of morality. He uniformly maintained the dignity of philosophy in private life, and he united in his character the most amiable modesty and gentleness with the noblest spirit of independence. He never solicited any favours from the great; and all his academical or other preferments were conferred upon him by those who were real judges of his merit, and thought he deserved them. To a sound, cautious, and discriminating judgment, a singular patience and perseverance of thought, and fixed attention to the operations of his own mind, he added the curiosity of a naturalist and the eyes of an observer; and of course his information was accurate and extensive. His sensibility was of an active and lively nature; and wherever he could command the means of relieving the distressed, he always employed them with the utmost possible secrecy. The life of Dr Reid, by his disciple and friend Mr Dugald Stewart, the great ornament of his master's school, is known to all the world as one of the first specimens of philosophical biography that any language can furnish.

REIGATE, or Ryegate, a market and borough town of the county of Surrey, in the hundred of its own name, twenty-two miles from London. It is situated in a pleasant valley at the foot of the Chalk Hills, upon a branch of the river Mole. It has a weekly market on Tuesday, and a monthly one for cattle on Wednesday. It is an ancient borough, and, until 1832, returned two members to parliament, but it now returns only one. The population of the borough amounted in 1801 to 923, in 1811 to 1128, in 1821 to 1323, and in 1831 to 1419; but the Foreign, a part of the parish now added to the borough, contained, in 1831, 1978 inhabitants, making in all a population of 3397.

REISKE, John James, a profound scholar and eminent critic, was born in the year 1706, at a small town in the duchy of Anhalt, in Germany. His connections, it would appear, were in a humble situation of life; and, in consequence of the narrow circumstances in which he was placed, he had many difficulties to struggle with during the early part of his education. These, however, he surmounted by unabating perseverance; and in 1733 went to Leipsic, where he remained during five years in the ardent pursuit of his studies. Here he acquired an extensive knowledge of the Arabic, and engaged in the translation of a book from that language, which was afterwards published. With the view of prosecuting to greater advantage the study of Arabic, which had become with him a favourite object of pursuit, he travelled on foot to Leyden, where new difficulties attended him. Whilst he remained there he was employed in arranging the Arabic manuscripts belonging to the university; and for this labour he received a very small compensation. During his residence at Leyden, part of his time was occupied in the translation of various essays from the German and French languages into Latin. These essays afterwards appeared in the *Miscellanea Critica*. About the same time, also, our learned author translated into Latin the whole of the *Chariton* from the Greek, and the Geography of Abulfeda from the Arabic.

Having spent eight years at Leyden, Reiske was driven from this place by jealousy and calumny, which, it is said, were excited against him chiefly by the younger Burmann, in consequence of his critical strictures on the edition of Petronius published by that author; but before his departure from this learned seminary, he had obtained the degree of doctor of physic, which was conferred in a manner highly to his honour. He afterwards visited different parts of Germany, and at last settled a second time at Leipsic, where he remained for twelve years. But although he had received the appointment of professor of Arabic, the emoluments of his office were so scanty, that he had still to struggle with all the difficulties attendant on poverty, and, merely to procure a subsistence, was obliged to engage in the humble employments of literary labour, and submit to the severe and ill-requited drudgery of editing works for booksellers, or contributing detached papers to periodical publications. About this time the *Acta Eruditorum* were greatly indebted to the labours of Reiske. But in the midst of all the difficulties and hardships now alluded to, he prepared and published a work of profound learning and great merit. This work, which extended to five volumes, appeared under the title of *Animadversiones in Auctores Græcos*, and added much to our author's reputation.

In the year 1758, in consequence of the death of Haltausius, he obtained a situation, which was not only honourable, but lucrative. This was the place of rector of the academy of Leipsic, in which he continued during the remainder of his life. He was now raised above want, and being free from the difficulties and embarrassments which had hitherto constantly attended him, he was thus enabled, in the midst of learned ease, to prosecute his favourite studies.

In the year 1764 Reiske married E. C. Muller, a woman of great learning, and of whom it is said that her knowledge, especially in Greek literature, was little inferior to that of her husband. In all his literary labours she was an useful associate; but the assistance which she contributed to his great work, the edition of the Greek Orators, was particularly valuable. Thus passed the latter period of the life of this learned man. He died in 1774, possessing a very distinguished reputation as a scholar and a critic. The number of the works which he superintended and published is very great. The most approved are the following, viz. Remarks upon Greek Authors; an Edition of the Greek Orators, in twelve vols. 8vo; Dionysius Halicarnassensis, in seven vols.; and Plutarch's Works, in nine vols.

REITRA, a city of the Austrian province of the Hither Danube, in Hungary, and the capital of a circle of the same name, which comprehends 412 towns and villages, with 368,000 inhabitants. The city is situated on the river of the same name, is the see of a bishop, is defended by a strong citadel, and contains 510 houses, with 4100 inhabitants, who grow much good wine. Long. 18. 58. 54. E. Lat. 48. 19. 10. N.

REJANG, a country in the island of Sumatra, bounded on the east by the territory of Musi, where the Palembang river takes its rise. Bencoolen river is the limit on the south-east. The other principal rivers are the Layc, the Pally, and the Sunzedano, on all of which the English have factories. The Rejangs are divided into tribes, of which there are four principal ones. They live in villages under the government of a head or magistrate, and the inhabitants seldom exceed 100.

RELAND, ADRIAN, an eminent orientalist, born at Ryp, in North Holland, in 1676. During three years' study under Surenhusius, he made uncommon progress in the Hebrew, Syriac, Chaldaic, and Arabic languages, and these languages were always his favourite study. In 1701, he was, by the recommendation of King William, appointed professor of oriental languages and ecclesiastical antiquities in the university of Utrecht, and died of the small-pox in 1718. He was distinguished by his modesty, humanity, and learning; and carried on a correspondence with the most eminent scholars of his time. His principal works are, 1. An excellent Description of Palestine; 2. Five Dissertations on the Medals of the ancient Hebrews, and several other dissertations on different subjects; 3. An Introduction to the Hebrew Grammar; 4. The Antiquities of the ancient Hebrews; and, 5. On the Mahommedan Religion. These works are all written in Latin.

RELAY, a supply of horses placed on the road, and appointed to be ready for the traveller to enable him to change, and thus make the greater expedition.

RELICS, in the Church of Rome, the remains of the bodies or clothes of saints or martyrs, and the instruments by which they were put to death, devoutly preserved, in honour of their memory.

The respect which was justly due to the martyrs and the teachers of the Christian faith increased in the course of time almost to adoration; and at length all but divine honour was really paid both to departed saints and to relics of holy men or holy things. Such was the rage for them at one time, that, as Mabillon, a Benedictine, justly complains, the altars were loaded with suspected relics, numerous spurious ones being everywhere offered to the piety and devotion of the faithful. He adds, too, that bones are often consecrated, which, so far from belonging to saints, probably do not belong to Christians. From the catacombs numerous relics have been taken, and yet it is not known who were the persons interred therein. In the eleventh century, relics were tried by fire, when those which did not consume were reckoned genuine, and the rest not. Relics were, and still are, sometimes preserved on the altars whereon mass is celebrated.

The Romanists plead antiquity in behalf of the respect paid to relics. The Manicheans, say they, out of hatred to the flesh, which they considered as an evil principle, refused to honour the relics of saints; and this is reckoned a kind of proof that the Christians in the first ages did so. We know, indeed, that the touching of linen cloths on relics, from an opinion of some extraordinary virtue derived therefrom, was as ancient as the first ages; there being a hole made expressly for the purpose in the coffins of the forty martyrs at Constantinople. The honouring the relics of saints, on which the Church of Rome afterwards founded her superstitious and lucrative use of them, as objects of devotion, as a kind of charms or amulets, and as instruments of pretended miracles, appears to have originated in a very ancient custom which prevailed amongst Christians, of assembling at the cemeteries or burying-places of the martyrs, for the purpose of commemorating them, and of performing divine worship. When the profession of Christianity obtained the protection of the civil government, under Constantine the Great, stately churches were erected over their sepulchres, and their names and memories were treated with every possible token of affection and respect. This reverence, however, gradually exceeded all reasonable bounds; and those prayers and religious services which were performed over their tombs were thought to have a peculiar sanctity and virtue. Hence the practice, which afterwards obtained, of depositing relics of saints and of martyrs under the altars in all churches. This practice was then thought of such importance, that St Ambrose would not consecrate a church because it had no relics; and the council of Constantinople ordained, that those altars should be demolished under which there were not found any relics. The rage of procuring relics for this and other purposes of a similar nature became so excessive, that in 386 the Emperor Theodosius the Great was obliged to pass a law, forbidding the people to dig up the bodies of the martyrs, and to traffic in their remains. Such was the origin of that respect for sacred relics, which, when perverted afterwards, became the occasion of innumerable processions, pilgrimages, and miracles.

RELIEVO, or RELIEF, in *Sculpture*, is the projection or standing out of a figure which arises prominently from the ground or plane on which it is formed, whether that figure be cut with the chisel, moulded, or cast.

There are three kinds or degrees of relievo; alto, basso, and demi-relievo. The alto-relievo, called also *high-relief*, is when the figure is formed after nature, and projects as much as the life. Basso-relievo, bas-relief, is when the work is raised a little from the ground, as in medals and the frontispieces of buildings, but particularly in the histories, festoons, foliages, and other ornaments of friezes. Demi-relievo is when one half of the figure rises from the plane. When, in a basso-relievo, there are parts that stand clear out, detached from the rest, the work is called a demi-basso. In architecture, the relief or projection of the ornaments ought always to be proportioned to the magnitude of the building it adorns, and to the distance at which it is to be viewed.

RELIEVO, or *Relief*, in *Painting*, is the degree of boldness with which the figures appear, at a due distance, to stand out from the ground of the painting.

The relievo depends much upon the depth of the shadow and the strength of the light; or in the height of the different colours, bordering upon one another, and particularly on the difference of the colour of the figure from that of the ground. Thus, when the light is so disposed as to make the nearest parts of the figure advance, and is well diffused on the masses, yet insensibly diminishing, and terminating in a large spacious shadow, brought off insensibly, the relievo is said to be bold, and the clear-obscure well understood.

RELIGION (RELIGIO) is a Latin word, derived, according to Cicero,[1] from *relegere*, to reconsider; but, according to Servius and most modern grammarians, from *religare*, to bind fast. The reason assigned by the Roman orator for deducing *religio* from *relego*, is in these words: "Qui autem omnia, quæ ad cultum deorum pertinerent, diligenter retractarent, et tanquam relegerent, sunt dicti *religiosi* ex relegendo." The reason given by Servius for his derivation of the word is "quod mentem religio religet." If the Ciceronian etymology be the true one, the word *religion* will denote the diligent study of whatever pertains to the worship of the gods; but, according to the other derivation, which we are inclined to prefer, it denotes that obligation which we feel on our minds from the relation in which we stand to some superior power. In either case, the import of the word religion is different from that of theology, since the former signifies a number of practical duties, and the latter a system of speculative truths. Theology is therefore the foundation of religion, or the science from which it springs; for no man can study what pertains to the worship of superior powers till he believe that such powers exist, or feel any obligation on his mind from a relation of which he knows nothing. The subject, in as far as it can be discussed with advantage in a work of this kind, will accordingly be resumed under the former head. (See THEOLOGY.)

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[1] *De Natura Deorum*, lib. ii. sect. 28.

RELIGIOUS is used substantially for a person engaged by solemn vows to the monastic or conventual life; or a person shut up in a monastery or convent to lead a life of devotion and austerity, under some rule or institution. The male religious are popularly called Monks and Friars; the female, Nuns and Canonesses.

RELIGIOUS MISSIONS.

THE present time, says Leibnitz, is the child of the past, and the mother of the future. Yet though every generation derives not only its existence, but in some measure its lot and its fortunes, from the one that preceded it, it is often most influenced by circumstances which attracted least the notice of its immediate predecessor. We are well aware of many of the changes which are taking place around us; they are such as strike the most inattentive eye. There are others of equal potency, but which force themselves less on observation, and in which a portion only of the community are interested. Such are the religious missions now coming into operation, which are scattering the seeds of new institutions, and laying the foundation of future empires, and which will cause that which is now a waste and howling wilderness to rejoice and blossom as the rose.

Protestant missions are so late in their origin and partial in their establishment, that, if we look merely to themselves, we have scarcely sufficient data for estimating their effects. Fortunately, in the history of the world we may trace the operation of similar causes, and be enabled to estimate upon a great scale, during a long lapse of time, the immense benefits which missions for the diffusion of religious opinions have produced.

At first view it may appear like a paradox to assert that the civilization of the world is greatly owing to religious missions; and yet no truth in remote antiquity is so well ascertained.

The ancient forms of civilization with which we are best acquainted is that of Egypt and Greece in the west, and that of India in the east. The civilization of Egypt was eminently sacerdotal; it spread with the colonies of the priesthood, and had its chief residence around the temples. The original inhabitants of Egypt long retained traces of their ancient barbarity; and it was not till the system of life introduced by the sacred caste, and conformed to the religious institutions, was complete, that Egypt assumed that national character which so eminently distinguished it from the surrounding nations. Whether Meroë or Thebes was the original college of the priests, is of small consequence to the present purpose. From either, new sacred colonies issued out in continued succession and in widening circles, until not only Egypt, but the banks of the higher Nile, and the green islands of the sandy desert, had their temples and their oracles, their arts and their institutions.

But these institutions were not confined to Egypt. These religious colonies crossed over the sea to impart their rites to different lands; and amongst others the priests of Sais, bringing with them the worship of the divine wisdom, laid the foundations of a temple to Neith, a name which was afterwards transposed into Athene. From this religious mission, then, Athens, "the eye of Greece," and the light of the world in secular wisdom, derived that lustre which length of years has rather increased than impaired.

Not dissimilar from the progress of the priesthood over Egypt was the advance of the Brahminical caste or tribe over India, except that the latter were attended by military companions, and made their way by force of arms as well as that of opinions. Wherever the country was rich and open enough, this well-organized priesthood introduced its temples and its creed, its philosophy and its regulations, institutions that were not indigenous to India, but which were spread over its plains by colonies and conquest; whilst among the hills are found a race, unmixed with the foreign intruders, speaking a different language, and still following the simple rites of their rude forefathers. Still more widely the rejected offspring of the Brahmins, namely, the Buddhists, have spread as missionaries over the half of Asia, and penetrated alike the seclusion of China, the remoteness of Japan, and the pastoral solitudes of Central Asia.

But these, it may be said, are the missionaries of a false religion. True; but if so much good has accompanied so much evil and error, what may not be expected from the missionaries of a faith founded upon revelation, who proceed upon their enterprise in more favourable times and with greater resources?

When the true religion was established in the Jewish nation, it appeared at first view to be stationary rather than progressive. The Jews had the advantage of a central position. They bordered upon the states which in early times did most for the advancement of knowledge, Egypt, Phœnicia, and afterwards the dominions of Assyria and Babylon; but what facilities the Jewish people gained for spreading their opinions by their being central, was in a great measure lost by their being morally isolated.

Providence, however, unfolded means, independently of the exertion of the Jews, for spreading the knowledge of the divine unity. The other descendants of Abraham, who, as is seen by the book of Job, retained the true religion, obtained that lot amongst the nations which placed them in the direct route by which the early commerce of the world was carried on; and their favourable position enabled them at once to promote knowledge and to diffuse religion. The two points to which their journeys were especially directed were Sheba and Saba, Arabia Felix, and that part of Africa which still retains in a portion of it the name of Azab. Extending along this line of intercourse, a portion of the Ishmaelites occupied Mecca, in the paucity of Arabian towns early named the Great, at once the mart of superstition and commerce; and where the Ishmaelites united to the worship of the black stone their own religious opinions, a mixture which is observable down to the time of Mahommed, who endeavoured to separate the doctrine of the unity from idolatrous rites, but who, from the inveteracy of ancient habits, was still forced to retain some of the Pagan customs.

We have a subsequent proof of the line of communication being kept open between Judæa and Arabia Felix, in the journey of the queen of Sheba to Jerusalem in the time of Solomon. And the Jewish religion was still more extensively introduced, whether by early colonists or proselytes, both into Meroë, the dominions of Queen Candace, and also into the remoter mountains of Abyssinia.

The Jewish worship had a strange aspect to the surrounding countries of the Gentiles. To their besotted minds it appeared a wonder and an absurdity that a nation should exist without idols.

> Nil præter nubes et cœlos numen adorant.

But although the Jews, as far as we have positive information, made but few converts in their prosperity, they became missionaries as soon as they became captives; and the Israelitish maid who directed Naaman the Syrian for a cure to consult the prophet of her country, indicates to us the way in which a large accession was made from amongst the Gentiles to the true worshippers of Jehovah.

We are better acquainted with the removal of the Jews to the east than with the dispersion on a smaller scale which was taking place towards the west, where the Phœnicians were selling the Jewish captives to the isles of the Gentiles or the coasts of the Mediterranean Sea. We have even in the case of Jonah an instance of a Jew attempting voluntarily to expatriate himself in a Phœnician vessel to Tarshish; the Tarshish doubtless of the far west, not the Tarsus of Cilicia, but the Tartessus of Spain.

It is striking to observe how the great bulk of the Jewish nation were subsequently dispersed throughout those very tracts which war and commerce opened up in the remotest periods of history; and how much more their misfortunes have contributed to the success of their tenets than the victories of their ancient kings. The moral influence of the Jewish nation appears to have reached its greatest height when their civil power was on the eve of vanishing, about the time of our Saviour. Dissatisfied with their own sentiments of belief, many in the countries of Greece and Rome were looking to the East, their original instructress, for a deeper philosophy and a more venerable religion; and whilst many were only the more bewildered amongst the mysteries of eastern superstition, in the case of others the pursuit was not fruitless, for they had revealed to them "whatever Moses had handed down in his dark volume."

The influence which the Jews were acquiring is strongly indicated in the jocular excuse which Horace's friend makes him for not entering upon any business, because it was the "thirtieth Sabbath" of the Jews, or their solemn passover; and in the support which the Jews received from "devout and honourable women not a few" throughout the Roman empire, including sometimes, as in the instance of Poppæa, the empress herself.

The progress of early Christianity is wonderful, and becomes the more so in proportion as we narrowly inspect the agency by which that progress was carried on. To obtain a just view, we should not dwell too much on the activity of a few, and too little on the backwardness of the many. The first Christians, with some rare exceptions, were men of like passions and of like failings with ourselves. The apostles and disciples had received a command, "Go and baptize all nations," without (as far as appears by the record) taking one step to put it into execution. The first missionaries were those involuntary labourers who were driven by persecution to Antioch, in answer to that early petition, "Pray ye the Lord of the harvest, that He would thrust forth labourers into His harvest." Still the work was proceeding slowly till Paul appeared, and then, as Christian churches are compared to lights shedding their salutary effulgence over the dangers of the deep, a hundred beacons seemed at once enkindled along every cape and headland, to guide the mariner bewildered on his darksome way.

Christianity, as planted by Paul, took the shortest course to become universal. It followed the line of greatest communication, and took up a position in each of the principal cities; from thence, as from new centres, to spread its influence over the surrounding country. Its success was various in various places; slow where the population was remote, scattered, and barbarous; rapid where it was condensed and civilized. It had nearly attained an early predominance in the most refined region of the earth, that of Asia Minor; and had it not been immediately checked by the dread and majesty of the empire, and by an early persecution, which showed how different nominal adherents are from real friends whenever a day of trial arrives, its supremacy would have been complete.

It deserves to be remarked, that it was not only by means of the Greek language, but of the Greek race, that Christianity was speedily diffused. To the east of the Roman empire it had its chief seats in the Grecian colonies, reduced indeed under the Parthian sway, but still spirited and intelligent; and still in its farther progress it kept in the line of the same pre-eminent race, and sprung out again with fresh vigour in the Bactrian regions, where the Greeks, after Alexander, had been extending a kingdom that at one period promised to subjugate the East. From thence Christianity penetrated into China and into Tartary, and, from its ancient success in these quarters, kept in suspense the emperors who wielded the sceptre of Zengis, whether they should desolate the world with the sword in one hand, and the Koran or the Bible in the other.

Much more might have been expected of the popes, for the diffusion, if not of religion, at least of tenets that were favourable to their own interest and sovereignty, than was actually performed by them. Their attention was too much distracted by the quarrels of nominal Christendom, and the more tempting opportunities of increasing their power at home at the expense of Christian kings, to enable them to look steadily and far abroad, or to form any settled plan for extending their spiritual dominion over foreign nations. Another obstacle presented itself, the Papists were inferior in knowledge to the Moslem; the Greek church might boast of some superior civilization; but the Franks were despised by the Saracens for their ignorance and barbarity, as well as held in abomination for their gross idolatry. Their missions therefore were there chiefly confined to tribes of kindred and German origin, whose conversion was facilitated by the greater number of their own tongue and blood having already submitted to the papal sway.

But if the popes did little in comparison with their resources, individuals did much. The mission of St Patrick to Ireland may compare in zeal and in success with whatever had been undertaken for the spread of Christianity since the times of Constantine; and its effects were not confined to Ireland, but spread over Scotland and the north of England, and reached even to Germany. The popes, indeed, when aroused by the fear of a Tartar invasion, despatched an ill-contrived and hopeless mission to the sovereigns of Tartary, in order to avert the danger which threatened Europe, by converting them; but any real and disinterested zeal throughout the dark ages is chiefly to be found in individuals, who, like the ingenious but fantastical Raymond Lully, were meditating plans for extending religion whilst the rest of the Christian world were careless and asleep.

The Reformation gave a revival to Popery itself; and as the Carthaginians sought to regain the resources which they had lost nearer home by founding a new empire in Spain, so the Roman Catholics endeavoured to counterbalance the loss of the third of Europe by extending the spiritual dominions of the church over the regions of the boundless and populous East. Of the Jesuits, with Bacon, regarding their talents and unwearied application, we can only speak with regret. "Talis quum sis, utinam noster esses." "Seeing they are such, would they were ours." The Jesuits alone understood the power of education; but it shows the spirit of the body, how differently they used that mighty instrument in Europe, and in the countries that were beyond the range of Christendom. Where they had to contend with the reformed, they raised up disciples not unequal to the contest; but where this motive was withdrawn, they soon showed they had no great liking to education for its own sake, for all their arts were employed to train submissive, not enlightened disciples; and this is an error which Protestants as well as Papists may fall into. All men, good as well as bad, are fond of power, and they naturally, if there is no check over them, retain their disciples longer than is necessary in the state of pupillage. How different would have been the resources of the Jesuits, and how much greater the renown they have justly acquired, had they taken the same pains to instruct their Asiatic and American, that they did for their European scholars; and how different would have been the condition, at this day, of their missions throughout the world.

The Reformation, of all religious revivals, least abounded in missionary efforts; the cause of which, though obvious, has not yet been sufficiently attended to and pointed out. Other changes of religious opinion were owing to the personal exertions of missionaries. The Reformation was spread chiefly by means of writings; nor otherwise, with the ecclesiastical and secular power united against it, could it so rapidly have penetrated the different countries of Europe. It was the first great manifestation of the power of printing, and, being an unexpected attack, no defences whatever were prepared, as in after-times, against its inroads. The use of so new and mighty an engine seemed to supersede for a time all other exertions; and the general mind, already stirring and awake, hailed with eagerness the new dawn of civil and religious freedom. Unfortunately the Reformation, necessarily controversial in its origin, continued, and almost ended, in controversy; and, immersed in disputes with the Church of Rome, and in dangers from the civil power, and in domestic strifes about standards of orthodoxy, lost first the spirit, and then the form, of sound doctrine, and its followers became equally unable and unwilling to proclaim that truth to others which they were forsaking themselves.

The revivals amongst the reformed, and their returns to the primitive doctrine and spirit, were local and sectional, and their efforts, of course, were feeble and circumscribed; but they were operated by personal exertion and fervent preaching, and therefore possessed more of a missionary character than the Reformation itself; and though much less powerful at their centre, spread to a wider circumference, and exerted a remoter influence. The Danes deserve the praise of being amongst the earliest and most persevering of the Protestant nations in planting Christianity in foreign lands. But the plant has too much the air of an exotic still; it does not fully take root and imbibe its nourishment from the soil; it wants the strongest symptom of vitality, growth. No cause can prosper that is chiefly dependent upon foreign aid. External force may prop up a stationary and a sinking cause; but whatever spreads and flourishes must have an interior principle of life.

How numerous were the converts of the Dutch, if we might believe the reports that were given of them; but when the Dutch dominion was withdrawn, how suddenly did numbers of the Dutch converts disappear. The Dutch, like the Jesuits, were doubtless contented in many instances with an outward conformity to Christianity; yet still it is striking how slight a hold even the practice of outward rites had upon multitudes, who quietly relapsed into the profession of Paganism. It is evident that primitive Christianity proceeded upon a different plan. It collected its converts into free societies, who were instructed by native teachers, trained to rely upon their own resources, not only in furnishing their own funds, but also in supplying the wants of others, and who, in assuming the form of a church, assumed at the same time the model of a missionary society, and became themselves the new centres from which light and civilization proceeded to still remoter regions.

The zeal, devotion, and activity of the primitive Christians seemed revived in the Moravians, who, scarcely escaped from persecution themselves, proceeded without delay to subject themselves to new trials, and, like the forlorn hope of Christianity, chose the most desperate situations and the most degraded tribes to exemplify what Christianity might be enabled to do in more favourable circumstances, when it had succeeded where all things seemed to be against it.

The Wesleyans, after Christianizing the abandoned districts of England, and encountering the rage of their own savage countrymen, often backed by their civil or religious guides, the neighbouring magistrate or clergyman, have carried the same zeal, dexterity, and success, to the slaves of the West Indies, more docile than their masters; and to the savages of the remotest countries and islands, less infuriated and dangerous than the rude agricultural population of England.

In the Serampore Mission we might produce equal if not superior names to any of which the Jesuits can boast; superior to them even in the arts of education when applied to a half-civilized people, and incomparably above them in extending information amongst the general population of the country, and in the most important of all operations, the raising up of native labourers, and creating resources for their maintenance, in part at least, in the country itself.

The London Missionary Society, distinguished for its catholic spirit, and the largeness of its undertakings, has achieved one of the most visible triumphs of Christianity, in bringing so many islands into subjection to the mild law of the gospel; and the Episcopal Church of England, so long eminent for the numerous lights it has given to science, to knowledge, and to morals, is preparing to transplant that learning to the banks of the Ganges; and the Church of Scotland, after originating a national system of education at home, is laying the commencement of an admirable plan of instruction for the learned region of the East. In addition to the different religious denominations, each able from its own resources, if concentrated in any direction, for producing a wide and lasting effect, several single congregations, without extrinsic aid, and with a self-devotion worthy of the apostolic days, send out their own missionary or missionaries, supported by their private funds, and strengthened by their fervent prayers.

Independently of what Britain can effect, with resources far greater than any other nation has yet possessed, a new empire has come into the conflict, with all the energy of youth and freedom, and exulting in the consciousness of ever-growing strength. The Americans are eminently fitted for missionaries. The maxim is scarcely true when applied to them, that of all animals, man is the most rooted in the soil. They move over America as if they were already masters of that great continent, and revisit Europe as another home, and their original birthplace. They bring with them ardent hopes from the land where, in spite of many disappointments, hopes are most speedily and abundantly realized; and, accustomed to overcome the obstacles of nature, they engage with no less alacrity in the more stubborn contest with the perversity and prejudices of mankind. Their plans are admirably conceived, and in the course of being ably executed; and they are already receiving their due applause in the dread and detestation of the corrupt priesthood of the East, who deeply feel and sincerely express with what dangerous enemies they have now to deal.

If it be a duty to send the gospel to all nations, it cannot cease to be a duty because we have been unsuccessful in our efforts. The want of success should merely lead us to reconsider the means to be employed. Hume remarks, that, prior to experience, we do not know whether or not the throwing of a pebble against the sky may not produce the ruin of the world. Some with regard to missions seem equally to overlook the proportion between cause and effect, and expect that any efforts, however ill directed, should be crowned with immediate success; whilst others seem to suppose that no efforts can be successful, that the Orientals never change their opinions, and that they will continue steadfast to the same errors and the same idols which they have worshipped ever since the earliest dawn of history.

But history itself might inform us that all nations have already changed their opinions. In China all modes of superstition are comparatively recent, the oldest, as far as they exist in that country, not being prior to Confucius, at least in their present form. If we look for aboriginal rites in India, we can only trace some broken remains of them amongst the barbarians of the remoter hills, or in the depth of the undisturbed forest. Where are the idols of the countries to the west of the Indus? They are with the idols of Hamath, Arphad, and Sepharvaim. The beautiful deities of Greece are mingling their dust with the monster gods of the East, in irretrievable and indiscriminate confusion. Whatever obstacles may exist to the spread of Christianity, we cannot reckon amongst them, as of most importance, the obstinate tenacity with which men cleave to their previous opinions. No one need despair of converts since the orphan of Mecca has planted his victorious standards over the ruins of the thrones of Chosroes and Constantine.

Not only are religious opinions continually changing, but all religions at this present moment, with the exception of Christianity, are in a state of continuous decay; and not merely decaying themselves, but imparting their caducity to the states which uphold them; and so forcible and rapid is that decline, that it counterbalances both the tendency of society to improve, and of the numbers of mankind to increase. On the contrary, wherever Christianity exists, even in its lowest form, there is an augmentation of the numbers of mankind and an improvement in their condition, so that the balance between Christianity and the unchristianized portions of the world is continually changing; and whilst Christendom is filling with inhabitants, even to a dread, on the part of some, of an overflow, barbarous tribes are almost disappearing, and the Moslems are decreasing, and the far East is stationary, so that there is a provision making, even without the intention of Europe, for Europeans spreading their augmenting numbers over the remotest shores of the world.

Independently of colonization, the new intercommunity of nations will efface ancient prejudices and national peculiarities. This has already taken place in Europe itself. The former French, were they to rise from the dead, must take their descendants for Englishmen; and the ancient English might have equal difficulty in recognising their descendants, though, like all insular nations, less subject to change from the influx of foreign manners. Increasing intercourse has its effects upon the remotest districts. Individual originality and national peculiarity have, from continual attrition, lost their salient points, and are wearing away. The same causes which have operated in Europe will operate on a greater scale, though more slowly, on the world at large. The Moslems are forsaking their creed, and, what is still harder, their dress; and Hindu rajahs quote Shakspeare, and read the Elegant Extracts.

But the loss of old principles would merely produce demoralization, if no new ones were supplied. We are communicating to all the world our vices and our diseases; shall we withhold the remedies with which we are combating, and, we trust, successfully struggling against both? We are sending out missionaries of evil, the convict and the runaway, who are adding to the atrocities of savage warfare and of savage life. Their vices spread even faster than themselves, and reach to tribes which the white man has not visited; and in a still more rapid and wider circle the diseases which are generated amidst the corruption and misery of European society, are spreading desolation and death in recesses where the name of Europe has scarcely been heard. It would be but common charity to send out physicians to these distant tribes, if they could be reached, to combat, with European remedies, diseases originated in Europe; and it would be most unchristian neglect not to send out the physicians of the soul to apply healing remedies to those moral diseases, the contagion of which, as a nation, we have been so instrumental in extending.

Protestant missions are only in their commencement, therefore we have not the means to judge fairly of their success. Success in missions also must be distinguished into two kinds; the gaining nominal, and the making real converts. We may compare the success of the gospel abroad with its results at home. The promised results are great and unconfined; the real results comparatively small and limited. Multitudes of nominal Christians in our land pay just as much regard to the precepts of the gospel, in all the real business of life, as they do to the injunctions of the Koran. If we number those who are really living under the influence of the gospel, success in proportion to the number of those who proclaim it may be found to be fully as great abroad as at home. Each missionary effort will be found to have had nearly as much success, and of the same kind and value, as they originally proposed to themselves.

The success of the Jesuits cannot be compared to that of any Protestant mission. Their aim was entirely different. What they asked of their converts, was not so much to embrace opinions, as to submit to rites; and if they became outwardly Christian, they hoped partly to influence them, and still more their children, whose training would necessarily be placed in their hands. They attempted, and they succeeded in gaining the consideration, and in some degree the favour, of the higher classes, for their European attainments, by their politic habits of insinuation. It was not for their interest that the higher classes should become immediate converts. Whilst these retained their ancient superstition, they could afford the Jesuits a more effectual protection. As soon as the more powerful left their ancient belief, instead of helps they became hindrances to the mission, by the jealousies which they inspired, as the natural heads of a new and rising sect. Thus the influence which the Jesuits had acquired amongst the wise and powerful, and which had forwarded their cause at first, contributed to overthrow it; for the political dexterity which had gained them friends necessarily raised up to them enemies in a still greater proportion. We cannot, on the whole, regret that the attempts of the Jesuits were not more successful. The experiment of Christianizing Paganism had already been attempted, on a large scale, in the Roman empire, under the successors of Constantine; and the result was, as Mr Coleridge justly expresses it, "Paganized Christianity." The success of the Jesuits in China would have ended in attaching a new load of Pagan opinions and observances to that degenerate form of Christianity which was already labouring under an intolerable burden of them.

The Dutch, the lowest in character perhaps of Protestant missions, appeared to have that measure of success which they aimed at. Numbers, under their routine of superficial teaching, assumed the outward form of Christianity, which was all that could reasonably have been expected from their efforts. In many later instances the success has been beyond the means employed. The distinguished abilities of Dr Carey succeeded beyond all reasonable expectation in the translation of the Scriptures into the languages of the East. The education conferred by the Serampore missionaries, by means of the circle of schools under their superintendence, was superior in kind to the education given to European children in the same condition in life, and was more favourably received by the natives, though there was a natural want of perseverance on their part, in availing themselves of the benefit to the utmost.

It is more difficult to judge both with respect to the number of converts and the influence which Christianity exercises over their lives. Neither at home nor abroad, at this present moment, have we reason to suppose that Christianity is enjoying a season of spiritual prosperity. It is rather a time of outward progression than of internal renovation; and a review of what has been done, both here and in distant countries, may more wisely lead us to place our trust in the Divine arm, which will never desert his own cause, than to form any very lofty and exaggerated notions of our present acquisitions. In some instances we have the encouragement to perceive that the success is far beyond the means. Amiable as the character was, and great as were the talents, of Henry Martyn, they are not sufficient to account for the striking and lasting impression which he produced on the Persians; and his short residence in Persia produced more fruit than a long life might have done, even with many prosperous circumstances attending it. Those who are last and least upon the missionary field have yet made a beginning; they have got what Archimedes required in order to move the world, a place where to stand and to erect their moral machinery, some influence over the native mind, and increased facilities for introducing new improvements and additional labourers from Europe.

Success in general will be proportioned to the means employed, and the efficacy of the means will depend upon the method of using them. The first efforts in all undertakings must be expected to be merely tentative. Resources are few, and there is a want of experience, in order to employ the scanty means to the uttermost. What was defective in the commencement is often unnecessarily prolonged, from the dislike of change; and the very proposal of improvements often appears to imply the censure of previous mismanagement.

In most instances it is the governed who force improvements upon their governors; but in religious enterprises the contributors are too well satisfied with having paid their subscriptions, to give themselves any farther trouble or thought as to the mode in which these contributions are expended. Yet on no subject is thought more required. The first requisite to lasting success is to act upon a system, and to be provided with a plan. Circumstances must modify that plan; but they who act upon a large scale, and through a considerable tract of time, will at last modify circumstances to their own purposes, and ultimately turn what might seem hindrances into helps.

The first object is to understand the nature of the country and of the people on whom a missionary society is intended to operate. The Americans afford excellent examples of missionary pioneers, previously exploring the country in which they intend to settle; weighing the advantages and the obstacles which present themselves, exhibiting a rare union of prudence and determination, and, whilst strictly acting up to their own principles, succeeding, at least for a time, in conciliating the minds of others; though it is not to be expected that this transient favour can last long, for it must be dissipated by the first success on the part of the foreign missionaries. These missionary travels are of double service, creating and deepening an interest at home, which is the true way to enlarge the resources of missionary operations, and at the same time discovering how these resources are to be best economized, by preventing fruitless expenditure, and by pointing out and discovering the true points of attack by which the country to be entered is assailable. Those, however, who have done such service as explorers, should continue their good offices as superintendents; and in many cases there might be an advantage in separating between the council and the executive, between those who laid down the plan and were watching the progress of its being carried into execution, and those who were filling up the outline, and engaged in the details. Many reports and evil surmises will arise against missionaries, which, being engaged in more important occupations, they little hear of and less heed, and which, even if they were desirous to do so, they could ill ward off; but these might easily be removed by one who was friendly to the mission, and yet not a party implicated in each of its transactions.

If a physician in Mahommedan countries should make the first survey, and propose the original plan, by his influence with the governors he would obtain a more favourable opening for a missionary enterprise, and then watch over its prosperity, without being identified with all its proceedings. He would also have greater facilities, by the access which his profession gives him, both to governors and families of influence, to secure and extend favour and assistance from the ruling powers, and to remove the more speedily any obstacles or stumbling-blocks that might be cast in the way. The employment of physicians as missionaries, which has only very lately and very partially been practised, has been attended, on the limited scale on which it has been tried, with yet happier results than could reasonably have been anticipated. It has opened a new fountain of humanity in the hard and selfish breasts of distant nations, to see the strange spectacle of a man, in imitation of his Saviour, "going about doing good," and healing the sick. Those who are insensible to the diseases of the mind, feel with sufficient acuteness the sufferings of their bodies; and though missionaries may complain of the want of listeners, a missionary-physician has no reason to complain of the want of patients; nor has he reason to lament the want of success in treating the cases that are submitted to him. The healing art transported to a distance appears to assume new powers; and the reason is plain. Here medicine has to contend with inveterate debility, and can only hope, by the most successful treatment, to prolong a sickly existence. There the more rigorous life has already swept away those who were not possessed of the stamina of a vigorous constitution, and the physician has chiefly to attend to the cases where nature is ready to second his efforts, where disease is not inveterate, but accidental; not to mention, that our usual remedies come to distant lands with the advantage of new discoveries, and seem to resume the efficacy which they possessed when first invented, and before the body, like that of Mithridates, seasoned to drugs, and therefore blunted to their operation, had lost the sensibility which it possessed on their first and hitherto untried exhibition. Novelty also greatly augments the power of not the least potent of medicines, faith and hope.

What interest would the residence of an intelligent physician possess at Jerusalem; of one who was a physician indeed in the largest sense of the term, and wise in the knowledge of nature? We need such a commentator even for the Scriptures, an intelligent and resident spectator, to view and to record again the same natural appearances which were viewed by the sacred writers of old, that we may stand again in their position, see anew the same objects, and affix the same significance to their terms. What a benefactor he might be to the weary and superstitious pilgrims from distant lands, who might return home with prolonged life, and carrying with them the words of that life which will never end. The Moslems despise the Franks, but not the Frank physician. The caliphs themselves owed much of their fame and their intelligence to the Nazarene doctors, who communicated to them not only the art of healing, but much of the various knowledge of the Greeks. A Frank traveller is suspected; he is certainly seeking for hidden treasure. But a physician proceeding on the same path is reverenced; he is a benefactor, not a spoiler; he is culling simples to form some potent elixir; he has adopted the nobler part of the wonder-working art, not the secret of finding or making gold, but the mystery of prolonging life.

As the physician enables the missionary to gain immediate access to the hearts both of the young and the old, so the teacher, with the approbation of many who are unaware of the changes which he must introduce, is enabled to cut off the sources of error, and to implant the seeds of truth. Why is it that the present generation of idolaters still believe in their monstrous idols? It is because they have been educated to do so. All these superstitions are attached to the past, and have no other root in the present than what custom and education give them. They already exhibit the symptoms of decay, even with the Pagan education in their favour. An education founded on facts, even though it were not grounded on Christian principles, would unfasten the slight and relaxing hold which they yet retain over the minds of the multitude, and would speedily accelerate their destruction. It is a great improvement which is beginning to be introduced into education, the uniting the acquisition of reading and writing with the practice of some of the manual arts. By this no time is lost, and health is promoted.

The first of all the arts, and applicable to every condition of society, is the cultivation of the ground. How much would a few simple rules and improved practices alter the external comforts of the tribes amongst whom missionaries are labouring, whilst the improvement of the mind would proceed more rapidly along with the amelioration of their outward condition, and the more abundant supply of their temporal wants. The teacher also who is endeavouring to infuse common elementary knowledge into the minds of the young, has the best practice for obtaining that plainness of speech and simplicity of illustration, which will convey, in a tongue unused to express them, the truths of the gospel to those who are no longer young, but whose minds are still in the state of infancy, retaining the weakness of childhood without its pliancy.

There is great hope for the world in this, that an education founded solely upon facts, without reference to opinions, and therefore without open controversy, is calculated to destroy all the roots of error, and, though it cannot change the heart, yet will leave a much wider field for truth than exists at present. The contests between different creeds is in a fair way of being reduced to narrow ground, and to a decisive issue. The only alternative speedily will be between Christianity and no religion; and, unless belief and hope could be exterminated from the human breast, we need have no doubt as to the general result.

The introducing agriculture, and the other manual arts, into missionary establishments, would remedy one difficulty which frequently presents itself in affording employment and maintenance for new converts, who, in quitting their former creed, are often cut off from society and the means of existence, and in this way, without a new opening to enable them to provide for their own living, must become a burden and a discredit to the new society with which they have become connected. The amelioration of the soil around missionary stations, and improved methods of culture, would be attended with manifold advantages; it would give a visible reply to the objections of the most sceptical, of what use are missionaries? It would afford food and employment to those who are in temporary want of both, till new outlets could be found for the new converts, either from the ceasing of persecution against them, or from placing them in situations where their recent change does not excite the same enmity; and it would form a little colony where Christian habits and Christian maxims prevailed, a moral oasis in the midst of the heathen wilderness. How great a change, in many missionary stations, would even an acquaintance with the best method of irrigation produce? There is sunshine to ripen any produce; all that is required is moisture, and the rock is as ready at the hand of art as at the rod of the prophet, to yield its secret treasure of waters, and to spread as it flows over the sand a profusion of fruits and flowers. It was owing to this art that the Arab dominion in Spain owed much of its prosperity and glory. The children of the desert, in their own burning regions, had been taught the economy of water; the same skill which produced a wretched garden in the Sahara, created a paradise in Spain; and to directing the streams which were descending from the snows of the Alpuxaras, we owe these magic wonders which Madame de Stael could never hear of without her pulse beating faster, "Les orangers du royaume de Grenade, et les citronniers des rois Maures."

The employment of a few religious artisans, whilst they would tend greatly to the success of a mission, and to its speedier taking root in the soil to which it was transplanted, would, if they were possessed of a missionary spirit, add little to the expenditure. A gardener or practical agriculturist might be expected to do more than maintain himself; a physician, though so important to the mission, might also, in many instances, detract but little from the funds. These, however, are minor considerations; for a somewhat liberal expenditure, if judicious, is in the end the wisest economy.

A source both of economy and power is to concentrate the efforts that are made; it may present a more imposing appearance to have a number of stations dotted about in all parts of the world; but we have the example of the apostles, that the first object is to establish a church, to collect a number of believers, and to form them into a new centre, whence the truth may emanate in every direction around. In war nothing is so frequently fruitless as a victory, and it is the highest art of a commander to improve it to the utmost. In missionary efforts, success might be almost as fruitless, if advantage were not taken of it to the fullest extent, by bringing up additional resources, and completely occupying the ground that was gained. The fate of a battle often depends upon the reserve. One or two additional labourers on the missionary field might often terminate a long series of disappointments by a prosperous result. A little missionary colony would at once transplant Christianity into the region proposed to be ultimately occupied, and the children of the agriculturist or the artisan might form the missionaries of future years, inured to the climate, habituated to the mode of life and thought, and speaking the language with native facility. When a single missionary goes amongst a multitude of heathen, he has the whole tide of sympathy against the sentiments which he endeavours to introduce; the case is reversed when the heathen youth is brought to the missionary settlement, and placed under the social influence of Christianity and civilization. A small missionary colony would at once commence a Christian church; it would immediately become sacred ground, "a place where prayer is wont to be made," and where He who hears and answers prayer would interfere on their behalf, and would abundantly grant their requests.

The missionaries are availing themselves, with much intelligence and activity, of that instrument which is changing the world, the press. The Reformation was occasioned by tracts; and all other changes since, both religious and political, have been indebted to those swift and efficacious messengers, which, like the winged Hermes of the ancients, glide without impediment over land and sea. The operations of the Tract Society are one of the wonders of our times. Their little works are showered down upon every shore, if not quite as eloquent as the words of Ulysses, yet, like his, they fall thick as the winter snows, and no barrier has yet been found that can effectually repress the effect of these missiles. There is no tongue or speech in which their voices are not heard, nor does there seem any limit to their operations, except that which circumscribes all human endeavours, the "alte terminus hærens," the limitation of funds.

Another great instrument for diffusing civilization and Christianity, is the spread of the English tongue. It is to be regretted that many natives are more anxious to learn English than the missionaries are to teach them, from the fear, it appears, by some missionary accounts, that these natives, when instructed, would only employ their knowledge of English in the pursuit of gain. It might probably so happen in several instances at first; but the demand for those who have a superficial acquaintance with English is not unlimited, the market would soon be supplied, and the premium lowered. Then the advantages of teaching English would remain when the disadvantages were removed. The Romans understood the art of governing rather better than the English, and met the desire of the provincials to be instructed in the Roman tongue. With them it might be matter of amusement, not of scorn or rejection, that even remote barbarians had some aspirations after Italian refinement or Grecian eloquence :—

> De conducendo rhetore jam loquitur Thule.

Still remoter regions from Rome than the farthest Thule are now desirous of an acquaintance with English, and, if the English were wise, would be encouraged in this attainment, for with the spread of their language they would extend their glory and their commerce.

The true end of missionary societies, it must never be lost sight of, is to raise up native teachers and preachers. Until this point be gained, the foreign missionaries must address the natives "with stammering lips, and another tongue;" for though the words may be native, the idiom is sure to be foreign; and the missionaries will certainly continue to think in English, even when they are pronouncing the words of another language. This plain and obvious truth does not seem to have hitherto been sufficiently considered. Yet to perceive the difficulty, we have only to imagine a number of French apostles endeavouring, in broken English, to recall a heathen multitude of Britons to a sense of solemnity, and trying to infuse into their minds, through so distorting a medium, some knowledge of the truths of the Gospel. The actual engagement of a certain number of native teachers may serve indeed as an excuse, but not as a complete justification, for this important and obvious principle not having been carried more fully into effect.

The employment of well-educated native preachers supposes, in some degree, the erection of higher schools and colleges, and therefore presents the difficulty of finding sufficient funds and suitable teachers. But the employment of native teachers is itself a source of economy, tending to diminish the number, and of course the expenditure, of European labourers, whilst it would increase the efficiency of those who are actually sent. And the knowledge to be taught must in the first place be elementary, and suitable teachers for the elements might readily be found. The Kirk of Scotland affords a good example of scholastic instruction; the Church of England possesses a college on a large and liberal scale; and the plan of Serampore was marked by great ingenuity and intelligence. What is desirable is, that these beginnings should be pursued and extended; and that other denominations should make equal efforts for training up a body of native missionaries, possessed of the acquirements of Europe, and having greater opportunities than Europeans can possibly obtain, of familiar intercourse and ready sympathy amongst their own countrymen.

But if missionary societies do not raise up native teachers in abundance, without any one's instruction or assistance native heretics will rise up of themselves. Light and darkness are intermingling together, and new and foreign opinions, from casual intercourse with Europeans, will combine with old prejudices, and produce a new set of errors. Thus Gnosticism arose from the first dawn of Christianity in the East; and thus Manes united the Persian doctrine with the true principles and the purer tenets of Revelation. Thus the Sikhs in India have remodelled the opinions of the Hindus, in part, upon the more warlike creed of their Moslem conquerors, and have adopted the half of the Moslem religion, which consists of the Koran and the sword, rejecting the Koran, but worshipping the "All-Steel." The overflow of the English race from either side of the Atlantic would augment the confusion and destruction of the ancient systems, alike by their profligacy or their piety; even the outcasts, throwing contempt upon the idols, prepare the way for the reception of a new system of belief; for in many instances the native savages only wait for an example of their idols being despised with impunity, to cast them aside, and admit the superiority of that Power which has instructed the white strangers in so many arts of which they themselves are ignorant. The enterprise and rivalry of Europeans naturally tend to embroil the most distant nations in their quarrels, and shake the thrones of the native princes, already crumbling from their antiquity. Every new invention shortens the period which will make the whole world European; and, considering only human means, steam alone has brought us a hundred years nearer to the conversion of the world.

The advantages of missions are obvious, both to those who send missionaries and to those who receive them. The contributors to missions have the double advantage both of saving and of giving. Every step of progress that the world has made from the lowest scale of barbarism, is by saving; by preferring the future to the present; by making the acquisitions of the day go farther than the day itself; and by rendering the surplus of the gain of the former generation a bequest to the generation which is to succeed it. But this noble attainment often proceeds from an unworthy cause. The love of money often injures the individual as much as it benefits his species. In giving to missionary societies, the saving is not only profitable, but the motive is generous and ennobling. It solves the question of Who is our neighbour, in the manner pointed out by the Saviour, and brings into a nearness of affection those who are distant in place. It restores the dormant affinity of our common species, and embraces the whole family of man in a new and still more elevated brotherhood. Some objects chiefly warm the affections, and others enlighten the understanding; but the cause of missions at once accomplishes both. The labourer who, from his hard earnings, spares a portion for the greater spiritual need of that distant brother whom he never saw, not only feels his heart warmed towards him whom he intends to benefit, but listens with an interest, unfelt before, to all the information he may receive concerning him. Curiosity becomes a loftier feeling, which exists after novelty is ended; and the head and the heart are alike actively employed in devising means to ameliorate the most distant tribes of the family of man, and in affording the resources which are to carry these plans into execution. If missionary efforts were attended with no other advantages, the benefits they confer upon the contributors were well worth all the sums that have been expended upon them. But they are "twice blessed." Every step abroad is also an advantage, even if the mission should proceed no farther. The mere employment of a physician, the diseases that he removes, and the gratitude that he excites, were sufficient reward for any expense attending his mission. Every step in education well recompenses the trouble and expenditure attending it. Every communication of knowledge, even if it should stop short of the highest knowledge, should more than repay a benevolent man for any little sacrifices he might have made in affording light to others. But these are merely the commencements. With common prudence, there is no danger that the stream of beneficence, after a short and rapid course, should be swallowed up in the sands. We may rather anticipate that its progress will be like the beautiful description of the son of Sirach.

> I also came forth as a canal from a river,
> And as a conduit flowing into a paradise.
> I said, I will water my garden,
> And I will abundantly moisten my border:
> And, lo! my canal became a river,
> And my river became a sea.

God has raised Britain to a pitch of power and affluence unexampled in the history of mankind. Great as its prosperity apparently is, it is still greater than it seems; for its immense resources have never been fully developed. Those who are blessed are intended to be made a blessing. We were raised to the height of our present condition, not to abuse the gifts of Providence in luxury, but to disseminate the distinguished mercies which have been committed to us in trust, as far as the winds and the waves can waft the messengers of benevolence from our shores. (B. G.)

REMBRANDT VAN RHIN, a Flemish painter and engraver of great eminence, was born in 1606, in a mill upon the banks of the Rhine, whence he derived his name of *Van Rhin*. This master was born with a creative genius, which never attained to perfection. It was said of him, that he would have invented painting, if he had not found it already discovered. Without study, without the assistance of any master, by his own instinct alone, he formed rules, and a certain practical method for colouring; and the mixture produced the designed effect. Nature is not set off to the greatest advantage in his pictures; but there is such a striking truth and simplicity in them, that his heads, particularly his portraits, seem animated, and rising from the canvass. He was fond of strong contrasts of light and of shadow. The light entered into his working-room only by a hole, in the manner of a camera obscura, by which he judged with greater certainty of his productions. This artist considered painting like the stage, where the characters do not strike unless they are exaggerated. He did not pursue the method of the Flemish painters, that of finishing his pieces. He sometimes gave his light such thick touches, that it seemed more like modelling than painting. A head of his has been shown, the nose of which was as thick of paint as that which he copied from nature. He was told one day, that by his peculiar method of employing colours, his pieces appeared rugged and uneven; but he replied that he was a painter, and not a dyer. He took a pleasure in dressing his figures in an extraordinary manner; and with this view he had collected a great number of eastern caps, with ancient armour and drapery long since out of fashion. When he was advised to consult antiquity in order to attain a better taste in drawing, in which he was usually heavy and uneven, he took his counsellor to the closet where these old vestments were deposited, saying, by way of derision, that these were his antiques.

Rembrandt, like most men of genius, had many caprices. Being one day at work, painting a whole family in a single picture, word was brought him that his monkey had died; and he was so affected by the loss of this animal, that, without paying any attention to the persons who were sitting for their pictures, he painted the monkey upon the same canvass. This whim could not fail to displease those for whom the piece was designed; but he would not efface it, choosing rather to lose the sale of his picture than to act like a rational being.

This freak will appear the more extraordinary in Rembrandt, when it is considered that he was extremely avaricious, a vice which daily grew upon him. He practised various stratagems to sell his prints at a high price. The public were very desirous of purchasing them, and not without reason. In his prints the same taste prevails as in his pictures; they are rough and irregular, but picturesque. To heighten the value of his prints, and increase their price, he made his son sell them as if he had purloined them from his father; others he exposed at public sales, and went thither in disguise in order to bid for them; sometimes he even gave out that he was going to leave Holland and to settle in another country. These stratagems were successful, and he got his own price for his prints. At other times he would print his plates half finished, and expose them to sale; after which he would finish them, and then they became fresh plates. When any of them wanted retouching, he made some alterations; which promoted the sale of his prints a third time, though they differed but little from the first impressions.

His pupils, who were not ignorant of his avarice, one day painted some pieces of money upon cards; which Rembrandt no sooner saw than he was going to take them up. He was not angry at the pleasantry; but it had no effect in checking his avarice. He died in 1674.

REMBANG, a Dutch residency on the north-east coast of Java, which produces salt and timber for ship-building. Long. 111. 15. E. Lat. 6. 40. S.

REMEMBRANCE is when the idea of something formerly known recurs again to the mind without the operation of a similar object on the external sensory.

REMEMBRANCERS, anciently called clerks of the remembrance, certain officers in the exchequer, three of whom are distinguished by the names of the King's Remembrancer, the Lord Treasurer's Remembrancer, and the Remembrancer of the First Fruits.

REMINISCENCE, that power of the human mind by which it recollects itself, or calls again into its remembrance such ideas or notions as it had really forgotten. In this it differs from memory, which is a treasuring up of things in the mind, and keeping them there, without forgetting them.

REMISSION, in *Physics*, the abatement of the power or efficacy of any quality; in opposition to the increase of the same, which is called *intension*.

REMONSTRANTS, in *Ecclesiastical History*, a title which was given to the Arminians in consequence of the Remonstrance made by them in the year 1610, to the states of Holland, against the sentence of the synod of Dordrect, which pronounced them heretics. The chief leaders of the Remonstrants were Episcopius and Grotius; and their principles were first openly countenanced in England by Archbishop Laud. In opposition to the representation or remonstrance of the Arminians, the Dutch Calvinists presented an address, which was called a counter-remonstrance; and hence they obtained the denomination of Counter-Remonstrants. A great deal of keen controversy was agitated in this affair by these rival sects.

REMORSE, in its worse sense, signifies that pain or anguish which one feels after having committed some wicked action. It also means tenderness, pity, or sympathetic sorrow; but it is most generally used in a bad sense, and is applied to persons who feel compunction for some great crime, as murder, and the like. Murders which have been committed with the utmost circumspection and secrecy, and the authors of which could never be discovered by any human investigation, have frequently been disclosed by the remorse and confession of the perpetrators, and that, too, many years afterwards.

REMPHAN, an idol or god whom St Stephen says the Israelites worshipped in the wilderness as they passed from Egypt to the Land of Promise. "Yea, ye took up the tabernacle of Moloch, and the star of your god *Remphan;* figures which ye made to worship them." That the martyr here quotes the following words of the prophet Amos, all commentators are agreed: "Ye have borne the tabernacle of your Moloch, and *Chiun* your images, the star of your god, which ye made to yourselves." But if this coincidence between the Christian preacher and the Jewish prophet be admitted, it follows that *Chiun* and *Remphan* are two names of one and the same deity. This indeed is further evident from the Septuagint translators having substituted in their version the word Ραιφαν, instead of *Chiun*, which we read in the Hebrew and English Bibles. But the question which still remains to be answered is, What god was worshipped by the name of *Remphan, Raiphan,* or *Chiun ?*

That *Chiun* or *Remphan* was an Egyptian divinity, cannot be questioned; for at the era of the Exodus the Hebrews must have been strangers to the idolatrous worship of all other nations; nor are they ever accused of any other than Egyptian idolatries during their forty years' wanderings in the wilderness, till towards the end of that period, when they became infected by the Moabites with the worship of *Baal-peor*. That *Moloch, Molek, Melek,* or *Milcom,* in its original acceptation, denotes a king or chief, is known to every oriental scholar; and therefore, when it is used as the name of a god, it undoubtedly signifies the *Sun,* and is the same divinity with the Egyptian *Ra, Ré,* or *Phré.* Reasoning in this way, many critics, and we believe Selden amongst the number, have concluded that *Chiun,* and of course *Remphan,* is the planet Saturn; because *Chiun* is written *Ciun, Cevan, Ceuan, Chevvin,* all of which are modern oriental names of that planet.

But against this hypothesis insurmountable objections present themselves. It is universally allowed that the first objects of idolatrous worship were the Sun and Moon, considered as the king and queen of heaven. The fixed stars, indeed, and the planets, were afterwards gradually admitted into the Pagan Pantheon; but we may be sure that these would be first associated with the two prime luminaries which most resembled them in brightness, and were supposed to be most benignant to man. The planet Saturn, however, appears to the naked eye with so feeble a lustre, that, in the infancy of astronomy, it could not make such an impression on the mind as to excite that admiration which we must conceive to have always preceded planetary worship. It is to be observed, too, that by the Pagan writers of antiquity Saturn is constantly represented as a star of baleful influence. He is termed the *leaden planet;* the *planet of malevolent aspect;* the *dismal,* the *inhuman star.* That the Egyptians, at so early a period as that under consideration, should have adored as one of their greatest gods a planet obscure in its appearance, distant in its situation, and baleful in its influence, is wholly incredible.

There is another star, however, which they might naturally adore, and which we know they actually did worship, as one of their most beneficent gods, at a very early period. This is the ἀστρακυων or σειριος of the Greeks, the *canis* or *stella canicularis* of the Romans, and the *dog-star* of modern Europe. By the Egyptians it was called *Sothis* or *Soth,* which signifies safety, beneficence, fecundity; and it received this name because, making its appearance in the heavens at the very time when the Nile overflowed the country, it was supposed to regulate the inundation. On this account, Plutarch tells us, they believed the soul of their illustrious benefactress Isis to have transmigrated into the star Sothis, which they therefore worshipped as the divinity which rendered their country fruitful. It made its appearance, too, on the first day of the month called *Thoth,*[1] which was the beginning of the Egyptian year, and as such celebrated with feasting and festivity; and being by far the brightest star in the heavens, Horus Apollo informs us that it was considered as sovereign over the rest. A combination of so many important circumstances might have induced a people less superstitious than the Egyptians to pay divine homage to that glorious luminary, which was confounded with Isis, who had been long regarded with the highest veneration; and as Isis was the wife and sister of Osiris, and always associated with him, the star of Isis or Remphan was naturally associated with Moloch, the same with Osiris.

But it will be asked, how the star which by the Egyptians was called Soth or Sothis came to be worshipped by the Hebrews under the appellation of *Chiun* or *Remphan.* This is a pertinent question, and we shall endeavour to answer it.

Every one knows that the pronunciation of oriental words is very uncertain; and that as the vowels were often omitted in writing, it is of very little importance to the meaning how they be supplied, provided we retain the radical consonants. The word *Chiun* may with equal propriety be written *Kiun, Kion,* or even *Kyon,* the Hebrew *jod* being convertible into the Greek υ or the Roman *y;* but the words *Cane, Chan, Kan,* or *Khan,* which are often diversified into *Khen, Kyn, Cohen, Cahan,* signifying *head, chief, prince,* or *king,* are diffused throughout a great part of Asia and Europe. In the Chinese language *Quin,* which signifies a *king,* is so similar to the word *Chiun* or *Khiun* under consideration, that no etymologist will hesitate to pronounce them of the same origin and import. The word *Kan* or *Khan* is universally known to be an honorary title in Tartary; and *Kaian* or *Kain,* which is manifestly a cognate of the word *Chiun* or *Kiun,* is, in the Pahlavi, or old Persian language, the epithet applied to the dynasty of princes which succeeded Cyrus the Great. Amongst the Scythians or ancient Tartars, *Ghiun* signifies the Sun and likewise the day; and *Kung, Kinung, Kun,* runs through all the dialects of the Gothic tongue, everywhere denoting a chief or sovereign. In the Syrian dialect, *Kon* signifies a prince; and hence the Almighty is styled (Gen. xiv. 19) *Konah,* which is translated *possessor,* but might, with perhaps more propriety, have been rendered sovereign of heaven and earth. In the Hebrew, the word *Kahan* or *Kahen,* which is the same with *Khan* or *Kan,* signifies either a priest or a prince; and in ancient Egypt *Kon* was the name of the first Hercules, or the Sun. Hence the same word in composition denotes greatness, as *Can-obus,* the great serpent; *Can-athoth,* the great *Thoth* or Mercury; *Can-osiris,* the great *Osiris.*

From this deduction we may conclude that the word, which is found in so many tongues, and always denotes chief, prince, or sovereign, is the very word *Chiun* which the Egyptians and Hebrews applied to Sothis, as being, in their conceptions, the chief or sovereign of all the stars. This will appear still more probable, when we have ascertained the import of the word *Remphan,* or, as the Seventy-two have it, *Raiphan.*

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[1] This was the case at a very remote period; but it is otherwise at present, owing to the precession of the Equinoxes.

Remus
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Renfrew.

Phan, the latter part of this word, is unquestionably the same with *Pan*, the most ancient of the Egyptian gods. It is likewise a cognate of the Hebrew PHANAH, *conspexit, spectavit, vidit;* and the radical word seems to be PHAH, or PHTHAH, which signifies sometimes the countenance, and sometimes light. Hence *Phaethon*, which is compounded of *pha*, light; *eth* or *esh*, fire; and *on*, strength; came to be one of the names of the Sun. *Rai*, which we commonly write *Rajah*, has long signified, amongst the Indians, a subordinate prince; and we know that between India and Egypt there was a very early intercourse. *Raiphan*, therefore, may be either the *royal light* or the *bright prince*, subordinate to Osiris; and in either sense it was a very proper epithet of Sothis in the Egyptian kalendar. The word *Rem* or *Rom*, again, for it is sometimes written Remphan, and sometimes Rompha, is no other than the Hebrew רום, *Rum*, high or exalted. Hence Remphan is the *high* or *exalted light*, which Sothis certainly was. (O. O. O. O.)

REMUS, the brother of Romulus, was exposed, together with his brother, by the cruelty of his grandfather. In the contest which happened between the two brothers about building a city, Romulus obtained the preference; and Remus, for ridiculing the rising walls, was put to death by his brother's orders, or by Romulus himself. After this murder the Romans were afflicted with a plague; upon which the oracle was consulted, and the manes of Remus were appeased by the institution of the Remuria.

REMY, ST, a city of France, in the department of the Mouths of the Rhone, and arrondissement of Arles. It stands on a fruitful plain, and is celebrated for the marble found near it, as well as for valuable Roman antiquities, especially a triumphal arch, and a lofty mausoleum which is still in good preservation. The city contains 930 houses, with 6200 inhabitants, who manufacture serges and other cloths.

RENAPOOR, a town of Hindustan, in the Nizam's territories, and province of Aurungabad, seventy-one miles north-west from Beeder. Long. 76. 55. E. Lat. 10. 20. N.

RENDSBURG, a city of the Danish dominions, in Holstein. It is built on the river Eider, by which it is divided into the old and the new town. It is strongly fortified, being the bulwark of Denmark towards Germany. The great canal ends at this place. It is a town of considerable trade, especially of breweries and distilleries; and here is the chief government military arsenal. It contains 545 houses, and 7572 inhabitants. Long. 9. 34. E. Lat. 54. 18. N.

RENFREW, the chief town of a shire or county of the same name, in Scotland, situated on the south bank of the river Clyde, about six miles below Glasgow, and three north-east of Paisley. It was made a burgh by David I., who began to reign in 1124, and is undoubtedly the most ancient town in Renfrewshire. In 1396 Robert III. raised it to the rank of a royal burgh, and it is the only place in the county which enjoys that distinction. The name is apparently derived from *rhyn* in the British, or *rinn* in the Gaelic, both meaning a point of land; and *freu* or *frau*, in the British, meaning a flow of water. This forms an apt description, the town being situated on a point of land near the conflux of the rivers Clyde and Cart. Assuming that the name *Renfrew* was anciently applied to the site of the burgh, it is easy to understand how it would be given to the burgh itself, and afterwards be extended first to the barony, and then to the sheriffdom.

Renfrew possesses considerable historical interest. Here Somerled, Lord of the Isles, who rose in rebellion against Malcolm IV., was defeated and slain in 1164. The family of Stewart had their common residence at this place before they were called to the throne. Even after that event Robert II., and probably also some of his successors, occasionally resided here. The mansion of the Stewarts no longer exists; but its site is still called "Castlehill," and near it is "the King's Meadow." In former times the waters of the Clyde separated into two branches at Renfrew, and formed an insular piece of ground, or *inch*, on which there stood another ancient edifice, called "the Inch Castle."

Renfw.
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This town had once a little foreign trade. In a charter granted by James VI., in the year 1614, it is described as the principal port on the Clyde. A century later, its chief traffic was with Ireland. At present, some vessels in the inland trade load and unload at the harbour. About fifty years ago, a navigable canal was formed between the town and the river; and at the mouth of this canal a commodious quay was built in 1835, at an expense of about L.800. Some salmon-fishings on the Clyde have long belonged to the burgh. The principal occupation of the inhabitants is hand-loom weaving, in which 561 persons were employed in the year 1836. That Renfrew has but little participated in the prosperity which commerce and manufactures have diffused all around, is evident from the fact, that the population of the parish, which in 1801 had amounted to 2031, had in 1831 increased to only 2833. It contains a constituency of ninety-five qualified voters, and is joined with Rutherglen, Dumbarton, Kilmarnock, and Port-Glasgow, in sending a member to parliament.

RENFREWSHIRE, a county in Scotland, lying between 55. 40. 40. and 55. 58. 10. north latitude, and 4. 15. and 4. 52. 30. west longitude, is bounded on the east by Lanarkshire, on the south by Ayrshire, and on the north and west by the river and frith of Clyde, which separate it from the shires of Dumbarton and Argyle, excepting a section of about 1300 imperial acres, which is situated on the north bank of the Clyde, opposite the town of Renfrew. Its greatest length is thirty-one miles and a half, and its greatest breadth thirteen miles and a fourth. Its area is 241 square miles, or 154,240 acres, of which about 100,000 are cultivated, 20,000 uncultivated, and 34,240 unprofitable. Notwithstanding the small extent of this shire, its manufactures and commerce render it one of the most important in Scotland.

At the epoch of the Roman invasion, in the first century of the Christian era, this part of Scotland was inhabited by a Celtic tribe, called by the invaders the Damnii. After the withdrawal of the Romans, it was comprehended in the British kingdom of Strathclyde.

The district which now forms the county of Renfrew, at least the greater part of it, was denominated, from one of its rivers, Strathgryfe, the valley of the Gryfe, and at one time formed part of the shire of Lanark or Clydesdale. It was the chief patrimony of the great stewards of Scotland, to whom it was granted by the sovereign in the twelfth century. Afterwards it was called the barony of Renfrew, from the burgh of that name, where the stewards long had their principal residence. In 1404, thirty-three years after the accession of the house of Stewart to the Scottish throne, King Robert III. granted this barony, and the other portions of the estates of the steward, to his son and heir James; since which time the eldest son of the sovereign has, besides his other titles, borne that of "Baron of Renfrew." Soon afterwards this barony was erected into a distinct sheriffdom, the courts of which were held at Renfrew till the year 1705, when they were, for convenience sake, removed to Paisley. In 1815 the county was formed into two wards, termed the Upper and the Lower, with a sheriff-substitute for each, Paisley and Greenock being the seats of their respective courts.

Renfrewshire comprehends twenty-one parishes, besides small portions of those of Beith and Dunlop in Ayrshire, and Govan in Lanarkshire. Two of the parishes, Eaglesham and Cathcart, belong to the presbytery of Glasgow; the other nineteen composed the presbytery of Paisley for a long time prior to the year 1834, when two presbyteries were formed; that of Paisley, consisting of twelve of these nineteen parishes; and that of Greenock, consisting of the other seven, with the addition of Cumbraes in Buteshire, and Largs in Ayrshire, both of which parishes formerly belonged to the presbytery of Irvine. In the above enumeration of parishes, those which are so *quoad sacra* only have not been taken into account.

About two thirds of this county, comprehending the western and southern sides, are hilly, the medium elevation being from 500 to 600 feet. Mistylaw, on the west, which is about 1240 feet above the level of the sea, has been represented as the highest hill in the county; but it is now ascertained that a neighbouring height, called the Hill of Staik, is entitled to that distinction, being a few feet higher. This last was one of the points of observation in the general trigonometrical survey of the kingdom. Balagiech and Dunwan are the highest hills on the south-east side, being about 1000 feet above the sea-level. The hilly district is in general kept in pasture, for which it is better adapted, by the nature of its surface, than for tillage; though, as it has a free light soil, which readily absorbs water, it is seldom injured by moisture. The cultivated land, which forms the gently-rising district, lies on the north and north-east, and in the centre of the county on both sides of the Black Cart. Of this the greater part consists of low, detached eminences, which swell in endless variety. These being interspersed with copses, and often watered at the bottom by winding streams, present views remarkable for richness and variety. Indeed it will be difficult to point to a more beautiful surface anywhere in Scotland. Much of this tract has a close subsoil of small stones and coarse clay, almost impenetrable to water, though there are here many flat holms of great fertility. It is only between Paisley and the Clyde that the country sinks down into a plain, forming the flat district known by the name of "the Laighlands." The length of this beautiful level tract is about six miles, its breadth about three, and its area 12,000 acres. Here the soil is generally a deep rich loam of a dark-brown colour, sometimes of the nature of what is called "carse clay;" and much of it seems to have been formed by the deposition of vegetable mould from the higher grounds. Moss prevails in the first and last divisions, but is not found in the second one, where the soil is pretty uniform.

Like the other western counties of Scotland, Renfrewshire has a moist climate, with frequent rains; and the prevailing wind is from the south-west. At Largs, a village in Ayrshire, near the western extremity of this county, the yearly quantity of rain in 1809 and 1810 was $38\frac{2}{3}$ inches; at Glasgow, near the eastern extremity, for thirty years, from 1761 to 1790, it was 29·65 inches.

Besides the Clyde, which, as has been already mentioned, flows along the northern and western boundaries of this county, the principal rivers are the White Cart, the Black Cart, and the Gryfe. The White Cart, which rises in Lanarkshire, enters Renfrewshire from the south, and pursues a winding course, first westerly towards Paisley, through which it passes, and then northerly towards the Clyde. It is joined at Inchinnan Bridge by the Black Cart, which had previously received the waters of the Gryfe at Walkinshaw, above Barnsford Bridge; and these united streams, which contain nine tenths of the water of the county, fall into the Clyde about three miles below Paisley. By means of a short canal, which was cut to avoid the shallows at Inchinnan Bridge in 1786, the White Cart is navigable up to Paisley. Other improvements upon this river are in progress. Like some other Scottish streams, it was once famous for the pearls which were found in its bed, but these have disappeared since the beginning of the eighteenth century. The Black Cart rises from Loch Winnoch, or, as it is usually called, from an adjoining estate, Castle-Semple Loch, a lake in the south-western extremity of the county. The Gryfe rises in the west, amongst the high lands of the parish of Greenock. All these streams, and several others of smaller size, independently of their importance to agriculture, are, in almost every part of their course, applied by the industrious and ingenious inhabitants to the various purposes of manufactures. A ready supply of water is secured by means of reservoirs, some of which are of the size and appearance of considerable lakes; or by enlarging the natural lakes themselves, of which there are many. These streams and lakes contain the kinds of fish that are common in this quarter of the country.

Two railways, which will traverse the county, are now (March 1839) in course of being formed. Commencing at Glasgow, they will have a common line to Paisley, from which the one will lead north-westwards to Greenock, and the other westwards to several places in Ayrshire. These ways of transport must prove of incalculable value to the trade and commerce of the county. It is expected that they will be opened in 1840. The Paisley and Renfrew railway, and the canal from Glasgow to Johnston, have been noticed in the account of Paisley.

The minerals of Renfrewshire are of great importance, and constitute the main source of its manufactures and commerce; but we can only advert to them very generally. Coal, limestone, and sandstone, are wrought at Neilston, one of the parishes of the hilly district; and both coal and lime have been found in the flat district near Renfrew; but it is in the middle division that mines are wrought to the greatest extent. Of coal there are generally about twelve different works carried on, of which the most extensive and valuable are at Polmadie, on the north-east boundary; at Hurlet, three miles south-east from Paisley, where it has been wrought for more than three hundred years; and at Quarrelton, south-east from Johnston, on the Black Cart, near the centre of the county. The coal at this latter place consists of five contiguous strata; the thickness of the whole, measured at right angles to their surface, is upwards of fifty feet; but as in some places the seam forms a considerable angle with the horizon, the thickness of the whole in these places, measured vertically, is about fifteen fathoms. In consequence of this great depth, it is wrought in floors or stories. Limestone abounds in various parts, and is commonly wrought at eight different quarries. Ironstone in beds and balls is found in great profusion. Considerable quantities of pyrites are found in the stratum of coal at Hurlet and Househill, and manufactured into sulphate of iron or green vitriol. Alum is obtained at Hurlet, from the decomposed schistus which forms one of the strata of its coal-mines. Excellent freestone, lying near the surface, is wrought at various places in the middle district. Greenstone, or, as it is provincially called, *whinstone*, exists in immense masses.[1]

The annual value of real property in Renfrewshire, as assessed in 1815, was L.265,534 sterling. The valued rent in 1674 was L.69,172 Scots. This, exclusive of small properties occupied by *feuars*, chiefly as gardens, was, in 1810, divided among 350 proprietors, the estates of eighty-one of whom were above the valuation of L.100 Scots, and only six were above L.2000 Scots. At that time nearly half the valuation belonged to estates held under entail, and by corporations, which were not therefore allowed to be brought to market. Landed property in Renfrewshire underwent great changes during the forty years which preceded 1810, nearly one third part of the whole shire having been sold within that period. There are about thirty seats of noblemen and gentlemen, besides villas belonging to merchants and tradesmen. There are also many remains of ancient structures, which formed the seats of powerful or respectable families. This shire was anciently covered with wood. Even now it is ornamented with many woods and plantations; and it is in general well enclosed.

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[1] Much valuable and interesting information on the geology of Renfrewshire will be found in an essay by Mr William Montgomery, younger of Cloak, factor, Castle-Semple, inserted amongst the Prize Essays and Transactions of the Highland and Agricultural Society of Scotland for December 1838, p. 421.

As an agricultural district, this does not rank so high as some others in Scotland. Farms are generally small, seldom exceeding 100 acres on the arable land, and 400 or 500 acres on the hills. In 1811 the average rent per English acre was about fifteen shillings, varying from two or three shillings to four or five pounds; partly owing to situation, but still more to the different degrees of the natural fertility of the soil. The usual period of leases here, as in other parts of Scotland, is nineteen years; but many are now shorter. The mode of farming is such as every year to leave more than a half of the arable land in grass, on which the stock chiefly kept is cows, the most part of whose milk is made into butter. There are few cheese-dairies. The corn chiefly raised here consists of oats and bear. Wheat, barley, beans, and pease, are sown, but not in great quantities. Clover and rye-grass are sown only for hay. Turnips are much grown as a field crop. Potatoes are skilfully and extensively cultivated, the vast population of the district creating an extraordinary demand for a root so cheap and wholesome. A flock of Merino sheep was brought to this county from Spain in the year 1810, but the experiment proved unsuccessful.

It is by its manufactures and commerce that this county is most distinguished. Goods of silk, and cotton, and muslin fabrics, are the principal articles manufactured. Cotton-mills, bleachfields, and printfields, furnish employment to a large portion of the inhabitants. Paisley and its environs form the chief seat of the manufactures. At Greenock and Port-Glasgow the foreign and coasting trade of the county, and, indeed, a great proportion of the foreign trade of Scotland, are carried on. To prevent repetition, we refer to the articles PAISLEY, GREENOCK, and PORT-GLASGOW, for information concerning the manufactures and commerce of Renfrewshire.

The other more considerable towns and villages, with their population in 1831, are as follow: Johnston, 5617; Pollockshaws, a burgh of barony, 4267; Lochwinnoch, 2645; Barrhead and Newton Ralston, 2640; Kilbarchan, 2333; Neilston, 1137; and Elderslie, 1099.

In 1755 the population of the county was only 26,645; in 1831 it amounted to 133,443. The increase, therefore, in seventy-six years has been 106,995, being upwards of 400 per cent., which exceeds that of any other county in Scotland.

YEARS.	HOUSES.			OCCUPATIONS.			PERSONS.		
	Inhabited.	Families.	Building.	Families chiefly employed in Agriculture.	Families chiefly employed in Trade, Manufactures, and Handicraft.	Families not comprised in the two preceding classes.	Males.	Females.	Total of Persons.
1811	8,229	19,798	38	1,847	15,959	1,992	41,960	50,636	92,596
1821	10,490	23,977	55	2,725	15,780	5,472	51,178	60,997	112,175
1831	11,153	28,204	828	2,016	21,071	5,117	61,154	72,289	133,443

RENNES, an arrondissement of the department of Ille and Vilaine, in France, extending over 577 square miles, and containing ten cantons, seventy-eight communes, and 123,400 inhabitants. The capital is the city of the same name, situated at the junction of the two rivers which give name to the department. It is the seat of the departmental government, as it was of that of the province of Normandy in former times. It stands on a fine plain, and, excepting the suburbs, is well built; the parade being one of the finest squares in France. It has a cathedral and eight other churches, a fine exchange, 4000 houses, and 31,200 inhabitants. There are extensive linen manufactures, especially of sail-cloth for the royal navy. Cottons are made and printed, and many stockings are woven. Many of the inhabitants are employed in building, equipping, and navigating vessels. Long. 1. 45. 7. W. Lat. 43. 6. 50. N.

RENNIE, JOHN, a distinguished mechanist, architect, and civil engineer, was born on the 7th of June 1761, at Phantassie, in the parish of Prestonkirk, in the county of East Lothian. His father, a highly respectable farmer, died in 1766, leaving a widow and nine children, of whom John was the youngest. The first rudiments of his education were acquired at the village school; and as it frequently happens that some trifling circumstance in early life gives a bent to the pursuits and fixes the destinies of the future man, so it fared with young Rennie. The school was situated on the opposite side of a brook, over which it was necessary to pass by means of a rustic bridge of stepping stones; but when the freshes were out, the only alternative of crossing the stream was by means of a boat, which was kept at the workshop of Mr Andrew Meikle, an ingenious mechanic, well known in Scotland as the inventor of the thrashing-machine, and many improvements in agricultural implements. In passing through this workshop, which stood on his family property, young Rennie's attention was forcibly drawn to the various operations that were in progress, and a great part of his leisure and holiday time was passed therein. The sons of Mr Meikle, and the workmen, seeing the delight which he appeared to take in examining their labours, were in the habit of indulging him with their tools, and showing him their various uses. His evenings were chiefly employed in imitating those models which had particularly attracted his attention in the workshop; and it is known in the family, that, at little more than ten years of age, he had constructed the model of a windmill, a pile-engine, and a steam-engine. That of the pile-engine is still in existence, and is said to be remarkably well made.

Having continued at Preston school till twelve years of age, he had about that time a quarrel with his schoolmaster, whom he deemed incompetent to give him further instruction, and therefore entreated that he might be permitted to leave the school. But his active mind soon became restless; for the first time he felt the hours hang heavily on his hands; and having expressed a wish to be placed under his friend Mr Meikle, he employed himself with this ingenious mechanic for about two years; but his mind expanding with his growth, he began to feel that the progress of his intellectual faculties was likely to be retarded by a constant application to manual labour. He therefore at length determined to place himself under the tuition of Mr Gibson, an able teacher of mathematics at Dunbar; where he soon distinguished himself in so particular a manner, that Mr David Loch, general inspector of the fisheries in Scotland, in describing a visit which he paid to the school at Dunbar in 1778, notices the great proficiency displayed by young Rennie; prophesying that at no distant period he would prove an honour to his country.[1] From this school, in less than two years, he returned to Mr Meikle, with a mind well stored with every branch of mathematical and physical science which Mr Gibson could teach him. About this time, Mr Gibson being appointed master to the public academy of Perth, he earnestly recommended young Rennie to succeed him at Dunbar. But his views were of a more aspiring cast. As a matter of favour, he undertook the management of the school for about six weeks, when he returned to his family, occasionally visiting and assisting his friend Mr Meikle, but mostly improving himself in drawing and making models of machinery. His first essay in practical mechanics was the repairing of a corn-mill in his native village; and he erected two or three others before he was eighteen years of age.

Resolved, however, that these mechanical occupations should not interfere with his studies, he laid his plans so that he should be able to proceed occasionally to Edinburgh with a view of improving himself in physical science. He there attended the lectures of Professors Robison and Black, and formed that acquaintance with the former of these gentlemen, which was gradually raised into friendship, and which, perhaps, may be said to have laid the foundation of his future fortune; for by him he was introduced to Messrs Bolton and Watt of Soho, near Birmingham. With these gentlemen he remained but a few months, for the purpose of receiving explanations respecting the plan of the Albion Mills, then erecting, the machinery of which he superintended. This exactly suited his views; for, conscious of his own powers, he deemed the capital the proper theatre to try their strength, and in this he was not mistaken.

In proceeding from Edinburgh to Soho, he had taken the route by Carlisle, Lancaster, Liverpool, and Manchester, for the purpose of visiting the different mills and public works in those great commercial and manufacturing towns; and the remarks which he made on the bridge then building over the Lune at Lancaster, on the docks at Liverpool, and more particularly on the Bridgewater Canal, are distinguished by great sagacity, and were of essential use to him afterwards. On leaving Soho, he again made a tour through the manufacturing districts of Leeds, Sheffield, Rotherham, and Newcastle.

For some time after he was settled in London, the Albion Mills, of which Bolton and Watt and Mr Wyatt were the projectors and leading proprietors, and who engaged him to superintend the execution of the mill-work, occupied a great share of his attention. Mr Watt, in his Notes to Professor Robison's Account of the Steam-Engine, says, that, "in the construction of the mill-work and machinery, they derived most valuable assistance from that able mechanician and engineer Mr John Rennie, then just entering into business, who assisted in placing them, and under whose direction they were executed." He also says, that the machinery, which used to be made of wood, was here made of cast iron, in improved forms; and thinks that this was the commencement of that system of mill-work which has proved so beneficial to this country. In fact, Rennie's mills are the most perfect species of mechanism in that way that exist, distinguished by a precision of movement and a harmony and proportion of parts that now serve as models throughout the empire. His water-mills are so accurately calculated, that every particle of water is effectively employed, and none of it lost, as in the common mode of constructing water-wheels. There is reason to believe that the difficulties which occurred at the Albion Mills with regard to the ebb and flow of the tides, and which required all the ingenuity of that extraordinary genius, Mr Watt, first led Mr Rennie to the study of that branch of civil engineering connected with hydraulics and hydrodynamics, and in which he soon became so celebrated as to have no rival after the death of Smeaton, in whose steps, he always used to say, he was proud to follow.

Our limited space will not permit us to enter upon even an enumeration of all his great works, much less to give any detailed account of them; we must therefore content ourselves by mentioning some of the most important designs and undertakings in his threefold capacity of mechanist, architect, and civil engineer; three branches of art so intimately blended as scarcely to admit of a separation.

First, as a Mechanist. Immediately after the completion of the Albion Mills, in 1786 or 1787, Mr Rennie's reputation was so firmly established in everything connected with mill-work, that he found himself in a very extensive line of business. To him the planters of Jamaica and of the other West India islands applied for their sugar-mills, which he constructed in a manner so superior to the old ones, that he soon obtained almost a monopoly of these expensive works. The powder-mill at Tunbridge, the great flour-mill at Wandsworth, several saw-mills, the machinery for various breweries and distilleries, were mostly of his manufacture; and wherever his machinery was required to be impelled by steam, the incomparable engines of his friends Messrs Bolton and Watt supplied the moving power; but, contrary to what has been stated in some of the public journals, he never had the least concern in directing, contriving, or advising any one part or movement of the steam-engine. He also constructed those beautiful specimens of machinery, the rolling and triturating mills, at the Mint on Tower Hill, to which Bolton and Watt's engines give motion; and, at the time of his death, he was engaged in the construction of a rolling-mill, and similar machinery, for the intended mint at Calcutta.

As a bold and ingenious piece of mechanism, which may be considered as distinct from positive architecture, there is nothing in Europe that can bear a comparison with the Southwark Bridge. The three immense arches, the centre one of 240, and each side arch of 210 feet span, consist entirely of masses of cast iron, of various forms and dimensions, put together on the same principle as a similar fabric of hewn stone; a method of employing iron which may be considered to form a new epoch in the history of bridge-building. Various sinister predictions were entertained against this light and beautiful bridge, which was to be rent in pieces by the expansive power of the first summer's heat, or, if it escaped that, by the contraction of the first winter's cold; but it has stood the test of many winters and summers, and appears not to feel either. Mr Rennie was applied to by the East India Company for the design of a cast-iron bridge to be thrown over the river Goomty at Lucknow, at the desire of the nabob vizier of Oude. It consisted of three arches of cast iron, the centre arch ninety, and each of the other arches eighty feet span. The arches were cast, and a superintending engineer sent out with them; but on their arrival, the nabob, in one of those moments of caprice to which eastern despots, even in their impotency, are so liable, changed his mind, and would not allow it to be put up.

Secondly, as an Architect. Since there are few parts of civil engineering that do not occasionally require the aid of architecture, Rennie, at a very early stage of his progress, was called upon for a display of his skill in this line. Amongst his first undertakings in either line was that of the Lancaster Canal, which presented many difficulties, and, amongst others, that of carrying it by an aqueduct over the Lune, so as not to interrupt the navigation of the river. Being one of the largest fabrics of its kind in Europe, and of a pleasing design, it is an object that arrests the attention of strangers, and is very generally admired. The bridges of Leeds, Musselburgh, Kelso, Newton-Stewart, Boston, New Galloway, and a multitude of others, attest the architectural skill, the solidity, and, we may add, the good taste of Rennie; whilst a thousand smaller ones, with the various locks, wharf-walls, quays, embankments appertaining to canals, rivers, and harbours, in every part of the united kingdom, are so many proofs of his diversified talent, and his skill in adapting the means to the end. The breakwater in Plymouth Sound can scarcely be called an architectural work, but it is constructed on true hydrodynamical principles, and so gigantic in its dimensions, and cyclopean in its structure, as to defy equally the force of the waves and the ravages of time. To Mr Whidby, who zealously superintended the execution of this immortal work, the highest praise is also due; nor was the plan finally determined on without his advice and assistance.

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[1] Loch's Essays on the Trade, Commerce, Manufactures, and Fisheries of Scotland, vol. iii. p. 211.

But the architectural work which, above all others, will immortalize the name of Rennie, is the Waterloo Bridge, a structure which, even foreigners admit, has no parallel in Europe (and if not in Europe, certainly not in the whole world) for its magnitude, its beauty, and its solidity. That a fabric so immense, presenting a straight horizontal line, stretching over nine large arches, should not have altered more than a few inches, not five in any one part, from that straight line, is an instance of firmness and solidity utterly unknown, and almost incredible;[1] but all Rennie's works have been constructed for posterity. He made nothing slight; nor would he engage in any undertaking where, from an ill-judging economy, a sufficiency of funds was not forthcoming to meet his views.

Another work, executed from a design of his, is that of the stone bridge over the Thames, by which the old London Bridge, so long the disgrace of the metropolis, was replaced. His design, which was selected by a committee of the House of Commons, out of at least thirty that were offered, consisted of a granite bridge of five arches, the centre one of 150 feet span, being the largest stone arch in the world which has been constructed in modern times. This great work, an account of which will be found under the head LONDON, cannot but form a remarkable feature in the future history of the capital. For of the five bridges which connect the two banks of the Thames, three have been built from the designs of one man; a fact which must throw a lustre on the name of Rennie, and be regarded with a feeling of pride by the most distant connection of his family.

Thirdly, as a Civil Engineer. The first great attempt in this line of his profession was the survey and execution of the Crinan Canal, a work remarkable for the multitude of practical difficulties that occurred throughout the whole of this bold undertaking; it being necessary in many places to cut down through solid rock, to the depth of sixty feet; and it is rather remarkable, that the second undertaking, the Lancaster Canal, was also replete with difficulties, and called for the exercise of his skill as an architect, as we have already seen in noticing the aqueduct over the Lune. But these two works established his reputation as a civil engineer, and his opinion and assistance were required from all quarters. His faculties were now called into full play, and they expanded with the demands made upon them. The rage for canals had pervaded every part of the kingdom, and scarcely any of these useful means of conveyance and communication was thought of without a previous consultation with Rennie; so that in a few years the surveys he was called upon to make were so numerous, that he knew the surface of England as it were by heart, and could tell at once, when a canal was projected, whereabouts the line of it ought to be carried. The following are some of the most important of those the execution of which he personally attended: Aberdeen, Brechin, Grand Western, Kennet and Avon, Portsmouth, Birmingham, Worcester, besides many others.

But the resources of his mind were displayed in all their vigour in the plans and construction of those magnificent docks, which are at once an ornament to the capital, and of the utmost utility to commerce and navigation. Nor are these splendid and useful works confined to the metropolis. The docks at Hull, Greenock, Leith, Liverpool, and Dublin, attest his skill; and the harbours of Queensferry, Berwick, Howth, Holyhead, Dunleary (now called Kingstown Harbour), Newhaven, and several others, owe their security and convenience to his labours.

But even these works, splendid as they are, must yield to what he has planned and executed in her majesty's dockyards at Portsmouth, Plymouth, Chatham, and Sheerness. The latter was a mere quicksand of forty feet in depth, mixed with mud and the wrecks of old ships; the whole of which was excavated, and a magnificent basin constructed, with a beautiful surrounding wall of granite, with which three of the finest dry docks in the universe communicate; and that important dock-yard, which may be said to command the mouths of the Thames and the Medway, from being an unhealthy and detestable place, and wholly inefficient for its purpose, is now, by being raised many feet, and laid out with skill and judgment, one of the most convenient in the kingdom. He also planned the new naval arsenal at Pembroke, which is considered as a perfect model for a building-yard. But his plan for the projected naval arsenal at Northfleet on the Thames was far superior to all in design; and upon a scale so grand as to be capable of containing afloat two thirds of the whole navy, with dry docks and slips for repairing and building ships of all classes to the same extent, and with all manner of storehouses, workshops, and manufactories of all such articles as were required for consumption in the navy. But the estimated sum of eight millions, which would probably have amounted to ten, induced the government to pause, and it was finally deemed prudent to abandon the design altogether.

Mr Smeaton, we believe, was the first who used the diving-bell effectually for building with stone under water; but the machine he employed for that purpose was very defective, and could be used only in certain situations. Rennie, however, by improvements in the instrument itself, and in the machinery by which its movements could be regulated, was enabled to carry on the finest masonry, and the foundations of sea-walls, piers, and quays, as well under water as above it. The repairing of the pier-head of Ramsgate Harbour was a remarkable instance of this kind. The violence of the waves, acting upon the bad quality of the stone, had so completely undermined it, that the stability of the whole pier began to be endangered. It was from ten to thirteen feet below the level of low water, spring-tides; yet, by means of the improved diving-bell and its apparatus, the pier-head was not only effectually secured, but rendered more solid and durable than it originally had been. In the harbour of Howth the diving-bell was of the utmost use; and it is remarkable enough, that the masons who have been for a little while accustomed to work under water prefer it, at least the Irish masons do, to working in the air, ennie.

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[1] The bridge of Neuilly, which the vanity of the French led them to rank as superior to that of Waterloo, actually sunk 23 inches.

it being cooler in summer, and warmer in winter; though an increase of pay for submarine work is probably the real cause of preference.

The last effort of Rennie's genius to which we shall advert, was the drainage of that vast tract of marsh land bordering upon the rivers Trent, Witham, New Welland, and Ouse, which for centuries past had baffled the skill of some of the ablest men in that department of civil engineering. Upon the same principles, he laid down a grand scheme for draining the whole of that immense district known by the name of the Bedford Level, which has in part been carried into execution by the completion of the Eau-brink Cut, near Lynn. The estimate he made for draining the whole amounted to L.1,200,000.

Such are some of the grand undertakings which Rennie, during the last thirty years of his life, was either employed to project or to carry into execution, and which, on a rough estimate, collected from his valuable Reports, did not fall far short of forty millions sterling; about twenty millions of which were expended under his own immediate superintendence. Indeed, few great works were carried on, either by the public or individuals, on which he was not either employed or consulted. His industry was very extraordinary. Fond of the society of his select friends, and of rational conversation, he never suffered amusement of any kind to interfere with his business, which seldom engaged him less than twelve hours, and frequently fifteen, in the day. His conversation was always amusing and instructive. He possessed a rich fund of anecdote, and, like his old friend James Watt, told a Scotch story admirably. As a travelling companion, he was highly entertaining; he knew everybody on the road, and everybody knew John Rennie. Of an ardent and anxious mind, and naturally impetuous, he was gifted with the most perfect self-control; and the irritation of the moment was seen but as a light summer's cloud, passing across his finely-marked features, which were on so large a scale, though blended with much mildness as well as dignity, as to obtain for his noble bust by Chantrey, when exhibited in Somerset House, the name of *Jupiter Tonans*.

Were we to seek for a parallel to Rennie, the name of Smeaton would at once suggest itself. Their boyhood was employed precisely in the same manner, in making models of pumps and windmills, whilst their school-fellows were at play; their pursuits in manhood were similar, and their paramount success pretty nearly the same. But the spirit of speculation and improvement was but just springing up when Smeaton finished his career, and when Rennie began his. He was, in fact, the successor of Smeaton. There was a strong characteristic likeness between Rennie and the late Mr Ramsden. The pursuits of the former embraced a wider sphere of action, but they both arrived at their proposed objects by the most simple and obvious, and, at the same time, most effectual means. They were both equally clear in their mode of communicating information to others; and it is sufficiently remarkable that, in their illustrations, both of them had recourse rarely to any other instrument than a two-feet rule, which each always carried in his pocket. Many a time has the writer of this article derived instruction from the two-feet rules of John Rennie and Jesse Ramsden. They were both equally communicative when they saw that information was desired; and nothing like professional jealousy, or selfish feelings, actuated either of these ingenious men, who, on the contrary, were always kind and condescending to the more humble artists of their respective professions.

Mr Rennie possessed considerable skill in bibliography; and being a zealous and liberal collector, he succeeded in forming a very valuable library, consisting of the best and rarest books in all the branches of science and art, of voyages and travels, and many curious books in the black letter; whilst in his own department it contained every work of the least merit, in whatever language it might be written. He had, besides, a good collection of mathematical and astronomical instruments, and frequently spoke of erecting an observatory, but did not live to carry his intention into execution. He had for some years laboured under a disease of the liver, which had apparently yielded to the usual treatment; but a relapse took place, and on the 16th of October 1821, after a few days' illness, he expired without a struggle, in the sixtieth year of his age.

Rentering
||
Repentance.

Mr Rennie, in 1789, married Miss Mackintosh, who died in 1806, leaving a family of seven young children, six of whom are now living. The two eldest, George and John, are successfully following the profession, and promise to tread in the footsteps, of their able and excellent father.

Sixteen mourning coaches, filled with his friends, mostly men of eminence in the arts, sciences, or literature, followed his hearse to St Paul's, where his remains were interred near those of Sir Christopher Wren. A plain granite slab covers his grave, on which is the following appropriate inscription:

Here lie the mortal remains of
JOHN RENNIE,
Civil Engineer,
F. R. S. L. & E. F. A. S. &c. &c.
Born at Phantassie, in East Lothian, 7th June 1761;
deceased in London 4th Oct. 1821.
THIS STONE
testifies his private virtues,
and records
the affection and the respect of
his family and his friends;
but
the many splendid and useful works
by which,
under his superintending genius,
England, Scotland, and Ireland,
have been adorned and improved,
are
the true monuments
of
his public merit.

(M.)

RENTERING, in the manufactories, the same with fine drawing. It consists in sewing two pieces of cloth edge to edge, without doubling them, so that the seam scarcely appears; and hence it is denominated *fine drawing*. It is a French word meaning the same thing, and is derived from the Latin *retrahere*, compounded of *re*, *in*, and *trahere*, because the seam is drawn in or covered.

RENTERING, in tapestry, is the working new warp into a piece of damaged tapestry, whether eaten by the rats or otherwise destroyed, and on this warp restoring the ancient pattern or design. The warp must be of woollen, not linen. Amongst the titles of the French tapestry-makers is included that of renterers. Fine drawing is particularly used for a rent or hole, which happens in dressing or preparing a piece of cloth artfully sewed up or mended with silk. All fine drawings are reckoned defects or blemishes, and should be allowed for in the price of the piece.

RENVERSE, INVERTED, in *Heraldry*, is when any thing is set with the head downwards, or contrary to its natural way of standing. Thus, a chevron renverse is a chevron with the point downwards. The same term is also used when a beast is laid on its back.

REOUNZEIK, a town of the Birman empire, situated on the western bank of the Irrawaddy. It carries on a very considerable trade with Rangoon, the chief article being teak timber. Long. 95. 25. E. Lat. 17. 45. N.

REPENTANCE, in general, means sorrow for anything past. In theology it means such a sorrow for sin as produces a change of life, or such a conviction of the evil and danger of a sinful course as is sufficient to produce shame and sorrow in the review of it, and effectual resolutions of amendment.

REPRESENTATIVE, one who personates or supplies the place of another, and is invested with his right and authority. Thus the House of Commons is composed of the representatives of the people in parliament. (See PARLIAMENT.)

REPRIEVE, in *Criminal Law* (from *reprendre*, to take back), is the withdrawing of a sentence for an interval of time, by which means the execution is suspended.

REPRISALS, a right which princes claim of taking from their enemies anything equivalent to what the latter unjustly detain from them or their subjects. For as the delay of making war may sometimes be detrimental to individuals who have suffered by depredations from foreign potentates, our laws have in some respects armed the subject with power to impel the prerogative, by directing the ministers of the crown to issue letters of marque and reprisal upon due demand; the prerogative of granting which is nearly related to, and plainly derived from, that of making war, the former indeed being only an incomplete state of hostilities, and generally ending in a formal denunciation of war. These letters are grantable by the law of nations, whenever the subjects of one state are oppressed and injured by those of another; and justice is denied by that state to which the oppressor belongs. In this case letters of marque and reprisal (words used as synonymous, and signifying, the latter a taking in return, the former the passing the frontiers in order to such taking) may be obtained, in order to seize the bodies or goods of the subjects of the offending state, until satisfaction be made, wherever they happen to be found. And indeed this custom of reprisals seems dictated by nature herself; for which reason we find in the most ancient times very notable instances of it. But here the necessity is obvious of calling in the sovereign power to determine when reprisals may be made, else every private sufferer would be a judge in his own cause. In pursuance of this principle, it is with us declared by the statute 4 Henry V. c. 7, that if any subjects of the realm are oppressed in time of truce by any foreigners, the king will grant letters of marque in due form to all who feel themselves aggrieved. The form to be observed is thus prescribed: The sufferer must first apply to the lord privy-seal, and he shall make out letters of request under the privy-seal; and if, after such request of satisfaction made, the party required do not within a convenient time make due satisfaction or restitution to the party aggrieved, the lord chancellor shall make him out letters of marque and reprisal under the great seal; and by virtue of these he may attack and seize the property of the aggressive nation, without hazard of being condemned as a robber or a pirate.

REPROBATION, in *Theology*, means the act of abandoning, or state of being abandoned, to eternal destruction, and is applied to that decree which God has made from all eternity to punish sinners who shall die in impenitence; in which sense it is directly opposed to election. When a sinner is so hardened as to feel no remorse or misgiving of conscience, it is considered as a sign of reprobation; which by the casuists has been distinguished into positive and negative. The first is that by which God is supposed to create men with a positive and absolute resolution to damn them eternally. This opinion is countenanced by St Augustin and other Christian Fathers, and is a peculiar tenet of Calvin and most of his followers. The Church of England, in the Thirty-nine Articles, teaches something like it; and the Church of Scotland, in the Confession of Faith, maintains it in the strongest terms. But the notion is generally exploded, and is believed by no rational divine in either church, being totally injurious to the justice of the Deity. Negative or conditional reprobation is that by which God, though he has a sincere desire to save men, and furnishes them with the necessary means, so that all, if they will, may be saved, yet sees that there are many who will not be saved by the means, however powerful, which are afforded them; though by other means which the Deity sees, but will not afford them, they might be saved. Reprobation respects angels as well as men.

REPRODUCTION is usually understood to mean the restoration of a thing before existing, and since destroyed. It is very well known that trees and plants may be raised from slips and cuttings; and there are some animals which have the same property of being reproduced.

REPTILIA. REPTILES.[1]

THESE form the third great division of the animal kingdom, and in systematic works on natural history occupy an intermediate position between the class of birds and that of fishes.[2]

As in tracing the modifications of various organs, from the zoophytical and radiated animals to the molluscous, from these to the articulated classes, and onwards through the fishes to the reptile tribes, it is among the last named that we first perceive the passage from the truly aquatic to the terrestrial or air-breathing animal,—so the respiratory organs of such tribes are naturally those which excite the greatest and most peculiar interest. Among the more important classes of animals, respiration is effected in one or other of two ways; 1*st*, either by certain internal cellular sacs, for the reception of air, called *lungs*, which communicate with the mouth and nose by means of the trachea or windpipe; or, 2*dly*, by external organs called *gills*, which require either to float in water, or to be in some other way continually immersed in that fluid. The object of both contrivances is to subject the blood to the influence of vital air, and this end is obtained very admirably, though in a different way, by each. All mammiferous animals or quadrupeds, including whales, all birds, and all reptiles (in the perfect state), possess the first form of the respiratory organs; all fishes, and several reptiles in their adolescent condition, are distinguished by the second. But even among such as are furnished with true lungs, we observe different modifications of the circulating system.

The principal characteristic of reptiles in general consists in this, that only a portion of the blood is transmitted through the lungs, the remainder being projected by the heart directly to the other parts of the body, without being specially subjected to the influence of the respiratory organs; whereas, in the higher classes, such as man, the rest of the mammalia, and birds, the whole of the blood must pass by the lungs before it is retransmitted to the more distant parts of the circulating system. The amphibious habits of such reptiles as are unprovided with gills, result in a great measure from the power which they thus possess of carrying on a partial circulation of the blood, independent of respiration. The respiration of animals, or the process by which the blood is oxygenated, becomes weaker and less frequent in proportion to the diminution which takes place in the quantity of blood transmitted to the lungs, compared with that which passes directly from the heart; and as it is respiration which warms the blood, and produces in the fibres their susceptibility of nervous irritation, it follows, as observed by Cuvier, that the blood of reptiles is cold, and their muscular strength much less than that of birds and quadrupeds. The seat of their sensations is also much less centralised than in the last-named classes, and hence many of them exhibit life and motion long after their heads have been severed from their bodies.[1]

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[1] The natural history of reptiles is frequently treated of under the term ERPETOLOGY, from ἑρπητον, *reptile*, and λογος, *discourse*. The verb ἕρπειν signifies *to creep*.

[2] See our general sketch, under the title of ANIMAL KINGDOM, in this Encyclopædia, vol. iii. pp. 155-180.

A truly amphibious animal, according to the proper meaning of the term (which is derived from ἀμφι, *on both sides*, and βιος, *life*), ought to possess the power of breathing under water like a fish, and of respiring atmospheric air like a land animal. According to this interpretation, neither seals, nor beavers, nor even whales, are truly amphibious, for they cannot sustain their existence under water except by the use of a certain portion of air which they have previously inspired at the surface. In like manner, neither the frog nor the tadpole is amphibious (unless it may be for a short intermediate period, or state of transition); for the former seeks the water merely as a place of temporary resort, in which it cannot breathe, and the latter is entirely aquatic, being unprovided with lungs, and consequently unable to respire, except through the medium of water. A frog, therefore, can only be said to be amphibious in as far as it possesses, at two different periods of its life, the faculty of living first in the water and then on the land. Born with gills, and destitute of external members, its form and functions are originally rather those of a fish than of a reptile; but as it advances in growth, the four limbs become developed, the tail decreases and disappears, the jaws are formed, and the gills absorbed, and their functions supplied by lungs. But the peculiar structure of the heart, already mentioned, enables these and other species to remain submerged for a great length of time.

Among the many wonderful anomalies, however, with which the kingdom of nature presents us, there exist two truly amphibious animals, the *proteus* and the *siren*, both of which are provided at one and the same time with the gills of a fish and the lungs of a terrestrial creature. But their propensities are decidedly aquatic. The former inhabits certain subterranean waters in Carniola, the latter rejoices in the muddy marshes of South Carolina.[2] Both will be hereafter noticed.

The amount of respiration is by no means so fixed or determinate among reptiles as it may be said to be in quadrupeds and birds, but varies with the proportion which the diameter of the pulmonary artery bears to that of the aorta. Thus, turtles and lizards respire much more than frogs and others of the class; and from this results a much greater difference in energy and sensibility between different tribes of Reptilia, than exists among the members of the class of quadrupeds or birds. Reptiles also may be said to exhibit a much greater variety of form, aspect, and condition, than either of the classes just named; and it is in their production that nature (as we are wont to term the powers of the Omnipotent Creator), has invented the most extraordinary forms and modifications which exist among the vertebrated division of the animal kingdom.

No reptile is known to hatch its eggs, and in the Batrachian order (frogs, toads, &c.) fecundation does not take place till after the female has excluded the so-called ova, which in such cases are covered merely by a slight and simple membrane, bearing no resemblance to a shell. The young of this Batrachian order, on leaving the egg, bear the general form of fishes, and are, moreover, furnished with gills, which a few of them retain even after acquiring lungs, and assuming the other attributes of maturity. Among several of the egg-laying species, the included young are not only formed, but far advanced at the period of laying; while a few, such as vipers and certain lizards, are actually born alive, being hatched within the body of the mother. Hence the expression by which these are designated, of *ovo-viviparous*. Some even of those which usually lay eggs may be rendered viviparous by a short retardation of the process of laying, as effected by M. Geoffroy in the case of certain snakes by merely depriving them of water.

Although many reptiles are active leapers, and even run with rapidity for a short distance, the coldness of their blood, and proportional want of muscular power, induce on the whole an indolent habit. They are probably, of all vertebrated animals, the least perfectly endowed with the power of migratory movement. The brain is proportionally very small, a sea-tortoise, for example, weighing twenty-nine pounds, having been found to possess brains to the weight only of two drams, that is, equal to not more than an eighteen hundred and fifty-sixth part of the entire animal. Now, we know, that in several small birds and quadrupeds, the brain exceeds a thirtieth part of the remainder of the body. In reptiles, indeed, the brain seems less necessary than among other vertebrated beings, to the exercise of the animal and vital functions, and their sensations are less referable to a common centre. Connection with the nervous system is also much less necessary to the contraction of their fibres, and a portion of their flesh possesses its irritability long after separation from the rest of the body. The heart beats for several hours after being extracted, and the said extraction does not prevent the body itself from moving about for a considerable time. The cerebellum in several species is extremely small, a fact regarded as being in exact accordance with their indolence of movement.

The small size of the pulmonary vessels admits of reptiles suspending their respiration without arresting the course of the blood, and they can accordingly dive more easily, and continue submerged for a longer time, than either mammiferous quadrupeds or birds. The cellules of the lungs being less numerous, as having fewer vessels to lodge upon their parietes, are much wider, and these organs have sometimes indeed the form of simple sacs scarcely cellular.

They are all provided with a trachea and larynx, although many are entirely mute. Their blood being naturally cold, they have no need of such integuments as fur or feathers to retain the heat, and are covered either by scales or a naked skin.

Although no portion of the organ of hearing is external in reptiles, yet among crocodiles there is an appearance of an outer *meatus auditorius*, owing to the skin forming a thick cover over the tympanum. This peculiar formation is sufficient to explain a passage in Herodotus, who states, that the Egyptians were in the habit of suspending jewels from the ears of the crocodile.

The digestion in reptiles is extremely slow, and all their sensations are obtuse. In cold, and even in temperate climates, they fall into a state of torpor during the prevalence of chilly weather, being more than any other class of creatures under the influence of temperature,—“ frigida æstuantium animalia ;” and what is truly singular, is the fact mentioned by Humboldt, that the inverse cause produces a corresponding effect on some of the species of tropical climates, the caymans or crocodiles of South America becoming torpid, and entombing themselves in mud, during the prevalence of the hottest season.

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[1] "Les muscles des reptiles conservent plus long temps encore leur irritabilité que ceux des poissons. Nous avons vu des crapauds, des salamandres, des tortues, des serpens, privés de la tête et dépouillés de leur peau depuis plusieurs jours, et maintenus humides, produire encore des mouvemens pendant des semaines entières; un tortue terrestre, du poids des près de 40 kilogrammes, morte depuis plusieurs jours, dont le cou était tombé dans cette sorte de flaccidité, suite de la raideur qui survient après la mort, dont les yeux en particulier avaient la cornée dessechée, manifester des mouvemens par la contractions et la retraction des membres, toutes les fois qu'on stimulait, en les piquant, les muscles des membres postérieurs." (Dumeril et Bibron, *Erpétologie*, i. 41.)

[2] See Wilson's *Illustrations of Zoology*, vol. i.

Indeed, among the more singular features in the economy of the reptile race, may be numbered their power of enduring long-continued abstinence, and the lethargic state, infinitely more profound than the winter sleep of quadrupeds, into which they yearly fall. In connection with this subject, Mr Jacobson of Copenhagen has recognised in reptiles a special arrangement of certain vessels which constitute a peculiar *venous system.* This system may be said to exist more or less in all the race ; but, rudimentary in the tortoises and crocodiles, it shows its chief development among the other Saurians, and the Ophidian and Batrachian groups. “ It is composed of the veins of the abdominal members, the pelvian or caudal veins, the hinder veins of the kidneys, the veins of the oviductus, a great portion of the veins of the skin, of those of the muscles of the abdomen, and of those of certain organs peculiar to the reptiles. These veins combine, and form one or many trunks, which proceed either into the vena porta or the liver, or into both. What especially distinguishes this system is, that in it a part of the veins of the organs of locomotion, and of the skin, proceed to distribute themselves into the liver. There is no other example of this among the vertebrated animals. Certain special organs appear connected with this venous system in a peculiar manner, and are regarded by Mr Jacobson as proper for secreting and preserving a nutritive juice, destined to be re-absorbed in the rigorous months of the severe season, during the hybernal slumber of these animals.”[1]

In regard to the geographical distribution of reptiles in general, we shall here briefly observe, that they augment in number as we advance towards the equatorial regions. While Sweden possesses scarcely a dozen snakes and lizards, about three or four frogs and toads, and not a single tortoise, the temperate parts of Europe produce about forty snakes and lizards, and several of the tortoise tribe. In Scandinavia, however, although the species are so few in number, the individuals are much more abundant than in Britain ; from which we infer, that it is rather the want of strong continuous summer heat than the actuality of our winter’s cold, that is unfavourable to the production of reptiles in our cloudy clime. As soon as we gain the southern extremity of Spain, the number of species in these tribes greatly increases, and in Andalusia the African complexion of the country is still further manifested by the frequent appearance of the chameleon. On proceeding further south, not only does the number of reptiles increase, but they also augment in size, splendour, and ferocity, till from the Tropic of Cancer onwards and beyond the line, we meet with crocodiles, caymans, boas, and other giants of the reptile race. Several species, however, even in sultry latitudes, are subjected by their peculiar position to the influence of severe cold. Thus the *axolotl* of Mexico occurs in the chill waters of lakes elevated above 8000 feet from the surface of the sea ; and the salamander (a water newt) of Europe is frequently found frozen up in ice in early spring, without being destroyed. Indeed, Dufay has remarked, as a singular circumstance, that those very animals of which it once was fabled they could withstand the fiery flames, are in reality endowed with the almost equally surprising power of resisting frost, so generally fatal to the life of reptiles.

Although we have now endeavoured to state a few of what may be regarded as the generalities of the reptile class, yet it must be borne in mind, that no great division of the animal kingdom exhibits such a singular diversity of form and aspect, or is more liable to exceptions from whatever features we may incline to consider as general characteristics. “ Aussi les reptiles,” says Baron Cuvier, “ presententils des formes, des mouvements, et des propriétés beaucoup plus variés que les deux classes précédentes (quadrupeds and birds) ; et c’est surtout dans leur production que la nature semble s’être jouée à imaginer des formes bizarres, et à modifier dans tous les sens possibles le plan général qu’elle a suivi pour les animaux vertébrés, et spécialement pour les classes ovipares.” Among no animals indeed do we meet with beings of more singular forms than in the class Reptilia, many of which exhibit an aspect so unusual, so grotesque, and even so formidable, that it would be difficult for the imagination of the poet or the painter to exceed the “ dread realities” of nature. Although the majority are oviparous, some, as we have said, produce their young alive. Many have four legs, some only two, which vary from an anterior to a posterior pair, while the entire tribe of serpents have no legs at all. Some have their bodies more or less closely beset by scales, varying in size from extreme tenuity to the strength and thickness of mailed armour ; many, as the numerous tribes of frogs, are defended only by a soft and mucous skin ; as many more are shut up in a strong bony box-like covering, within which they dwell, as in an impregnable castle. The greater number possess a tail, but several entirely want that organ. Numerous tribes live unceasingly in the water, others pass their infancy in moist abodes, their maturer years on terra firma, provided in the former case with gills, in the latter with lungs for respiration. Marshes and muddy swamps, the dry and desert sands, the umbrageous woods, the upland mountains, the “ resounding shores,” are all alike pervaded by one or many of the numerous forms of reptile life. The subterranean proteus fears the light, though dealing in no deeds of darkness ; the agile lizard, “ all scaled silver bright,” basks delighted beneath the beams of the most brilliant sun, “ no cloud in heaven.” Some are fierce and carnivorous, others gentle and herbivorous. The most deadly poison is distilled by many, while entire tribes are quite innocuous ; and while some are resplendent in burnished gold and azure, “ like mailed angels on a battle-day,” as many exhibit the last stage of ugliness in

> worse
> Than fables yet have feigned or fear conceived,
> Gorgons, and hydras, and chimeras dire.

It has been observed, that in the popular superstitions of various countries, the reptile race have been almost always clothed in revolting attributes, and that the worship accorded them was one not of gratitude, but fear.[2] Victor or vanquished, they seem ever to have borne a cruel and pestilential character, in opposition to the welfare of the human race ; and the prowess both of gods and men was called into frequent and vigorous exercise for their subduction. “ Glorious Apollo” pursued the enormous Python with his unerring shafts ; the dreadful Acheloüs was strangled by the son of Jove, in spite of folds “ voluminous and vast ;” the Hesperian gardens and the golden fleece were protected by fierce dragons ; Perseus, from the dripping head of Medusa, sowed with serpents the arid Libyan sands ; and gorgons and furies, discord and envy, are armed by the poets with snakes, “ as appropriate emblems of their ministry of vengeance.”

It was chiefly on the comparative consideration of the amount of respiration, and of the organs of movement, that

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[1] Griffith’s Animal Kingdom, ix. 182.

[2] Ibid. 20.

M. Brogniart founded the four great orders of the class Reptilia, which are now so generally adopted in the works of systematic authors.[1] They are as follows.

1*st*, The CHELONIAN REPTILES (turtles, tortoises, &c.), of which the heart is provided with two auricles, and the body, borne on four legs, is contained as it were within an upper and an under buckler, formed by a peculiar structure of the ribs and sternum.

2*d*, The SAURIAN REPTILES (crocodiles, lizards, &c.), which have likewise two auricles and four legs, but the body is covered with scales.

3*d*, The OPHIDIAN REPTILES (or serpents), which have a heart furnished with two auricles, but the body is destitute of legs.

4*th*, The BATRACHIAN REPTILES (frogs, toads, &c.), in which the heart has only a single auricle, the body is naked, and the majority of species undergo a kind of transition as they advance in age, from the form of a fish with gills to that of a quadruped with lungs. Some, however, as already mentioned, never lose their gills, and a few have only a single pair of legs.

Our notices of the various genera of the different orders must be here extremely brief; and in the following slight sketch we shall adhere, as we have done in most of our zoological treatises, to the systematic exposition of Baron Cuvier.[2]

ORDER I.—CHELONIA. CHELONIAN REPTILES.

The various groups of this order are known to English readers by the general names of *tortoise* and *turtle*,—the former appellation being usually bestowed on those which dwell on land, the latter on such as inhabit water. The heart is composed of two auricles, and of a ventricle with two unequal chambers communicating with each other. The blood from the body enters into the right auricle, that from the lung into the left; but both streams mingle together more or less in passing by the ventricle.

All the species of this order are distinguished at first sight by the peculiar armature in which the body is contained, and which consists of an upper and under buckler, nearly meeting along their edges, and permitting only the head, limbs, and tail to appear externally. The upper buckler, called the *carapace*, is formed by the ribs, which amount to eight pair, extended and united by toothed sutures between, and having bony plates adhering to the annular portion of the dorsal vertebræ, and so connected that all these parts are rendered motionless. The under buckler is called the *plastron*, and is composed of portions which represent the sternum, and which are usually nine in number. A kind of lateral edging or frame-work, consisting of osseous pieces, bearing some analogy to the sternal or cartilaginous portion of the ribs, and which in one sub-genus even continue cartilaginous, surrounds the carapace, binding and uniting together the ribs by which it is composed. Thus the cervical and caudal vertebræ alone retain the power of distinct movement. See Plate CCCCXXX. fig. 1.

These two bony envelopes being covered immediately by skin or scales, the shoulder-blade and all the muscles of the neck and fore-arms, instead of having their attachments over the ribs and spine, as in other animals, are supported from beneath these parts; and the same peculiarity occurs in relation to the bones of the lower extremity and the muscles of the thighs, so that, as Baron Cuvier observes, a turtle may be termed "*un animal retourné*," as if it had been turned inside out.

The vertebral extremity of the shoulder-blade articulates with the carapace; and the opposite end, which may be regarded as analogous to the clavicle, articulates with the plastron in such a manner that the two shoulders form a ring through which the œsophagus and wind-pipe pass. A third bony branch, larger than the other two, and directed downwards and backwards, represents, as in birds, the coracoid process, but its posterior extremity is free.

The lungs are much expanded, and lie in the same cavity with the other viscera. The thorax being immoveable in the majority of species, it is by the play of the mouth that the Chelonians respire,—holding the jaws closed, and alternately lowering and raising the hyoid bone. The first movement permits the air to enter by the nostrils, and then the tongue closing the interior opening, the second movement forces the air into the lungs.

The Chelonians have no teeth, but their jaws are furnished with a horny substance like the mandibles of birds, with the exception of the *Chelydes*, in which they are cover-

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[1] *Essai d'une Classification Naturelle des Reptiles*, Paris, 1805.

[2] The following are some of the principal works on reptiles in general. We do not here name those systematic writers who have treated of the class in question merely in the course of their universal exposition of the animal kingdom, although they are elsewhere referred to in the progress of the present treatise.

J. N. Laurenti, *Specimen Medicum, exhibens synopsin Reptilium emendatam, cum experimentis circa venena et antidota Reptilium Austriacorum*, 1768. This work has been since attributed to M. Winterl, a chemist of Vienna, who is merely named by Laurenti, on the terminal page, as having been a co-labourer in his therapeutical experiments. Lacepède, *Histoire Naturelle des Quadrupèdes Ovipares et des Serpens*, 2 vols. 4to, 1788–90. The Abbé Bonnaterre is the author of the text which accompanies the plates of reptiles in the French *Encyclopédie*, under the title of *Tableau Encyclopédique et Methodique des trois Règnes de la Nature* (*Erpétologie et Ophiologie*), 4to, 1789–90. L. J. M. Daubenton composed *Les Quadrupèdes Ovipares et les Serpens*, in *Dictionnaire des Animaux Vertébrés*, tom. ii. part. *de l'Encyclop. Méthod.* J. G. Schneider, the celebrated Greek scholar, has not published any general work on reptiles, but has written extensively on various groups. His productions are the following:—*Amphibiorum Physiologiæ Specim.* i. and ii. 1797. *Amphibiorum naturalis et litterariæ Fasciculus primus, continens Ranas, Calamitas, Bufones, Salamandras, et Hydros, in genera et species descriptos notisque suis distinctos*, 1799. *Fasciculus secundus, continens Crocodilos, Scincos, Chamæsauros, Boas, Pseudoboas, Elapes, Angues, Amphisbænas, Cæcilias*, 1801. Latreille, *Histoire Naturelle des Reptiles*, four vols. small 12mo, 1801. Dr Shaw, *General Zoology*, vol. iii.—*Amphibia*, 1802. F. M. Daudin, *Histoire Naturelle des Reptiles*, eight vols. 8vo, 1802–3. Alex. Brogniart, *Essai d'une Classification Naturelle des Reptiles*, 1805. M. Oppel, *Die Ordnungen Familien und Gattungen der Reptilien, als Prodrom einer Naturgeschichte derselben*, one vol. 4to, 1811. Blas. Merrem, *Tentamen Systematis Amphibiorum*, one vol. 8vo, 1820. A. H. Haworth, A Letter on the Binary Arrangement of the Class of Reptiles, in the *Philosophical Magazine* for 1825, p. 372. F. J. Fitzinger, *Neue Classification der Reptilien*, one small vol. 4to, 1826. Ritgen, A Classification of Reptiles, in *Nova Acta Acad. Nat. Cur.* for 1828. Bory St Vincent, *Résumé d'Erpétologie, ou Hist. Nat. des Reptiles*, 12mo, 1828. J. Wagler, *Naturliches system der Amphibien*, one vol. 8vo, 1830. We have also by the same author an uncompleted work, *Icones et Descriptiones Amphibiorum*, two fascic. folio, 1830, as well as some explications and critical remarks on Seba's plates of reptiles (*Isis*, 1833, ninth cahier, p. 885). J. E. Gray, *Synopsis Reptilium*, part 1st, 1831; and later in the same year, *Synopsis of the species of the Class Reptilia*, in Griffith's *Animal Kingdom*, end of vol. ix. John Muller, *Beitrage fur Anatomie und Naturgeschichte der Amphibien*, in Zeitschrift fur Physiologie von Tiedemann, &c. No. 19, p. 190, 1832. H. T. Schinz, *Naturgeschichte und Abbildungen der Reptilien*, 4 fascic. large 4to, 1833. We conclude the list with a reference to a work already named, and frequently hereafter quoted, the *Erpétologie Générale, ou Histoire Naturelle complète des Reptiles*, of Messrs Dumeril and Bibron (four vols. 8vo, with plates), 1834–38. This work is still in course of publication. It contains as yet only the Chelonian, and a great portion of the Saurian Orders; and when to these are added the Ophidian and Batrachian tribes, we doubt not it will be deservedly regarded as the highest authority extant in all that regards the reptile race. We shall afterwards indicate the principal more special works which apply to particular departments of the subject in hand.

Chelonia.

ed with skin. Their tympanic cavity and palatine arches are fixed to the cranium, and immoveable. The tongue is short, and beset with fleshy filaments. The stomach is simple and strong, the intestines of medium length, and unfurnished with a cæcum. The bladder is very large. The females in this order produce eggs provided with a hard shell. The males of many species may be recognised by the greater concavity of the plastron.[1]

The limbs of Chelonian reptiles being so confined between the carapace and plastron, their powers of locomotion, at least on land, are very limited. They can scarcely raise their bodies above the surface of the ground, and they advance by a slow, awkward, and apparently embarrassed action. But the aquatic species being provided with fin-like members, and dwelling amid a fluid well adapted to their use, the flat and smoothly expanded bodies of these creatures glide along with great ease and considerable swiftness. Such of the land species as inhabit temperate countries pass the colder seasons of the year in a state of torpidity, having previously excavated or taken possession of some secure and subterranean retreat. They are supposed to be extremely long lived. The marine species are more tropical in their distribution; and we are not aware that any hybernation takes place among them. They are often met with many hundred leagues from land. They deposit their eggs on sandy shores, where they are hatched by the heat of the sun,—the process of laying being usually carried on during the night.

The dimensions of animals of this order exhibit a great range, some being only a few inches in length, while others attain to a gigantic size, and weigh many hundred pounds. They are all extremely tenacious of life,—whether under the effects of long-continued abstinence while being conveyed from distant regions, or when suffering from the infliction of grievous wounds. Indeed they will live for months, or, as it is alleged, even for years, without any food, and will show decided symptoms of life and locomotion for several weeks after their heads have been severed from their bodies.

The whole of this order was formerly contained in the old and unrestricted genus Testudo of Linnæus, divided by Cuvier into the five following generic groups, of which the distinctive characters are mainly derived from the form and covering of the carapace, and from the feet.

Genus Testudo, Brogn. Tortoises. Carapace bulged, supported by a solid bony frame-work, and soldered by the greater portion of its lateral edges to the plastron. Legs as if truncated, the toes extremely short, and united almost to the nails, of which there are five to the fore-feet, and four to the hinder, all thick and conical.

The species, most of which subsist on vegetables, are too numerous to be here described, but we shall indicate a few of the more noted or remarkable.

The Greek tortoise (*T. Græca*, Linn.) is the most common of the European kinds, and occurs in most of the countries which surround the Mediterranean, and in several islands of that sea. It is distinguished by its broad and equally bulged carapace, its relieved scales, granulated in the centre, striated on the margins, and spotted, or rather marbled, with black and yellow; in the centre of its posterior margin there is a small prominence slightly curved over the tail. The Greek tortoise lives on leaves, fruits, and insects. It sleeps throughout the winter, pairs in spring, and lays four or five eggs resembling those of a pigeon. It seldom attains to the length of twelve inches, its general extent being from six to eight. This species has been known to reach an extraordinary old age. One of the most remarkable instances has been often recorded. It is that of a tortoise which was introduced into the archiepiscopal garden at Lambeth in the time of Archbishop Laud, about the year 1633, and continued there till 1753, when it died, as was supposed, rather from accidental neglect than the effect of old age. Its shell is preserved in the library of the palace. The Greek turtle is used as an article of food in some of the southern countries of Europe. According to Forskal, it retires under ground in September, and re-appears in February. In this country it hybernates later, and does not emerge so soon. It lays its eggs in June, in a small hole, which it scratches in some sunny spot, and the young are hatched in autumn, being on their first exclusion about the size of walnuts.

Of the foreign species, one of the most remarkable for size is the Indian tortoise (*T. Indica*, Vosm.), first described by M. Perrault. It has been taken on the coast of Coromandel, and sometimes measures four feet and a half from the nose to the tail, with a height or convexity of fourteen inches. The shell is brown, reflected or turned upwards over the neck; and there is a tubercle on each of the three anterior scutella.

Other species are less remarkable for size than for the beautiful distribution of the colours by which they are adorned. Such is the geometrical tortoise (*T. geometrica*, Linn.), which is easily distinguished by the symmetrical regularity with which the yellow rays, and the alternate lines of brown and yellow, are disposed upon the scales of the upper shield. Certain species have the anterior part of the shield moveable, while in others the posterior portion is in that condition. The former constitute the genus Pyxis of Mr Bell, while the latter pertain to the genus Kinixis of that author.

Genus Emys, Brogn. Fresh-water tortoises.

The species of this genus are not distinguishable from those of the preceding by more important characters than the greater separation of the toes, which are terminated by longer nails, and have their intermediate spaces filled up by membrane. The number of the nails is the same, but the form of their feet enables them to indulge in more aquatic propensities. Their envelope is generally of a flatter form than that of the terrestrial species, and the majority live on insects, small fishes, &c. See Plate CCCCXXX. fig. 2.

One of the best known of this group is the speckled tortoise (*T. Europæa*, Schn.; *T. orbicularis*, Linn.), a small species, pretty widely distributed over the southern and eastern countries of Europe. Its carapace is of an oval form, but slightly convex, rather smooth, of a blackish colour, beset with innumerable small yellow spots. Its length seldom exceeds ten inches. This creature inhabits lakes, marshes, and muddy places. Its flesh is esteemed as food, on which account it is sometimes kept in ponds appropriated to the purpose, and fattened with lettuce leaves, bread, and other substances. It may also be kept in a cellar, and fed with oats scattered on the floor. These it eats readily, especially when they have begun to germinate. Its natural food, however, is said to consist of insects, slugs, &c. It deposits its eggs in warm and sandy places, and Marsigli alleges that an entire year elapses before they are hatched.

Another species of this genus is *la Bourbeuse* of the French (*T. lutaria*, Linn.), commonly called the mud-tortoise. It is a small animal, with a flattish brown-coloured shield, and a tail of considerable length, which, instead of being kept bent inwards, is stretched out in walking. It is well known in France, and is particularly plentiful in Languedoc and many parts of Provence. It has been known to occur in such abundance in a lake of about half a league in width in the plain of Durance, that the neighbouring peasantry, on one occasion, almost entirely sustained themselves upon them continuously for three months. Though the species is aquatic, it always lays its eggs on land. When the young are first hatched they do not measure above six lines in diameter. Like most other tortoises, it may be tamed, and its love of slugs and snails makes it a useful adjunct to a garden. Yet it must be borne in mind, that however beneficial to the horticulturist, it is a dangerous inmate of the fish-pond, where it attacks and destroys the inhabitants, first biting them till they become enfeebled through loss of blood, and then dragging them to the bottom, where it quietly devours everything but the bones and some of the cartilaginous parts of the head. The air-bladder also is often left, and, swimming on the surface, gives notice of the depredation done below. The mud-tortoise walks with greater quickness and activity than the ordinary land species, especially on even ground.

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[1] *Règne Animal*, ii. 8.

The painted tortoise (*T. picta*) likewise pertains to this genus. It is a beautiful little creature, with a smooth, rather flattish shield, of a brown colour, and each compartment bordered by a yellow band. It is a North American species, often seen congregated in clear sunny weather along the sides of rivers on stones and trunks of fallen trees, from which it plunges into the water on the slightest disturbance. It swims swiftly, but walks slowly, and is said to be very voracious, sometimes even destroying ducklings, by seizing their feet and dragging them below the water.

A few species with the neck more elongated (such as *T. longicollis*, Shaw) form the genus Hydraspis of Bell. There are also some peculiar species called *tortues à boîte* by the French, in which the plastron or lower shield is divided into two by a moveable articulation. These tortoises can close their carapace, and so shut themselves up as in a box, after having drawn in their head and legs. Such is the close tortoise (*T. clausa*, Gmel.), so called on account of the peculiarity just alluded to. The shell is of great strength, and although the creature itself rarely exceeds a few inches in length, it remains uninjured under a weight of five or six hundred pounds. It occurs in different parts of North America, being usually found in marshy places, though sometimes seen in dry and sultry situations. It feeds on insects, mice, and even snakes, which it is said to seize by the middle, and crush to death by drawing them within its shell.

Others have the tail and limbs by much too large to be withdrawn into the shell. Such is the long-tailed tortoise (*T. serpentina*, Linn.), a fresh-water species, native to the warmer parts of North America, where it is known under the name of snapping turtle. It is of considerable size, sometimes weighing twenty pounds, and seizes upon its prey (fish, ducklings, &c.) with great force and rapidity, stretching out its neck, and uttering a hissing sound. Its grasp is so tenacious that it will suffer itself to be lifted up by a stick rather than quit its hold. The tail is almost as long as the body, and is beset by sharp raised ridges. The plates of the shield assume a somewhat pyramidal form. See Plate CCCCXXX. fig. 3.

Genus Chelonia, Brogn. Turtles, or sea-tortoises. This group differs from all the preceding in its long, flat, fin-like feet, with the toes closely united, and enclosed within the membrane. The first two toes of each foot alone are furnished with nails, one or other of which often drops off at a certain term of life. The different portions of the lower shield do not form a continuous plate, but are variously dentated, and have large intervals covered by cartilage alone. The ribs are narrow, and separate from each other at their outer portion; but the circumference of the shield is occupied throughout by a circle of pieces corresponding to the sternal ribs. The interior of the œsophagus is entirely beset by sharp cartilaginous points directed towards the stomach.

To illustrate the prevailing habits of these curious creatures, we shall extract the following notices regarding several species of sea-turtle, from one of those delightful papers with which Mr Audubon has enlivened his Ornithological Biography. That gentleman's observations were made chiefly among the Tortugas, a group of low uninhabitable islands, or rather banks of shelly sand, which lie about eighty miles from Key West, off the peninsula of the Floridas. As usual, the author intermingles his minuter notices of natural history with very pleasing sketches of the general features of the surrounding scene. "If you have never seen the sun setting in those latitudes, I would recommend you to make a voyage for the purpose; for I much doubt if, in any other portion of the world, the departure of the orb of day is accompanied by such gorgeous appearances. Look at the great red disk increased to triple its ordinary dimensions! Now it has partially sunk beneath the distant line of waters, and with its still remaining half irradiates the whole heavens with a flood of golden light, purpling the far-off clouds that hover over the western horizon. A blaze of refulgent glory streams through the portals of the west, and the masses of vapour assume the semblance of mountains of molten gold. But the sun has now disappeared, and from the east slowly advances the gray curtain which night draws over the world." "Slowly advancing landward, their heads alone above water, are observed the heavily-laden turtles, anxious to deposit their eggs in the well-known sands. On the surface of the gently rippling stream, I dimly see their broad forms, as they toil along, while at intervals may be heard their hurried breathings, indicative of suspicion and fear. The moon, with her silvery light, now illumines the scene, and the turtle having landed, slowly and laboriously drags her heavy body over the sand, her 'flappers' being better adapted for motion in the water than on shore. Up the slope, however, she works her way, and see how industriously she removes the sand beneath her, casting it out on either side. Layer after layer she deposits her eggs, arranging them in the most careful manner, and, with her hind paddles, brings the sand over them. The business is accomplished, the spot is covered over, and with a joyful heart the turtle swiftly retires towards the shore, and launches into the deep." "There are four different species, which are known by the names of the *green turtle*, the *hawk-bill turtle*, the *loggerhead-turtle*, and the *trunk-turtle*. The first is considered best as an article of food, in which capacity it is well known to most epicures. It approaches the shores, and enters the bays, inlets, and rivers, early in the month of April, after having spent the winter in the deep waters. It deposits its eggs in convenient places in two different times in May, and once again in June. The first deposit is the largest, and the last the least, the total quantity being at an average about two hundred and forty. The hawk-bill turtle, whose shell is so valuable as an article of commerce, being used for various purposes in the arts, is the next with respect to the quality of its flesh. It resorts to the outer keys only, where it deposits its eggs in two sets, first in July, and again in August, although it 'crawls' the beaches of these keys much earlier in the season, as if to look for a safe place. The average number of its eggs is about three hundred. The loggerhead visits the Tortugas in April, and lays from that period until late in June three sets of eggs, each set averaging a hundred and seventy. The trunk-turtle, which is sometimes of an enormous size, and which has a pouch like a pelican, reaches the shores latest. The shell and flesh are so soft, that one may push his finger into them, almost as into a lump of butter. This species, therefore, is considered as the least valuable, and indeed is seldom eaten, unless by the Indians, who, ever alert when the turtle season commences, first carry off the eggs, and afterwards catch the turtles themselves. The average number of eggs which it lays in the season, in two sets, may be three hundred and fifty."

"The loggerhead and the trunk turtles are the least cautious in choosing the places in which to deposit their eggs, whereas the two other species select the wildest and most secluded spots. The green turtle resorts either to the shores of the Maine, between Cape Sable and Cape Florida, or enters Indian, Halifax, and other large rivers or inlets, from which it makes its retreat as speedily as possible, and betakes itself to the open sea. Great numbers, however, are killed by the turtlers and Indians, as well as by various species of carnivorous animals, as cougars, lynxes, bears, and wolves. The hawk-bill, which is still more wary, and is always the most difficult to surprise, keeps to the sea-islands. All the species employ nearly the same method in depositing their eggs in the sand; and as I have several times observed them in the act, I am enabled to present you with a circumstantial account of it. On first nearing the shores, and mostly on fine calm moonlight nights, the turtle raises her head above the water, being still distant thirty or forty yards from the beach, looks around her, and attentively examines the objects on shore. Should she observe nothing likely to disturb her intended operations, she emits a loud hissing sound, by which such of her many enemies as are unaccustomed to it are startled, and so are apt to remove to another place, although unseen by her. Should she hear any noise, or perceive indications of danger, she instantly sinks and goes off to a considerable distance; but should everything be quiet, she advances slowly towards the beach, crawls over it, her head raised to the full stretch of her neck, and when she has reached a place fitted for her purpose, she gazes all around in silence. Finding 'all well,' she proceeds to form a hole in the sand, which she effects by removing it from *under* her body with her *hind* flappers, scooping out with so much dexterity that the sides seldom if ever fall in. The sand is raised alternately with each flapper, as with a large ladle, until it has accumulated behind her, when, supporting herself with her head and fore part on the ground fronting her body, she with a spring from each flapper sends the sand around her, scattering it to the distance of several feet. In this manner the hole is dug to the depth of eighteen inches, or sometimes more than two feet. This labour I have seen performed in the short period of nine minutes. The eggs are then dropped one by one, and disposed in regular layers to the number of a hundred and fifty, or sometimes nearly two hundred. The whole time spent in this part of the operation may be about twenty minutes. She now scrapes the loose sand back over the eggs, and so levels and smooths the surface, that few persons, on seeing the spot, could imagine anything had been done to it. This accomplished to her mind, she retreats to the water with all possible despatch, leaving the hatching of the eggs to the heat of the sand. When a turle, a loggerhead, for example, is in the act of dropping her eggs, she will not move although one should go up to her, or even seat himself on her back, for it seems that at this moment she finds it necessary to proceed at all events, as she is unable to intermit her labour. The moment it is finished, however, off she starts; nor would it then be possible for one, unless he were as strong as a Hercules, to turn her over and secure her." "Persons who search for turtles' eggs are provided with a light stiff cane, or a gun-rod, with which they go along the shores, probing the sand near the tracks of these animals, which, however, cannot always be seen, on account of the winds and heavy rains that often obliterate them. The nests are discovered not only by men, but also by beasts of prey, and the eggs are collected or destroyed on the spot in great numbers, as on certain parts of the shores hundreds of turtles are known to deposit their eggs within the space of a mile. They form a new hole each time they lay, and the second is generally dug near the first, as if the animal were quite unconscious of what had befallen it. It will readily be understood, that the numerous eggs seen in a turtle on cutting it up could not be all laid the same season. The whole number deposited by an individual in one summer may amount to four hundred, whereas, if the animal is caught on or near her nest, as I have witnessed, the remaining eggs, all small, without shells, and as it were threaded like so many large beads, exceed three thousand. In an instance where I found that number, the turtle weighed nearly four hundred pounds. The young, soon after being hatched, and when yet scarcely larger than a dollar, scratch their way through their sandy covering, and immediately betake themselves to the water."

"The food of the green turtle consists chiefly of marine plants, more especially the grass-wrack (*Zostera marina*), which they cut near the roots, to procure the most tender and succulent parts. Their feeding grounds, as I have elsewhere said, are easily discovered by floating masses of these plants on the flats, or along the shores to which they resort. The hawk-billed species feeds on sea-weeds, crabs, various kinds of shell-fish and fishes; the loggerhead mostly on the fish of conch-shells of large size, which they are enabled, by means of their powerful beak, to crush to pieces with apparently as much ease as a man cracks a walnut. One which was brought on board the Marion, and placed near the fluke of one of her anchors, made a deep indentation in that hammered piece of iron that quite surprised me. The trunk-turtle feeds on mollusca, fish, crustacea, sea-urchins, and various marine plants. All the species move through the water with surprising speed; but the green, and hawk-billed in particular, remind you, by the celerity and ease of their motions, of the progress of birds through the air."[1]

We shall add a few brief notices, chiefly to connect the preceding observations, and such as follow, with the systematic names bestowed by naturalists.

Our first species is *Chelonia mydas*, commonly called the green turtle, not so much by reason of its external colour, as because its fat, beloved by aldermen, assumes, when the creature is in high condition, a decidedly greenish hue. This tint is by some regarded as derived from its marine pastures, particularly *Zostera marina*, or turtle-grass, of which it is particularly fond. The shield of this species consists of thirteen plates, which do not lie over each other after the manner of tiles. Those of the central or upper line are almost in the form of regular hexagons. The green turtle is a reptile of gigantic proportions, sometimes measuring six or seven feet in length, and weighing seven or eight hundred pounds. Its flesh forms an agreeable and healthy aliment to sea-faring men in most of the seas of the torrid zone, and is still more highly prized by epicurean landsmen. Its eggs are also most excellent as articles of diet. The introduction of turtle into Britain, as an article of luxury, is believed to be of no very distant date.

"Of the sea-turtles," says Catesby, "the most in request is the green turtle, which is esteemed a most wholesome and delicious food. It receives its name from the fat, which is of a green colour. Sir Hans Sloane informs us, in his History of Jamaica, that forty sloops are employed by the inhabitants of Port Royal, in Jamaica, for the catching them. The markets are there supplied with turtle as ours are with butchers' meat. The Bahamians carry many of them to Carolina, where they turn to good account; not because that plentiful country wants provisions, but they are esteemed there as a rarity, and for the delicacy of their flesh. They feed on a kind of grass growing at the bottom of the sea, commonly called turtle-grass. The inhabitants of the Bahama Islands, by often practice, are very expert at catching turtles, particularly the green turtle. In April they go in little boats to Cuba and other neighbouring islands, where, in the evening, especially in moonlight nights, they watch the going and returning of the turtle to and from their nests, at which time they turn them on their backs, where they leave them, and proceed on, turning all they meet; for they cannot get on their feet again when once turned. Some are so large that it requires three men to turn one of them. The way by which the turtle are most commonly taken at the Bahama Islands, is by striking them with a small iron peg of two inches long, put in a socket at the end of a staff of twelve feet long. Two men usually set out for this work in a little light boat or canoe, one to row and gently steer the boat, while the other stands at the head of it with his striker. The turtle are sometimes discovered by their swimming with their head and back out of the water, but they are oftenest discovered lying at the bottom, a fathom or more deep. If a turtle perceives he is discovered, he starts up to make his escape, the men in the boat, pursuing him, endeavour to keep sight of him, which they often lose, and recover again by the turtle putting his nose out of the water to breathe; thus they pursue him, one paddling or rowing, while the other stands ready with his striker. It is sometimes half an hour before he is tired; then he sinks at once to the bottom, which gives them an opportunity of striking him, which is by piercing him with an iron peg, which slips out of the socket, but is fastened with a string to the pole. If he is spent and tired by being long pursued, he tamely submits, when struck, to be taken into the boat or hauled ashore. There are men who by diving will get on their backs, and by pressing down their hind parts, and raising the fore part of them by force, bring them to the top of the water, while another slips a noose about their necks."[1]

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[1] *Ornithological Biography*, ii. p. 370.

" The sea-tortoises, or turtles, in general," continues our author, " never go on shore but to lay their eggs, which they do in April. They then crawl up from the sea above the flowing of high water, and dig a hole above two feet deep in the sand, into which they drop in one night above an hundred eggs, at which time they are so intent on nature's work that they regard none that approach them, but will drop their eggs into a hat, if held under them; but if they are disturbed before they begin to lay, they will forsake the place and seek another. They lay their eggs at three, and sometimes at four different times, there being fourteen days between every time, so that they hatch and creep from their holes into the sea at different times also. When they have laid their complement of eggs, they fill the hole with sand, and leave them to be hatched by the heat of the sun, which is usually performed in about three weeks."

A still more gigantic species is the loggerhead-turtle (*Ch. caretta*, Gm.), distinguished by fifteen dorsal plates, of which the central are raised into a ridge. The upper portion of the muzzle is bent or beak-shaped, the anterior pair of feet are longer and narrower than in the allied species, and the two nails are persistant and better marked. It inhabits the tropical seas along with the preceding species, but extends into nearer northern latitudes, occurring occasionally in the Mediterranean. In a commercial point of view it is of little or no value, the flesh being coarse and rank, and the shell of no estimation. It furnishes, however, a useful lamp-oil. The loggerhead is said to be a bold and voracious reptile, feeding on shell-fish and other animal products, which it crunches with its strong bony beak. Aldrovandus alludes to one which he saw exhibited alive in his days in Bologna. He held a thick walking-stick towards it, which it immediately bit in two.

The imbricated turtle (*Ch. imbricata*, Linn.) is so named on account of the mode in which its dorsal plates, thirteen in number, lap over each other, after the manner of tiles. (See Plate CCCCXXX. fig. 4.) Its muzzle is more prolonged than in many species, on which account it is sometimes named the hawk's-bill. Its mandibles are serrated. It measures from two to four feet, and occurs in the tropical seas. The flesh is disagreeable, and occasionally even dangerous, but the eggs are excellent; and its shield yields the finest quality of that valuable material in the arts called *tortoise-shell.* The lamellæ or plates are thicker, stronger, clearer, and more beautifully mottled than in any other species. The colours consist of an elegant undulation of white, yellow, red, and rich deep brown; but the article is too well known to require any detailed description. It is obtained by raising the fine external coating from the bony portion which it covers, by placing fire beneath the shell, which causes the plates to start and become detachable. They vary in thickness with the age and dimensions of the individual, and measure from an eighth to a fourth of an inch in thickness. A large turtle is said to afford about eight pounds weight of tortoise-shell; and Mr Schoepf states the range to be from five to fifteen or twenty pounds, adding, that unless the animal itself has attained the weight of a hundred and fifty pounds, the shell is of little value.

" In order," says Dr Shaw, " to bring tortoise-shell into the particular form required on the part of the artist, it is steeped in boiling water till it has acquired a proper degree of softness, and immediately afterwards committed to the pressure of a strong metallic mould of the figure required; and where it is necessary that pieces should be joined, so as to compose a surface of considerable extent, the edges of the respective pieces are first scraped or thinned; and being laid over each other during their heated state, are committed to a strong press, by which means they are effectually joined or agglutinated. These are the methods also by which the various ornaments of gold, silver, &c. are occasionally affixed to the tortoise-shell."

" The Greeks and Romans appear to have been peculiarly partial to this elegant ornamental article, with which it was customary to decorate the doors and pillars of their houses, their beds, &c. In the reign of Augustus this species of luxury seems to have been at its height in Rome."[2]

" The Egyptians," says Mr Bruce, in the supplement to his Travels, " dealt very largely with the Romans in this elegant article of commerce. Pliny tells us the cutting them for fineering or inlaying was first practised by Carvillus Pollio; from which we should presume that the Romans were ignorant of the art of separating the laminæ by fire placed in the inside of the shell when the meat is taken out. For these scales, although they appear perfectly distinct and separate, do yet adhere, and oftener break than split, where the mark of separation may be seen distinctly. Martial says that beds were inlaid with it. Juvenal, and Apuleius in his tenth book, mention that the Indian bed was all over shining with tortoise-shell on the outside, and swelling with stuffing of down within. The immense use made of it in Rome may be guessed at by what we learn from Velleius Paterculus, who says, that when Alexandria was taken by Julius Cæsar, the magazines or warehouses were so full of this article that he proposed to have made it the principal ornament of his triumph, as he did ivory afterwards when triumphing for having happily finished the African war."

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[1] One of the most remarkable modes of capturing turtles is that mentioned by Mr Salt. When that gentleman was at Mosambique he received a present of a fish of the genus *Echeneis*, which the inhabitants assured him they were in the habit of employing, by securing it by a cord to a boat, after which it would fasten itself by a sucker on the head to the breastplate of the first turtle it met with, and so firmly that the latter might be drawn towards the boat and captured.

[2] *General Zoology*, iii. 91.

But of all the marine tortoises, the coriaceous turtle (*Ch. coriacea*, Linn.) seems to attain to the greatest size, individuals having been met with measuring eight feet in length, and weighing about a thousand pounds. It differs from the rest of its tribe, as well in its more lengthened form and tapering termination, as in the softer or more leathery texture of its shield, which is not formed into distinct plates, but rather marked all over with small obscure subdivisions or lineations, which do not interfere with the general smoothness of the surface. There are also three raised longitudinal ridges, which run from above the shoulders to the posterior portion of the shield. (See Plate CCCCXXX. fig. 5.) This species inhabits the Mediterranean Sea, has been frequently taken even along the outer coasts of France, and occasionally makes its way to our own island shores. In the month of August 1729 a specimen was taken about three leagues from Nantes, near the mouth of the Loire. It measured above seven feet in length, and is said, when taken, to have uttered a scream so loud and hideous as to have been heard at the distance of a mile. Its mouth "foamed with rage, and exhaled a noisome vapour." It no doubt, and very naturally, objected to being lifted into a stinking slimy boat, from its own beautiful translucent sea. In the year 1778 a specimen was captured off the coast of Languedoc, which measured seven feet five inches; and, in 1756, another was taken on the Cornwall coast, which, Dr Borlase says, "measured six feet nine inches from the tip of the nose to the end of the shell, and ten feet four inches from the extremities of the fore-fins extended, and was adjudged to weigh eight hundred pounds." According to Lacépède, the coriaceous turtle is the species with which the Greeks were best acquainted, and he supposes it to have been particularly used in the formation of the ancient harp or lyre, which was originally constructed by attaching strings or wires to the carapace of one of these marine reptiles. "We may add," says Dr Shaw, "that the ribs or prominences on the back of the shell bear an obscure resemblance to the strings of a harp, and may have suggested the name of luth or lyre, by which it is called among the French, exclusive of the use to which the shell was anciently applied." This turtle is reputed to be extremely fat, and it is eaten by the Carthusians, although its flesh is coarse and bad.

GENUS CHELYS, Duméril. Wide-mouthed turtles. This little group resembles the preceding genus Emys in the feet and claws. The carapace is much too small to admit of the withdrawal of the head and limbs, which are proportionally large. The muzzle is prolonged into a little trunk, but the most marked and peculiar character consists in the deeply cleft transverse gape, which is not armed with corneous mandibles, as in the other Chelonians, but rather resembles that of the Batrachian genus *Pipa*.

The best known and most noted species is the matamata (*T. fimbria*, Gm.), an animal of a very singular and rather repulsive aspect, first described by M. Bruguiere.[1] It measures about a foot and a half in length. Its carapace is oval, with raised pyramidal plates pointing backwards. The neck and other parts of the body are furnished with peculiar projecting fringes, or wart-like appendages. This reptile is native to Guiana, and was once common in Cayenne; but its numbers were long ago much thinned by the fishermen, who prize it as an excellent and nutritious food. It feeds on aquatic plants, and is said to wander by night to some distance from the banks in search of pasture. The specimen described by M. Bruguiere was brought to him alive, and was sustained for some time on bread and herbs. It afterwards laid five or six eggs, one of which produced a young turtle.

GENUS TRIONYX, Geoff. Soft turtles. These have no plates or scales, but merely a soft skin enveloping their carapace and plastron, neither of which are completely supported by the bones, the ribs not reaching to the margins of the shield, nor being united to each other except by a portion of their length, and the parts analogous to the sternal ribs being replaced by simple cartilage, and the sternal pieces, partly toothed as in the marine species, by no means filling up the whole of the under surface. The feet, as in the fresh-water tortoises, are palmated though not elongated, and only three of the toes are furnished with nails. The corneous portion of the beak is clothed externally with fleshy lips, and the snout is prolonged. The tail is short. The species of this genus dwell in fresh waters, and the flexible margins of their carapace are of use in swimming.

The Egyptian species or tyrse, the *soft turtle* of the Nile (*Test. triunguis*, Forskal, *Tr. Ægyptiacus*, Geoff.), sometimes attains the length of three feet. Its shield is flattish, and of a green colour, spotted with white. This reptile devours young crocodiles the moment they are hatched, and, according to Sonnini, is more serviceable in this way than even the ichneumon.

An American species (*Tr. ferox*, Gmel.) inhabits the rivers of the new world, from Guiana as far north as the southern parts of the United States. It lies concealed in reeds and rushes, seizes on birds and reptiles, preying also on young caymans, and being in turn frequently devoured by the elder members of that powerful family. It is itself sought after as an article of food even by the human race, its flesh being by some esteemed equal to that of the green turtle. This species has been described as possessing considerable vigour and swiftness in its motions, and as springing forward when attacked to meet its assailant with fierceness and alacrity. It measures about a foot and a half in length, and seems to have been first described by Dr Garden in his correspondence with Pennant.[2]

ORDER II.—SAURIA. SAURIAN REPTILES.

In this order the heart is composed, as among the Chelonians, of two auricles and a ventricle, the latter being sometimes divided by imperfect partitions. The ribs are moveable, partly attached to the sternum, and are capable of being raised and depressed for the purposes of respiration. The lungs extend more or less towards the hinder portion of the body, and frequently enter far into the lower part of the abdomen. Those in which the lungs are large possess the singular faculty of changing the colour of their skin, according as they are excited by their wants or passions. The eggs are enveloped by a more or less consistent covering, and the young are born in the perfect state, that is, they merely increase in size, without undergoing metamorphosis. The mouth is always armed with teeth; and the toes are furnished with nails, with very few exceptions. The skin is clothed with scales, or with little scaly granules. All the species have a tail, varying in length in the different kinds, but almost always thick at the base. The majority have four legs, although a few have only a single pair.

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[1] *Journal d'Hist. Nat.* 1792:

[2] *Phil. Trans.* lxi. 266. The chief works on the Chelonian reptiles are the following. J. G. Walbaum, *Chelonographia oder beschreibung einiger Schildkræten*, 1782. J. G. Schneider, *Allgemeine Naturgeschichte der Schildkræten, nebst einen Systematischen berzeichnisse der einzelnen arten*, 1783. J. D. Schoepf, *Historia Testudinum iconibus illustrata.* A. F. Schweigger, *Monographia Testudinum* (in the Archives de Kœnigsberg for 1812). Thomas Bell, F. R. S., *Monograph of the Testudinata.* J. Spix, *Species Novœ Testudinum et Ranarum quas in itinere*, &c., 1824. The various species are also enumerated by Mr Gray in his *Synopsis Reptilium.*

The Saurian order of reptiles was included by Linnæus under two genera, Draco and Lacerta. The latter has been greatly subdivided, in accordance with the number of the feet, the form of the tongue, tail, and scales; and the formation of several separate families has resulted from the consideration of these important features. None of the saurian reptiles are venomous, although the bite of several of the larger kinds is to be avoided rather than otherwise. They all appear to be what may be called carnivorous; that is, they feed on living prey. Many assume the torpid state during the colder seasons of the year; but in their more active condition they affect, according to the species, a great diversity of situation; some haunting obscure and humid places, others rejoicing in a dry and sandy soil, exposed to the influence of the most radiant sun. Several are aquatic; while many climb trees, or, avoiding "leafy umbrage," seek the surface of exposed and barren rocks. Their form and outward adornment are as varied as their habits. Some are remarkable for beauty of shape and brilliancy of colour, while others present a repulsive aspect and a lurid hue. Many are extremely small, entirely innocent, and naturally familiar and confiding in their mode of life; others are of gigantic size, and distrustful and dangerous in their disposition. How great the difference between the beautiful, bright-eyed lizard, which suns itself beside a cottage window, and the huge cayman of America, stretched like a blackened log along the desolate shore of some forsaken river!

FAMILY I.—CROCODILIDÆ. CROCODILES IN GENERAL.

The *Crocodilidæ* take the first place in the Saurian order, a distinction to which they are well entitled from their great magnitude and strength, and a ferocity which has obtained for them the appellation of the tyrants of the fresh waters, both in the old and new world. They often attain the size of ten and twelve feet, frequently that of fifteen and twenty, and, more rarely, even that of twenty-five and thirty. Inhabiting the margins of the mighty streams of tropical climates, they are the terror of all who approach them; they prey upon every animal which comes within their reach; and man himself is not free from their attacks, for instances are by no means rare, both in ancient and modern times, of their suddenly seizing upon human beings, and carrying them off to their watery haunts. Hence these formidable animals are never witnessed, especially in temperate climates, but with the deepest interest. In the year 58 before the common era, the edile Scaurus exhibited at Rome five crocodiles from the Nile; on another occasion, Strabo mentions that the inhabitants of Denderah brought many to the great capital of the world; but the most astonishing spectacle of this sort ever witnessed was when the Emperor Augustus caused the Flavinian Circus to be filled with water, and there displayed thirty-six crocodiles, which were killed by an equal number of men accustomed to fight with these monsters. Popular curiosity continues unabated; and the intimate connection of the creatures in question with geological investigations has more recently conferred upon them a very different but not less important interest.

The Crocodilidæ form an exceedingly natural group, closely associated by many common characters, of which the following are the most striking. They all attain a great size. Their tail is compressed laterally. The fore-feet have five toes; the hind four, the three internal of which are furnished with nails, but all of them are more or less united by membranes. There is a single row of teeth in each jaw. The tongue is fleshy, flat, and attached by nearly the whole of its margin, a circumstance which led the ancients to believe that crocodiles were destitute of this member. The back and tail are covered with great scales or plates, which are often pointed in their centre; the scales on the abdomen are not so thick and strong.

The nostrils of these amphibious creatures open at the end of their snout by two small apertures, which shut with valves. The lower jaw is prolonged behind the cranium, which gives the appearance of motion to the upper jaw when the mouth is opened, an idea entertained by the ancients.[1] Their external ears are shut at will by two fleshy lips; their eye has three eyelids, two horizontal, like our own, and the third, a membrana nictitans, capable of being drawn from within outwards over the whole front of the globe. Beneath the lower jaw, on either side, is a gland, whose duct opens by a small slit a little within the lower edge of the jaw; it secretes an unctuous matter of a strong musky smell, and is supposed by Mr Bell (*Phil. Trans.* 1827) to be a bait for attracting fish towards the sides of the mouth. This gland, with others of a like nature situated elsewhere, confers a smell which pervades the whole animal. The vertebræ are to the number of sixty; seven are cervical, and these are so connected with each other by bony processes that they impede lateral movements, so that it is difficult for the animal to change its direction; and hence, when a person is pursued, he may easily escape by turning. Of all the Saurians, they are the only ones which are destitute of clavicles. Besides the ordinary supply of ribs, they have some which protect the abdomen without ascending to the spine. Their lungs do not descend into the abdomen, as in other reptiles of their order; and this, with their heart of three cavities, where the blood from the lungs does not mix with that from the body so freely as in the rest of the Reptilia, associates them somewhat nearer to warm-blooded animals.

It would be interesting, did space permit, to enlarge upon these physiological details. It is not a little curious, that in the animals belonging to this group, two openings are found, leading from the surface to the internal cavity of the abdomen, a structure similar to that which prevails in a few animals further down the scale. M. Geoffroy St Hilaire supposes that the superior energy of the crocodile in water is due to this penetration of that fluid, and the consequent conversion of the peritoneum into an additional respiratory surface. Another singular circumstance is, that these animals, as in some higher up the scale, are in the habit of swallowing great stones. An officer in the Colombian navy, who mentions this, tells us, that being somewhat incredulous on the point, he was satisfied of the fact by Bolivar, who, in order to convince him, shot several alligators with his rifle, and in the stomachs of all of them were found stones varying in weight according to the size of the animal. The largest killed was about seventeen feet in length, and had within him a stone weighing from sixty to seventy pounds. Upon their dispositions and habits we cannot greatly dilate.

In relation to the geographical distribution of the Crocodilidæ, we may here remark, that they are entirely foreign to Europe, and do not occur in New Holland, but are else-

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[1] The peculiar structure of the jaws, and the nature of their movement, among these reptiles, have formed the subject of frequent argument. The fact, or rather the knowledge of it, although controverted by Perrault and Duverney, is as old as the time of Herodotus; and Aristotle asserts that they can move both jaws: κινουμενων οὕτω των σιαγονων. "Enfin, nous réviendrons encore sur la circonstance, tout-à-fait particulière, qui permet à la mâchoire supérieure, ou plutôt à toute la masse supérieure de la tête, de s'élever en bascule, et de se mouvoir ainsi sur la machoire inférieure quand celle-ci répose sur le terrain ou sur un plan fixé." (*Erpétologie Générale*, iii. 25.) See also *Annales du Mus.* ii. 38.

Sauria. Crocodilidæ.

where extensively spread over various regions of the earth. The caymans are peculiar to America, the crocodiles, properly so called, are common to both worlds, and the gavials have hitherto been found only in Continental India. The following table will show the distribution of the family, and the amount of species, in all the great divisions of our globe:

	Asia.	Both Asia and Africa.	Africa.	America.	Doubtful.
Cayman..........	0	0	0	5	0
Crocodile........	2	1	1	2	2
Gavial............	1	0	0	0	0
Total species ...	3	1	1	7	2=14

Genus Gavialis, Cuv. and Geoff. We begin with the very limited genus Gavial, which, so far as known, is confined to the old world, if not to the Asiatic continent. The first description of one of these animals was given by our celebrated countryman Edwards.[1] Count Lacépède introduced the native name Gavial into our systematic works. The most recent researches of Cuvier have scarcely succeeded in determining whether there is more than one living species; there appear, however, to be several fossil, and hence additional interest is excited.

In this genus the snout is slender, and very much prolonged; the teeth are nearly uniform and alike; the fourth of the under jaw, when the mouth is closed, locks not into a foramen in the upper jaw, but into a lateral groove only; the hind feet are denticulated on the outer margin, and palmated to the extremity of the toes; and there is a deep depression behind the eye.

G. longirostris, Cuv.; *Crocodilus longirostris*, Schn.; *Lacerta Gangeticus*, Gmel. *The Great Gavial.* The muzzle of this species is almost cylindrical, and somewhat bent at its extremity; its head is singularly broad, especially towards the back part; the length of its muzzle to that of its body is as one to seven and a half. Its dental formulary is $\frac{28}{25} =$ 106. Its scales, as in all its congeners, supply excellent specific characters. This animal appears to attain a great size. Baron Cuvier received from Mr Wallich a specimen of an individual captured near Calcutta, which was seventeen feet long; and from a fragment in the Paris museum, it is calculated it must sometimes attain to nearly double that size. Notwithstanding its great bulk, the very slender form of its muzzle renders it much less formidable than the other and more numerous genus (Crocodilus), which also frequents the Ganges. It feeds wholly upon fish, and is not regarded as dangerous to man, a fact confirmatory of Ælian's observation, that "there are two kinds of crocodiles in the Ganges, the one innocent, the other cruel." Though it has not hitherto been observed in other Asiatic rivers, it may reasonably be supposed to exist elsewhere than in the Ganges.

G. tenuirostris. Though the materials possessed by Baron Cuvier did not enable him to come to a definitive conclusion regarding the existence of the *small gavial*, yet upon the whole he favoured its claims to being something more than the young of the preceding species; the existence of some nearly allied fossil kinds favouring the conclusion. There is no difference in the shape and arrangement of the teeth or scales; and the greater narrowness of the upper and back part of the head, and of the orbital foramina, are the only specific differences supplied. Its average size has not been ascertained. Like the preceding, it frequents the Ganges.

Genus Crocodilus, Cuv. The generic characters of the *true crocodiles* are sufficiently distinct. They do not possess the slender beak of the gavials; the head is oblong, and not half as broad as it is long; the muzzle is oblong and depressed; the teeth, which are somewhat unequal in their dimensions, are fifteen on each side in the lower jaw, and nineteen in the upper; the fourth, which are the longest, pass into furrows, and are not lodged in distinct foramina of the upper jaw; the hind feet have usually a denticulated crest at their outer margin; and the interval of their toes, at all events the external ones, are palmated. There is a deep hollow behind each eye.

Different species of crocodile are found in the hot regions of Asia, Africa, and America. Many bear a very close resemblance to each other, but about eight seem to be satisfactorily established. These are, the species called *chamses*, or *temsach*,—the common crocodile of the Nile; the *biporcatus*, or double crested; the *acutus*, *rhombifer*, *galeatus*, and *cataphractus* (Cuv.); to which are to be added the *Gravesii* and *Journei* (of Bory de St Vincent). We begin with that which has been longest, and perhaps is best known, the famous crocodile of the Nile.

C. vulgaris, Cuv.; *Temsach* of the modern Egyptians; *Lacerta crocodilus*, Linn. The length of the head of this species is double that of the breadth; the snout is very ragged and unequal, especially in the old; its eyes are more asunder than in other species. Without entering into minute details of the number and arrangement of the scales on the neck, back, tail, &c. we shall only state, that six rows of nearly equal-sized plates run all along the back, giving it the appearance of mosaic. The colour is a bronzed green, speckled with brown; underneath it is a yellowish-green.

These animals sometimes attain the enormous size of thirty feet; "and if we except," says Lacépède, "the elephant, the hippopotamus, some cetacea, and a few enormous serpents, they have no equal in nature." The female lays her eggs twice or thrice in the year, but only during the hot weather, and deposits them in the sand, where they are hatched by the sun. They amount to about twenty; and are said to be hatched after fifteen or twenty days. They are about twice the size of the goose's egg, and it is stated that the mother takes no charge whatever of them. Indeed we believe that this maternal carelessness is characteristic of the reptile race.

This species is frequently designated the crocodile of the Nile, a name far from happy,—because other species may inhabit its waters, and the one in question may be more common elsewhere. There seems, indeed, to be no doubt that this same animal abounds in the Senegal and other rivers of Western Africa; probably even in all the rivers of that continent, and certainly in those of Madagascar. Formerly it used to frequent the Nile as far down as the Delta, but now we must ascend to its less frequented portions before it is encountered. It was probably in reference to an individual of this species that Mungo Park relates the fact, that one of his guides across the river Gambia was suddenly seized by a crocodile and pulled under water. The negroes, however, are so familiar with these creatures, and so skilful in meeting their attacks, that they generally escape. On this occasion the negro thrust his fingers in the crocodile's eyes with so much violence that it quitted its hold; but seizing him again, he resorted to the same expedient, and with more success, as it again released him, appeared stupified, and swam down the river. Although its flesh has a strong musky smell, yet the inhabitants of the districts wherein it abounds frequently attach a high value to it, as, according to the testimony of Herodotus, did also some of the ancient Egyptians. A common method employed by the Africans for destroying the crocodile is to thrust the arm, well defended with ox-hides, down its throat, and then to plunge a dagger into its vitals. The European traveller will probably prefer avoiding such a close encounter.

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[1] *Phil. Trans.* 1756.

Although we have hitherto treated of the common crocodile as one and distinct, yet it seems beyond doubt, that in the wide habitat assigned to it, many *varieties* at least exist. Cuvier remarks, that from the Senegal to the Ganges, and even beyond it, there are crocodiles very like the common one, which have the muzzle somewhat longer or narrower, and have slight differences in the scales of their neck and back, but which it is very difficult to distribute into distinct species. He himself was not able to establish any; nor could he with satisfaction adopt the four proposed by his eminent colleague M. Geoffroy, viz. *C. suchus*, *marginatus*, *lacunosus*, and *complanatus*.[1] Of these, by far the most famous is the *suchus*, which the last-named naturalist considers identical with the *sacred crocodile* of the ancient Egyptians. His theory is, that there existed a species of a small size, having a narrow snout, and a disposition which was wholly gentle and inoffensive, which affected the margin of the river, and was thus the precursor of its inundations; and that it was to this species that the Egyptians rendered divine honours. The opposing view, advocated by Cuvier, is that the favoured crocodile did not belong to any one species or variety more than another, and, far from being less, was even more ferocious; but that it was the custom of the priesthood to entertain, not a host of crocodiles, but only one, or a few, of any given variety, under the name of *souchis*, as the idol of a divinity who was represented by a crocodile's head; and that it was to this individual especially that divine honours were paid, in the same way as *apis* was the name of the sacred ox at Memphis, and *mnevis* at Heliopolis. This favoured animal was always nourished and adorned with extreme splendour, and after its death was buried in the subterranean cells of the Labyrinth; whilst throughout the district where these honours were paid, the whole race of crocodiles were respected and preserved. Cuvier assigns the following among other reasons for the accuracy of his views, which we think conclusive: *First*, the crania of the buried and embalmed crocodiles do not belong to any one variety, but to all of them; and, *2dly*, there is the strongest historical proof that the crocodiles in those districts where they were worshipped, far from being less savage, were even more so than in others, because from their impunity they became more bold. Thus Ælian reports, that in the district of Tyntyrites, where they unsparingly destroyed the crocodiles, the inhabitants could bathe and swim in the river securely, whilst at Arsinoë they could not safely walk, far less draw water from the river's banks. The evidence that individuals, when taken young, may be completely tamed, is equally satisfactory. Thus Bruce relates, that on the western shores of Africa, the negroes bring up crocodiles, which become so gentle as to let children play with them and ride upon their backs; a fact which satisfactorily corroborates the accounts of those religious processions, &c. in which the sacred crocodile performed so essential and conspicuous a part.

C. biporcatus, Cuv. Dum; *C. porosus*, Schn. *Double crested crocodile.* This species is the common crocodile of India and its archipelago, frequenting the Ganges and other great rivers which empty themselves into the ocean, as also those of Corea and China, Ceylon, Java, Timor, &c. It has a strong resemblance to the Egyptian species; but the cervical scales are differently arranged, and the dorsal are smaller, more numerous, and differently shaped. (See Plate CCCCXXX. fig. 6.) The appearance of the pores between the scales is much more conspicuous than in the other species, and grows with their growth. Its colour is brownish, with black bands on the back, and spots on the side. In the Paris museum there is one seventeen feet long, from the Ganges. In the account of Macassar, or Celebes, we read, that in the great river of that island, there are crocodiles so ferocious that they do not confine themselves to making war on fish, but assemble in troops to watch the boats, and endeavour to overturn them, that they may devour those who are in them. It is the opinion in Java that these animals do not devour their prey on capturing it; but bury it for a time in the mud, that it may decay. This remark is so generally made of other species in different parts of the world, that it would appear to be a prevailing habit among them.

C. acutus, Cuv. Dum. *The slender-snouted crocodile*, or *crocodile of St Domingo.* This slender-snouted crocodile is extremely common in the island of St Domingo, as well as in Martinique, and the northern parts of South America. Its most remarkable specific characters are the length of the muzzle, which is bulged at its base; and the scales of the back are differently disposed from those of the preceding. The upper part of the body is of a deep green colour, spotted and marbled with black; the under part is pale green. Dr Descourtils states that this animal is more flexible than is usually supposed, for it can introduce the extremity of its tail into its mouth. On the same respectable authority we learn that the males are not so numerous as the females; that they fight furiously at the season of reproduction; that the males are fit for generation at the age of ten, and the females at that of eight or nine, their fecundity not lasting more than four or five years,—a statement which may well be questioned. The eggs are deposited in spring, and hatched in a month. On issuing, the young are only nine or ten inches long; their growth continues for about twenty years, and some are as long as sixteen feet. At the time of the escape of the young, the female comes to scrape away the earth and let them out. She conducts, defends, and feeds them, by disgorging her own food for about three months, a space of time during which the male would seek to devour them.

C. rhombifer, Cuv. Dum. *Lozenge-scaled crocodile.* The habitat of this species has been ascertained only of late years. It occurs in the island of Cuba, and probably inhabits the other Antilles. Its specific characters are well marked. Its chanfrin is extremely prominent, forming a semicircle, whilst in the common crocodile it is only a gentle elevation; and the extremities are clad with much stronger and more projecting scales than in the other species. Its ground colour is green, bespeckled with small and very distinct brown spots.

C. galeatus, Cuv. Dum. *Helmeted crocodile.* The helmeted crocodile has been hitherto found only in Siam, and is remarkable for two bony triangular crests implanted, the one behind, the other on the middle line of the head. It has been taken ten feet long. *C. biscutatus* is now regarded as an anomalous variety of *C. acutus*. *C. cataphractus*, the *cuirassed crocodile*, may be witnessed in the museum of the London Royal College of Surgeons, and it is very different, according to Cuvier, from all the others described. The source from whence it was obtained is unknown.[2] Its muzzle is longer and narrower than that of the St Domingo crocodile, whose peculiar chanfrin it wants. It is most easily distinguished by the armour on its neck; there are first two oval plates, then a row of four, then scaly bands common to the neck and back, which together form a cuirass as strong as that of any of the gavials or alligators.

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[1] These seem all to be now regarded as varieties of the common Egyptian crocodile,—*C. vulgaris*, Cuv. and Dum. See *Erpétologie Générale*, iii. 104.

[2] A specimen of a young individual was presented to the Paris museum as having been obtained from "le grand Galbac, rivière qui coule près de Sierra de Leone."

There still remain two other true crocodiles, described by M. Graves,[1] and which he regards as new; the *C. Gravesii* and *Journei* of Bory de St Vincent. Both of them are in the Bordeaux museum. The habitat of the former is believed to be the Congo, and of the latter America. All the bones of the *Gravesii* are as if pierced with small holes, a character they possess in common with some of the alligators. Its head is of the shape of a slender isosceles triangle; the extremity of the snout is rounded, and its surface covered with great obtuse tubercles, having no regular arrangement. The ninth, tenth, and eleventh teeth of the lower jaw are received into a furrow, as well as the fourth. The colour of the upper part is a dark deep brown, that of the lower a dull yellow. The snout of the *Journei* is very slender, approaching to that of the gavials; it is convex as well as long, and near its extremity is almost cylindrical. The back of this species is of a deep yellowish green; the flanks are yellowish, and the belly yellow.

GENUS ALLIGATOR, Cuv. The alligators are by far the most common representatives of this group in the new world; although, as we have already seen, there are true crocodiles in St Domingo, and probably in many other localities. In most parts of America they are known by the title of cayman, a name apparently of African origin, and applied by the negroes, not to the alligators only, but indifferently to every species of the group. It does not seem to be yet ascertained whether any true caymans are found in the old world. Adanson thought he discovered one in the Senegal; M. de Beauvais states that he saw one in Guinea; and Cuvier thinks it most probable that they have their representatives in our hemisphere. They possess all the power and ferocity of the true crocodiles, and in many places are found in astonishing numbers.

The head of the alligators is not so oblong as that of the true crocodiles; the snout is broad and obtuse; the teeth are somewhat unequal, the number ranging from nineteen to twenty-two on each side of each jaw; the fourth of the under jaw is received, not into a lateral furrow of the upper one, but into a distinct foramen. Their feet are only semipalmated, and are not denticulated.

A. lucius, Cuv.; *Croc. Cuvieri*, Leach. *Pike-muzzled alligator*. This is peculiarly the alligator of the southern parts of North America, including Carolina, the Floridas, and Louisiana. In the Mississippi it ascends as far as the thirty-second degree north, a higher latitude than any species reaches in the old world. In these countries they frequent the muddy banks, and quite bury themselves in the cold season, falling into a lethargic state before the setting in of the frost.[2] This sleep is so profound that they may be almost cut to pieces without manifesting any sign of life; when the warm weather returns, they are soon roused into activity. According to Bosc, their eggs are white, and not larger than those of the turkey. They are good eating, and are prized by the natives, though they partake of the musky smell of the animal. As soon as they escape, the young betake themselves to the water; but the vast majority become the prey of turtles, fish, and amphibious animals, not excluding the older of their own species. During the first year they feed upon insects and very young fish. Bosc states that he preserved a brood of fifteen. They ate only living insects; and never captured them except when moving, upon which they darted at them with great velocity. They appeared quite gentle when he took them in his hand. At the end of the first year they are still very feeble creatures; during the second they acquire their formidable teeth. The duration of their existence is not precisely ascertained, but is supposed to equal that of man. They never cast their skin; and on acquiring their full size, few animals can injure them. They can fast long. They live on frogs, fish, aquatic birds, on dogs, hogs, cattle, and any animal they can catch; when these go to the river to drink, they seize them by the muzzle or leg, and draw them into the water to drown them. "I used often," adds the traveller last named, "to amuse myself, bringing them from their retreats by making my dog bark. Sometimes I used to advance and strike them with my stick, at which they were little disturbed. They never thought of attacking me, and deliberately retired when they found their hunting promised no success." Though slow on land, they swim with great velocity. In Carolina they make deep burrows, where they pass the whole winter, and even the entire day in summer. Though usually met with on the edges of rivers and lakes, they are sometimes also found in ponds in woods. Bosc often attempted to take them with every kind of strong snare; but these were invariably broken to pieces. They are commonly taken with a strong hook bated with a bird or small quadruped, and connected by a chain to a tree. The Indians eat the tail only. At the time of reproduction they fight furiously with each other, and bellow as loud as bulls. They avoid the salt water and proximity to the sea, because they are there exposed to the attacks of sharks and the great turtle. In very warm districts in the Floridas, the rivers are sometimes quite crowded with them, so that they almost interrupt the navigation.

The specific characters of the pike-headed alligator are a flat snout, the sides of which are nearly parallel, uniting in front in a regular curve. There are eighteen transverse rows of scales on the back. The colour above is a deep greenish brown, beneath white tinged with green, and the flanks are regularly striated with the two colours. Catesby has seen them fourteen feet long. Its hide, except at particular spots, resists a musket ball; it is most vulnerable at the inferior part of the belly, and round the eye.

The great alligator of North America certainly forms one of the most remarkable features in the zoology of the United States. Whatever may be said of the African or South American species, this huge reptile is usually neither shy nor dangerous. Its ordinary motion on land is slow and sluggish, a kind of laboured crawling, which leaves the track of a lengthened trail upon the mud, like the keel of a small vessel. When met with at any distance from the water, it immediately squats, that is, lies as flat as it can, with its nose upon the ground, and staring around with rolling eyes. "Should a man approach them," says that accurate and admirable describer Audubon, "they do not attempt either to make away or attack, but merely raise their body from the ground for an instant, swelling themselves, and issuing a dull blowing sound, not unlike that of a blacksmith's bellows. Not the least danger need be apprehended; you either kill them with ease, or leave them." As if conscious of their incapacity of self-defence, they seldom travel except during the night, being then less subject to disturbance, besides "having a better chance to surprise a litter of pigs, or of land-tortoises, for prey." "In Louisiana," Mr Audubon observes, "all our lagoons, bayous, creeks, ponds, lakes, and rivers, are well stocked with them; they are found wherever there is a sufficient quantity of water to hide them, or to furnish them with food; and they continue thus in great numbers as high as the mouth of the Arkansas river, extending east to North Carolina, and as far west as I have penetrated. On the Red River, before it was navigated by steam-vessels, they were so extremely abundant, that to see hundreds at a sight along the shores, or on the immense rafts of floating or stranded timber, was quite a common occurrence, the smaller on the backs of the larger, groaning, and uttering their bellowing noise, like thousands of irritated bulls about to meet in fight;[1] but all so careless of man, that unless shot at or positively disturbed, they remained motionless, suffering boats or canoes to pass within a few yards of them without noticing them in the least. The shores are yet trampled by them in such a manner that their large tracks are seen as plentiful as those of sheep in a fold." It was in the Red River, it seems, that so many thousands of these reptiles were killed, while a mania prevailed for wearing boots and shoes made of *crocodile leather*. This had fairly become an article of trade, many of the squatters following for a time no other business. But this leather, though handsome and pliant, exhibiting all the regular lozenges of the scales, and capable of receiving the highest polish, is not sufficiently firm or close-grained to prevent for any length of time the ingress of damp or moisture.

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[1] *Ann. Gén. des Scien. Physiques*, t. ii. p. 343.

[2] An individual, however, was observed by Messrs Dunbar and Hunter in latitude 32½° north, in the month of December, while the weather was very cold.

The power of this alligator lies chiefly in his jaws and tail. The latter is admirably adapted to serve as an ally to the former, because when curved into a semicircle it sweeps everything towards the enormous mouth. "Woe be to him who goes within the reach of this tremendous instrument; for, no matter how strong or muscular, if human, he must suffer greatly if he escapes with life. The monster, as he strikes, forces all objects within the circle towards his jaws, which, as the tail makes a motion, are open to their full stretch, thrown a little sidewise to receive the object, and, like battering-rams, to bruise it shockingly in a moment. The alligator, when searching after prey in the water, or at its edge, swims so slowly towards it as not to ruffle the water. It approaches the object sidewise, body and head all concealed, till sure of his stroke; then, with a tremendous blow, as quick as thought, the object is secured." When these giant reptiles are engaged in fishing, the flapping of their tails upon the water may be heard at half a mile. In the vicinity of Bayou Creek, on the Mississippi, there are extensive shallow lakes and marshes, yearly overflowed by the dreadful flooding of that mighty river, and stored with myriads of fish of many different kinds—trouts, white perch, cat-fish, alligatorgars or devil-fish. Thither, in the heats of early autumn, after a burning summer sun has exhaled a quantity of water, the squatter, planter, hunter, all proceed in search of sport. The lakes are then not more than two feet deep, with a fine sandy bottom, and much grassy vegetation bearing seeds, keenly sought for by vast multitudes of water-fowl. In each lake is a deeper spot, called the Alligator Hole, because dug and dwelt in by these reptiles. There they may be seen in numbers lying close together. "The fish that are already dying by thousands, through the insufferable heat and stench of the water, and the woumds of the different winged enemies constantly in pursuit of them, resort to the alligator's hole to receive refreshment, with a hope of finding security also, and follow down the little currents flowing through the connecting sluices; but no! for as the water recedes in the lake, they are here confined. The alligators thrash them and devour them whenever they feel hungry; while the wood-ibis destroys all that make towards the shore. The hunter, anxious to prove the value of his rifle, marks one of the eyes of the largest alligator, and as the hair-trigger is touched, the alligator dies. Should the ball strike one inch astray from the eye, the animal flounces, rolls over and over, beating furiously with his tail around him, frightening all his companions, who sink immediately; while the fishes, like blades of burnished metal, leap in all directions out of the water, so terrified are they at this uproar. Another and another receives the shot in the eye, and expires; yet those that do not feel the fatal bullet pay no attention to the death of their companions till the hunter approaches very close, when they hide themselves for a few moments by sinking backwards." So disinclined are they to attack the human race, that Mr Audubon and his companions have waded waist-deep among hundreds of them. The cattle-drivers may be often seen beating them away with sticks before crossing with their beasts, for they will readily attack cattle, and swim after such animals as dogs, deer, and even horses.

As soon as the cool autumnal air gives warning of the approach of frosty weather, alligators leave the lakes to seek for winter quarters, by burrowing beneath the roots of trees, or covering themselves with earth. They speedily become inactive; and to sit and ride on one, according to Mr Audubon, who never rows in the same boat with Squire Waterton, would now be no more difficult than for a child to mount a rocking horse. The negroes kill them by separating, at a single blow, the tail from the body. They are afterwards cut into large pieces, and boiled in a good quantity of water, from the surface of which the fat is collected in large ladles. A single man often kills above a dozen alligators in an evening, prepares his fire in the woods, and, by morning, the oil is rendered. This oil is used for greasing the machinery of steam-engines and cotton-mills; and formerly, when Indigo was made in Louisiana, it served (we know not how) to assuage the overflowing of the boiling juice, when a ladleful was thrown into the caldron. We would have deemed the remedy more dangerous than the disease. These reptiles emit a strong odour, and a large one may be discovered by it at a distance of sixty yards. The smell is musky, and, when strong, is insupportable. It is not, however, perceptible when they are in the water, "although I have," says Mr Audubon, "been so close to them while fishing, as to throw the cork of my line upon their heads to tease them." He adds, that he has regularly found in their interior round masses of a hard substance resembling petrified wood. He has broken these with a hammer, and found them brittle, and as hard as stones, which they outwardly resemble. "And as neither our lakes nor rivers in the portion of the country I have hunted them in, afford even a pebble as large as a common egg, I have not been able to conceive how they are procured by the animals if positively stones, or (if not) by what power wood can become stone in their stomachs." They are probably concretions formed of indigestible animal substances, or may themselves assist digestion.[2] Mr Audubon has often amused himself, when fishing where alligators abounded, by throwing an inflated bladder towards the one next him in the water. It makes for it at once, flapping it towards its mouth, and trying to seize it, but in vain. The light inflation floats aside, and in a few minutes many more of these huge creatures are seen attempting to master the delusive bladder, "putting one in mind of a crowd of boys running after a foot-ball." A black bottle is also sometimes thrown among them, tightly corked; but some one, more active than the rest, will seize it greedily, and the crunched glass gives way within its ponderous jaws as easily as if ground in a coarse mill.

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[1] The majority of authors who have written of crocodiles from personal observation, agree regarding the frequent cries of the younger individuals, but seem to consider the older ones as seldom giving utterance to their feelings in that way. "Au contraire," says Humboldt, "le rugissement du crocodile adulte doit être très rare, car ayant vécu pendant plusieurs années ou en couchant à l'air libre sur les bords de l'Orénoque, nous avons été presque toutes les nuits entourés des crocodiles, nous n'avons jamais entendu la voix de ces sauriens à taille gigantesque." (*Recueil d'Observ. de Zoologie*, tom. i.)

[2] "Une particularité notable, mais qui parait assez constante chez les crocodiles, puisque tous les auteurs qui en ont fait l'anatomie en ont fait mention, c'est qu'on trouve dans leur estomac des cailloux de differentes grosseurs, qui semblent devoir servir à la trituration des alimens, comme les petits pierres qui se rencontrent dans le gesier ou l'estomac musculeux des oiseaux." (*Erpétologie Générale*, iii. 27.)

During the season of love, in spring, the male alligator is a fierce and dangerous animal, and possibly its observation by different naturalists, at different seasons of the year, may account for the contradictions which pervade the recorded statements of its life and manners. When thus excited, no man dares to swim or wade among them, or, as Mr Audubon quietly observes, "they are usually left alone at this season," a delicate piece of attention, which, we doubt not, like other virtues, is its own reward. The female prepares her nest about the first of June, choosing a place about forty or fifty yards from the water, in some thick bramble or cane, where she gathers leaves, sticks, and rubbish of all kinds, carrying the materials in her mouth as a hog does straw. As soon as a proper nidus is formed, she lays about ten eggs, which she covers over with more rubbish and mud; and proceeding in this manner, she deposits about fifty or sixty eggs in various layers. The whole is then covered up, matted, and tangled together with long grasses, in such a manner that it is extremely difficult to break it up. These eggs are in size like those of a goose, but of a longer form, and are protected rather by a parchment-like transparent substance than by shell. Though they are not eaten either by hogs or vultures, the female, now not only wary, but ferocious, watches near the spot, visiting the water from time to time for food. The nest is of course easily discovered, as she always goes and returns the same way, and soon forms a conspicuous path by the dragging of her giant form. According to Mr Audubon, to whom we stand indebted for these details, it is not the heat of the sun which hatches the eggs, but that of the nest itself,—a perfect hot-bed, from the mode of its formation. The young, as soon as excluded, force their way through the walls of their putrescent chambers, and issue forth all as beautiful and brisk as lizards. The female then leads them to the lake, or more frequently, for greater security, to some small detached bayou; for now the males, their own ungentle fathers, will swallow them by hundreds, and the wood-ibis and sand-hill cranes devour them.[1]

A. sclerops, Cuv.; *Croc. sclerops*, Schn. *Spectacled alligator.* This is more especially the alligator of Guiana and Brazil. Its snout, though broad, has not the sides parallel, as in the preceding; and is more triangular in its shape. The lower edge of the orbits are very prominent, and a crest projecting between them gives the appearance whence their specific name is derived. Its colour is bluish-green above, and irregularly marbled green and yellow, more or less pale, below. Azara speaks of a red variety, which is the most savage of all. It acquires a great size. Cuvier has seen it fourteen feet long; and in Surinam some have attained the length of twenty and twenty-four feet. In South America it extends as far as 32° south latitude, the same distance from the equator on the one side, as the preceding species reaches on the other. It cannot run half so swiftly as man, and rarely attacks him; but when the eggs are plundered, the female defends them courageously. She lays, according to some, as many as sixty, and covers them with a few leaves or a little straw. It passes the night in water, as Herodotus states of the crocodile of the Nile, and during the day basks in the sun on the banks. It has been stated, that in certain places, when the morass is partially dried, the remaining water is so crowded with caymans that nothing is to be seen but their projecting backs.

It was probably over this species (the *Yacare* of Azara, *Jacare noir* of Spix) that Mr Waterton obtained his far-famed and well-known conquest; and of it also that he relates the following anecdote. "One fine evening last year, as the people of Angustura, said its governor, were sauntering up and down here on the bank of the Oronoco, I was within twenty yards of this place, when I saw a large cayman rush out of the river, seize a man, and carry him down, before any body had it in his power to assist him. The screams of the poor fellow were terrible as the cayman was running off with him. He plunged into the river with his prey; we instantly lost sight of him, and never saw or heard him more." The negroes of South America sometimes eat the flesh, notwithstanding its fetid and musky smell. Azara tells us that they succeed in sticking it with an armed harpoon, and after fatiguing it in the water, pull it out by main force and despatch it.

A. palpebrosus, Cuv. *Bony eyelid alligator.* The muzzle in this species is somewhat longer and less depressed than in the preceding, and the margins of the orbits are not projecting. The character, however, which at once distinguishes it from all the other Crocodilidæ is, that the upper eyelid is wholly occupied with an osseous plate, divided into three pieces by sutures. None of its congeners have more than a small osseous particle near the inner angle. Its teeth are $\frac{19}{21}$ on each side of each jaw. The interval between the two external toes is less palmated than in the other species, from which it may be concluded to be more terrestrial. This animal inhabits Cayenne, and exhibits considerable variation in its characters.

In addition to these clearly distinct species, naturalists now recognise the two following, viz. the dog-headed cayman, *Al. cynocephalus*, Dum. and Bib., and the black spotted cayman, *Al. punctulatus*, Spix.[2]

FAMILY II.—LACERTINIDÆ. LIZARDS IN GENERAL.

The members of this family are characterised by a slender extensile tongue, terminated by two filaments, like that of many snakes. All the four legs have five toes, separate, of unequal size, especially the hinder ones, and furnished with nails. The scales on the abdomen, and those beneath the tail, are disposed in transverse parallel bands. A produced portion of the skin, longitudinally cleft, and closing by a sphincter, protects the eye, beneath the anterior angle of which there is the vestige of a third eyelid. The false ribs do not form an entire circle.

The species of this family are numerous and diversified, and now constitute several generic groups. Like all other reptiles, they are much more abundant in sultry than in cold or temperate climates. "I am positive," says Mr Bruce, alluding to the lizard tribe in general, "that I can say without exaggeration, that the number I saw one day, in the great court of the temple of the sun at Balbec, amounted to many thousands; the ground, the walls, and stones of the ruined buildings were covered with them, and the various colours of which they consisted made a very extraordinary appearance, glittering under the sun, in which they lay sleeping and basking." He adds, that the desert parts of Syria, bordering on Arabia Deserta, abound with these reptiles beyond the possibility of calculation.

The genus Monitor of Cuvier contains the largest species, some of them almost approaching to the size of crocodiles. They have teeth on both jaws, but none upon the palate. The greater number have the tail compressed, which aids their aquatic propensities. Their vicinity to water brings them into the frequent neighbourhood of crocodiles and caymans, and they are said to give warning of the approach of these formidable reptiles by a shrill whistle. Hence probably their name of monitor. That of *Tupinam-*

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[1] See "Observations on the Natural History of the Alligator," by John J. Audubon, Esq. in *Edinburgh New Philosophical Journal*, ii. 270.

[2] *Erpétologie Générale*, iii. 86–91.

bis, which they often bear, was bestowed upon them by an error of Seba's, who, misconstruing a passage in Margrave, applied to these reptiles the designation of a tribe of people.

The *first subdivision* of the genus contains the MONITORS *properly so called* (genus VARANUS, Dum.),[1] distinguished by small and numerous scales on the head, limbs, beneath the abdomen, and around the tail, the last-named portion being surmounted by a kind of keel formed by a double range of projecting scales. The thighs want the peculiar range of pores observable among several other groups of saurians. The species are confined exclusively to the ancient world, although Seba, and in later years Daudin, have stated the contrary. Travellers report that they prey on the eggs of water-fowl and on those of crocodiles, and that chameleons, young turtles, and fishes, have been found in their stomachs. M. Leschenault de Latour even states that they combine together on the banks of lakes and rivers for the purpose of attacking such quadrupeds as come to assuage their thirst, and that he has seen them attempt to drown a young stag which was trying to cross a river. He moreover found the thigh-bone of a sheep in one which he dissected.

The monitor of the Nile (*L. Nilotica*, Linn. *Varanus Niloticus*, Dum.), called *Ouaran* by the Arabs, has the teeth strong and conical, the posterior becoming rounded by age. The general colour is brown, with paler and darker points, forming various compartments, among which are transverse rows of large ocellated spots, which on the tail become ring-like. The tail is rounded at the base, and surmounted by a keel throughout its whole length. This species grows to the length of five or six feet. A vulgar belief prevails among the Egyptians, that it is a young crocodile hatched in drier earth than usual. Its figure is engraved on the ancient monuments of Egypt, probably in connection with the fact of its preying on the eggs of the crocodile. To the monitors also belong the animal called scink (*L. scincus*, Merr., but not of Linn., *Var. arenarius*, Dum.), a small species, very abundant in Libya, Syria, Egypt, and Arabia, where it frequents rather dry and sandy soils. It is called *Ouaran el hard* by the Arabs. Its teeth are compressed, cutting, and pointed, the tail almost without ridge, and a great part of it rounded. Its habits are more terrestrial than those of the preceding, and it may be regarded as identical with the land-crocodile of Herodotus. The jugglers of Cairo pluck out its teeth, and then employ it in the performance of tricks. Many other monitors are found both in Africa and India.[2]

The *second subdivision* of Baron Cuvier's monitors consists of such as have angular plates upon the head, and large rectangular scales beneath the abdomen and around the tail. The skin of the throat is clothed with small scales, and forms a couple of transverse folds. There is a row of pores upon the thighs.

This subdivision corresponds to the genus TEYUS of Merrem, and several minor groups may be indicated in it. For example, those called Dracænæ by Lacépède have the scales raised up into ridges, as among the crocodile tribe, and forming crests along the tail, which is compressed. An eatable species (*Mon. crocodilinus*, Merr.) occurs in Guiana, where it inhabits holes in the vicinity of marshes. It is said to swim with difficulty, to run rather swiftly, to climb trees with facility, and to bite severely. It attains the length of six feet, and is characterized by some scattered ridges of scales upon the back. Another and much smaller species (*Drac. bicarinata*) likewise inhabits South America. (See Plate CCCCXXXI. fig. 1.) The little group of safeguards (*Sauvegardes*, Cuv. the restricted genus *Monitor* of Fitzinger) have all the scales of the back and tail without ridges. Their teeth are dentated, although those of the back part of the mouth become rounded by use or age. Some have the tail more or less compressed, and the scales of the abdomen longer than broad. They dwell by the banks of rivers. Such is the very large variegated lizard (*L. tequixin*), well represented by Madame Merian at the end of her work on the insects of Surinam. It inhabits Brazil, Guiana, &c. where it attains the length of six feet. It runs rapidly, and plunges into the water when pursued, although it can scarcely be said to swim. It feeds on insects, reptiles, the eggs of poultry and of other birds, and is itself useful as an article of food. Others, distinguished by the name of *Ameiva*, scarcely differ from the preceding sections of the genus TEYUS, except in the tail being rounded, and no way compressed, and furnished, as well as the abdomen, with transverse rows of square scales. The scales of the abdomen are rather broader than long. The species of this little group may be regarded as the *lizards* of America, that is, as representing in the new world the reptiles which we so designate in the old; but they differ in wanting the molar teeth, the majority have no collar, and all the scales upon the throat are small. Their heads also are more pyramidal, and they want the osseous plate above the orbits. Several different species have been confounded under the title of *Lacerta ameiva*. The most generally distributed is that named *Teyus ameiva* by Spix. (See Plate CCCCXXXI. fig. 2.) It is of a green colour, with vertical rows of white ocelli, bordered with black upon the flanks.

The genus LACERTA, Cuv., or lizards properly so called, forms the second principal group of the Lacertine family. They have the back part of the palate armed with two rows of teeth, and are further distinguished from the Ameivas and Safeguards by a collar beneath the neck, formed by a transverse row of broad scales, separated from those of the abdomen by a space, on which there are only minute scales, as on the throat. A portion also of the bones of the cranium projects over the orbits and temples, so that all the upper part of the head is provided with a bony buckler.

Lizards are remarkable for their lively movements, and light and elegant forms. Their colours are also often brilliant. They pass the winter in a state of torpidity, and are always active and vivacious in proportion to the power of the solar heat. They are often seen stretching themselves on rocks or stones, however heated, and brandishing from time to time their forked tongues, a motion which in some countries has induced the belief of their being venomous, an unfounded idea, we need scarcely say, no creatures being more innocent. They are by no means difficult to tame, but in a state of nature we have usually found them very timorous, although M. Bory St Vincent regards them as being as bold as they are beautiful. "Nous en avons vu plusieurs saisir bravement au museau des chiens d'arrêt qui les avaient surpris dans quelque pelouse sêche, et ne pas lâcher prise malgré les secouses violentes et les efforts que faisaient ces chiens pour se delivrent." They are by no means devoid of intelligence, and, though shy and fearful, are decidedly inquisitive in regard to what takes place around them. When raising themselves as high as their little limbs permit, in order to enlarge their "visible diurnal sphere," they often exhibit themselves to a quiet and concealed spectator in attitudes of great beauty. They frequently show themselves more alarmed for birds and quadrupeds than for the human race, and they will even acquire a certain degree of tameness when domiciled near

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[1] The term *Monitor* is somewhat injudiciously applied to this restricted group, in as far as it does not contain the species originally so named, that is, the *grande sauvegarde d'Amerique*,—*Lacerta tequixin* of Linn. and Shaw.

[2] The genera *Varanus* and *Heloderma* form a distinct family (*Varaniens*) in the system of MM. Duméril and Bibron. Of the former genus, four are Asiatic, two are from New Holland, one is from the Papous, one from Timor, and three are of African origin. *Heloderma horridum* (the sole species) is the only American member of the family.

Sauria. Lacertinidæ.

the dwelling of a gently-disposed lover of nature. They fear cats and children. Lizards change their skins, like most other reptiles, and the difference between the brightness and brilliancy of their old and new attire has caused the description by naturalists of many species which have no foundation in reality. Although belonging to the cold-blooded classes, they are warmly attached to their females, and frequent battles take place among the males for the possession of their fair companions. The eggs are covered by a pale-coloured membranous skin, and are hatched by the heat of the sun, whether in the body of the basking parent, or after exclusion. The eggs themselves increase in size considerably, as the creature contained within develops its parts. The reptiles of this group are never voluntarily found in water. They dislike that element, and avoid it, being bad swimmers; nevertheless, when pursued down steepish banks, we have seen them swim across small ditches to gain the other side and avoid persecution. One of the most singular attributes of these creatures consists in their extreme fragility. When running up a bank, or otherwise attempting to escape from danger, if even a light glove or handkerchief is cast upon them, several inches of the terminal portion of their body comes riggling off, and will twist about among the grass for a considerable period with great liveliness, while the body with its head and four legs proceeds upon its way rejoicing. The tail even appears to rest itself from riggling for a time, and if touched with a pin, or otherwise incommoded, will then resume its movements with such an apparent character of discomposure, as if it were expressing its dislike at the annoyance.

Although several anatomists, proceeding upon their too exclusive knowledge of the higher classes of creation, in which there is no reproduction of important parts, have doubted the extent and universality of this inherent power in reptiles, there is yet no fact in natural history more satisfactorily determined. When we refer to the satisfaction of the subject, we allude chiefly to the feelings of the experimenter, those of the creatures in question being, we fear, in such a crisis, but sparingly consulted. In numerous reptiles, the limbs, and a great portion of the posterior part of the body, may be cut off without more than a temporary inconvenience, the removal being not only speedy, but complete. Blumenbach, one of our highest modern authorities, has repeated[1] the experiment alluded to by Pliny.[2] He destroyed with an iron point the eyes of the green lizard, and placing the poor creature in a vessel with some fresh earth, which he deposited in moist soil, he found, after the lapse of a brief period, that the organs of sight were entirely reproduced,—"in integrum restitutos." Lizards and reptiles of the genus *Scincus*, of which the tail has been either intentionally or accidentally broken off, are found to reproduce it speedily. The newer portion is recognisable externally by the form and colour of the scales, and on dissection the vertebræ are found replaced by pieces of a more cartilaginous nature, which probably never acquire the hardness or consistency of bone. Many experiments have shown the facility with which the limbs and tail of water-newts, and other aquatic reptiles, may be reproduced.[3] "Qu'il nous soit permit," says M. Duméril, rather winningly, "de consigner ici une de nos expériences : nous avons emporté avec les ciseaux les trois quarts de la tête d'un triton marbré. Cet animal, placé isolément au fond d'un large bocal de crystal, où nous avions soin de conserver de l'eau fraîche à la hauteur d'un demi-pouce, en

Sauria. Lacertinidæ.

prenant la précaution de la renouveler au moins une fois chaque jour, a continué de vivre et d'agir lentement. C'était un cas bien curieux pour la physiologie ; car ce triton privé de quatre sens principaux, les narines, la langue, les yeux, et les oreilles, c'était reduit à ne vivre extérieurement que par le toucher. Cependant il avait la conscience de son existence ; il marchait lentement et avec précaution ; de temps à autre, et à des grands intervalles, il portait le moignon de son cou vers la surface de l'eau, et dans les premier jours on le voyait faire des efforts pour respirer. Nous avons vu, pendant au moins trois mois, se faire un travail de reproduction et de cicatrisation telle qu'il n'est resté aucune ouverture ni pour les poumons ni pour les aliments. Par malheur, cet animal a péri au bout des trois premiers mois d'observations suivies, peut-être par le défaut de soins d'une personne à laquelle nous l'avions recommandé pendant une absence. Mais on a conservé le sujet dans les collections du muséum, et quand nous en parlons dans nos cours, nous le faisions voir à nu pour qu'on puisse constater la singularité du fait d'un animal qui a vécu sans tête, et surtout pour demontrer la possibilité et la nécessité, même chez les Batracians, d'une sorte de respiration par la peau."[4]

We may observe, that in all the tentative experiments which have been hitherto made upon this subject, it has been perceived that these renewals are favoured by warmth and retarded by cold. As an article of diet, lizards are scarcely ever used in Europe, unless in years of peculiar scarcity. Their flesh is said to possess a sudorific quality.

The species of this genus are numerous in many continental countries (from fifteen to twenty different European kinds being known to naturalists), but are few in Britain. Of the former, one of the most beautiful is the ocellated lizard (*L. ocellata*, Daudin), well known in Spain, Italy, and the south of France. It likewise occurs in Barbary, and, generally speaking, over a great portion of the basin of the Mediterranean; but being extremely sensible to cold, it is not likely to extend into Kamtschatka, as some suppose. It may be kept alive within doors in Spain throughout the winter (it naturally then assumes the torpid state), but will perish if dug up from its retreat, and exposed to cold approaching to the freezing point. This magnificent reptile sometimes attains the length, even in Europe, of two feet, although its more usual length is from twelve to fifteen inches. Its proportions are rather ample, that is, somewhat thicker than usual, yet it is by no means devoid of elegance; and although it can scarcely be said to be ornamented with those tints of azure, green, and gold, which Lacépède has lavished on it, with more of poetical fancy than precision, it yet is pleasingly adorned. The back is black, beset with numerous circles of green or yellow distributed in great profusion, and showing like pearly beads upon a darker ground. The head is beautifully marbled with green and black, as are also the upper portions of the thighs and feet. The tail is brownish, and all the under parts are of a greenish yellow. "Le lézard dont il est question est innocent, mais hardi ; il fuit au moindre bruit, non lâchement, s'arrêtant de distances en distances pour observer la cause de sa crainte, et si on le presse de trop près il se jette sur l'assaillant en faisant entendre un certain soufflement qui rappelle en petit celui qui font entendre les oies en colère. Comme on en trouvait beaucoup aux environs d'une baronie de Saint Magne, où nous avons passé les premiers temps de notre jeunesse, et que nous en avons été souvent violemment mordus en leur faisant la petite guerre que l'enfance livre à tout ce qui fuit, nous pouvons affirmer que leur dent ne produit aucun mauvais effet après la douleur du moment. Il suffit d'avoir vu un seul grand lézard vert, pour s'étonner que Linné ait pu confondre cette espèce avec le lézard gris."[1]

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[1] *Specimen Physiologiæ Comparativæ*, p. 31.

[2] *Historia Mundi*, lib. xxix. chap. 38; and Ælian, edit. Schneid. lib. v. 47.

[3] On this very curious physiological subject the reader may consult the following works: Plateretti, *Su le reproducione delle gambe e della coda delle Salamandre aquajuole.* Scelt. de Opusc. interes. vol. xxvii. p. 18. Spallanzani, *Sopra le reproduzioni animali*, Fisica Animale e Vegetabile, 1768. Murray, *Commentatio de redintegratione partium nexu suo solutarum vel amissarum*, 1787. Bonnet, *Sur la réproduction des membres de la Salamandre aquatique*, Œuvres d'Hist. Nat. et de Philos. t. v. p. 177.

[4] *Erpétologie Générale*, i. 209.

It has been observed by the prince of Musignano (C. L. Bonaparte), that the Linnæan term *agilis* has been applied by the naturalists of different countries to that species of lizard which was most common or best known in their own. In this way several distinct kinds have been described under one name, and regarded as identical. The true *L. agilis* of Linn. is a northern species, which becomes rare in Italy, but is sufficiently common in France, and extends into Denmark and Sweden. Its history as a British reptile has been clearly illustrated only within a recent period by Mr Jenyns and others; for the so-called *L. agilis* of the generality of British authors ought not to be so named.[2] The actual species varies as usual in colour and markings; but the most common hue of the upper parts is sandy-brown, with obscure longitudinal fasciæ of a darker brown, and a lateral series of black rounded spots, each marked with a yellowish-white dot or line in the centre. "It is more timid," says Mr Bell, "and far less easily rendered familiar, than the beautiful green lizard (*L. viridis*) of Guernsey and the south of Europe. This latter species may be readily tamed, and taught to come to the hand for its food, and to drink from the hollow of the palm of any one to whom it is accustomed. It will lie coiled up between the two hands, enjoying the warmth, and not offering to escape. But it is very different from the present species, which appears not to be susceptible of any such attachment. It will indeed attempt to bite any one who handles it, which I have never known to occur with *L. viridis.* When in confinement it ceases to feed, conceals itself with extreme timidity when approached, and ultimately pines and dies." Mr Bell has bestowed the English name of sand-lizard on this *L. agilis.*

Our only other British species is the common viviparous lizard (*L. vivipara*, Jacquin, *Zootoca vivipara*, Bell[3]) confounded with the true *L. agilis* by many authors. "This agile and pretty little creature," Mr Bell observes, "is the common inhabitant of almost all our heaths and banks in most of the districts of England, and extending even into Scotland; it is also one of the few reptiles found in Ireland. On the continent its range does not appear to be very extensive; it is not found in Italy, nor, I believe, in France, and is very probably confined in a great measure to our own latitude. Its movements are beautifully gracile as well as rapid; it comes out of its hiding-place during the warm parts of the day, from the early spring till autumn has far advanced, basking in the sun, and turning its head with a sudden motion the instant that an insect comes within its view; and, darting like lightning upon its prey, it seizes it with its little sharp teeth, and speedily swallows it." This species also varies greatly in its external aspect. The prevailing ground colour of the upper parts is greenish brown, with a dark brown dorsal line often interrupted; a broad fascia extends parallel with this on each side, commencing behind the eyes, and extending to a greater or less distance down the tail; and between these and the former are often one or more rows of black dots, and similar ones occur in many individuals in the broad lateral fascia. The under side of the body and base of the tail are orange, spotted with black in the male; in the female grayish brown without spots. In reference to Mr Bell's excellent account of this reptile, we take leave to add, that although it is no doubt entitled to the character of an ovo-viviparous species, the young are not always born at once from the body of the mother, that is, already freed from the encumbrance of the egg. We have several times kept gravid females in our possession, and on two occasions the membranous eggs were deposited unbroken, and the young lay within them for from two hours till a day and a half before they made their appearance. Their movements, however, were visible through the walls of their prison from the moment they were laid.

The more limited genus ALGYRA of Cuvier has the tongue, teeth, and pores of the lizards; but the scales on the back and tail are ridged, those on the abdomen smooth and imbricated, and the collar is wanting. In the genus TACHYDROMUS, Daudin, the scales on the back, and those beneath the tail and abdomen, are square and ridged; the collar on the neck is absent, as well as the pores on the thighs, but on either side of the anal aperture there is a vesicle opening by a pore. The body and tail are both much elongated. The species run with great swiftness. See Plate CCCCXXXI. fig. 3.

FAMILY III.—IGUANIDÆ. IGUANAS.[4]

In this family the general form, the lengthened tail, the free and unequal toes, resemble those parts in the lizard

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[1] *Dictionnaire Classique d'Hist. Nat.* ix. 339.

[2] See Jenyns's *British Vertebrate Animals*, p. 291; and Bell's *History of British Reptiles*, p. 22.

[3] Mr Bell assigns as one of the generic characters by which this species differs from his restricted genus *Lacerta*, that the palate is toothless, while it is armed in that last named.

[4] The great family of the IGUANIDÆ is divided by MM. Duméril and Bibron into forty-six genera, containing 146 species, the detailed descriptions of which occupy about 550 closely-printed pages in the work of those authors. (See *Erpétologie Générale*, tom. iv.). We regret that our restricted limits debar us from following their extended system, but we shall here present a tabular view of the genera and amount of species, partitioned in accordance with their geographical distribution.

Genera.	Europe.	Asia.	Africa.	America.	Australasia and Polynesia.	Total Species.
Sub-Family PLEURODONTES.						
Polycrus	0	0	0	3	0	3
Læmanctus	0	0	0	5	0	5
Urostrophus	0	0	0	1	0	1
Nerops	0	0	0	1	0	1
Anolis	0	0	0	25	0	25
Corythophanes	0	0	0	2	0	2
Basiliscus	0	0	0	2	0	2
Aloponotus	0	0	0	1	0	1
Amblyrhincus	0	0	0	3	0	3
Iguana	0	0	0	3	0	3
Metopoceros	0	0	0	1	0	1
Cyclura	0	0	0	3	0	3
Brachylophus	0	1	0	0	0	1
Enyalius	0	0	0	2	0	2
Opryessa	0	0	0	1	0	1
Uperanodon	0	0	0	1	0	1
Carry over	0	1	0	54	0	55

tribe, and the eyes, ears, and other characters are similar, but the tongue is thick, fleshy, not extensile, and, instead of being terminated by two filaments, is merely notched at the extremity.

Sect. 1.—*No teeth on the palate.* Agamians, Cuv.

a. Tail surrounded by rings composed of large scales, which are frequently spiny. *Stelliones*, Cuv.

In the genus Cordylus of Gronovius, not only the tail, but even the back and abdomen, are furnished with large scales placed in transverse rows. The head, as in the common lizards, is provided with a bony buckler, and covered with plates. In several species the points of the scales of the tail form spinous circles, and there are also little spines on the sides of the back, on the shoulders, and outside the thighs. The last-named parts have a line of very large pores. The Cape of Good Hope produces several species, which have been long confounded in systematic works under the name of *Lacerta cordylus*, Linn. They are somewhat larger than the common green lizard of Europe, and like it feed on insects.

In the genus Stellio of Daudin, the spines of the tail are of medium size, the back part of the head is bulged by the muscles of the jaws, the back and thighs are here and there beset with scales of larger size, sometimes spiny, and little groups of spines surround the ears. The thighs want the pores. The tail is long and pointed. Only a single species seems distinctly known to naturalists,—*St. vulgaris* (*L. stellio*, Linn.), a reptile very common in Egypt, and throughout the Levant. It measures about a foot in length, and is of an olive hue shaded with black. It is the *koscordylus* of the modern Greeks (*hardun* of the Arabs), and is not unfrequently named the rough lizard, in consequence of the unusually hispid appearance of the whole of its upper surface. The Mahommedans slay this species wrathfully, from a feeling that a peculiar downward inclination of its head is in mockery of their own reverential motions while engaged in prayer. The species called *stellio* by ancient writers was so named on account of its being marked by spots resembling stars, and was probably in no way allied to the genus to which in after times the title was applied.

The genus Doryphorus, Cuv. (a name too nearly resembling one already bestowed upon a group of insects), resembles the preceding in the absence of pores, but the body is not beset with groups of spines. (See Plate CCCCXXXI. fig. 4.) The azure lizard (*L. azurea*, Linn.) may serve as an example. The genus Uromastix, Cuv., may be described as composed of stellions, of which the hind head is not inflated; all the scales of the body small, smooth, and uniform, except those of the upper surface of the tail, which are large, spiny, and projecting. There is a series of pores upon the thighs. *Stellio spinipes* of Daudin is a *Uromastix.* It is found in the deserts which encompass Egypt, and is supposed by Belon, although without sufficient proof, to have been the *land-crocodile* of the ancients. It measures from two to three feet, has an inflated body of a fine grass-green colour, with small spines upon the thighs, as well as on the upper portion of the tail.

b. Scales on the tail imbricated. *Agamæ*, Daud.

In the ordinary or restricted genus Agama, scales raised into points or tubercles beset different parts of the body, and especially the ears, with spiny projections, isolated or in groups. There is sometimes a row upon the nape of the neck, but not forming a compressed crest as in *Calotes.* The skin of the throat is loose, transversely folded, and susceptible of dilatation. A species from New Holland (*Ag. barbata*, Cuv.) is remarkable for its size and extraordinary formation. A series of large spiny scales, disposed in transverse bands, prevails along the back and tail. The throat, often much inflated, is furnished with long pointed scales, forming a kind of beard-like appendage; and similar scales beset the sides, and form two oblique crests behind the ears. There are yellow spots upon the abdomen, bordered with black. Another of this genus is the muricated lizard of Shaw (*L. muricata*), likewise a native of New Holland. In some the body is enlarged or inflated, so as

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Genera.	Europe.	Asia.	Africa.	America.	Australasia and Polynesia.	Total Species.
Brought over	0	1	0	54	0	55
Leiosaurus	0	0	0	2	0	2
Hypsibatus	0	0	0	2	0	2
Holotropis	0	0	0	2	0	2
Proctotretus	0	0	0	10	0	10
Tropidolepis	0	0	0	8	0	8
Phrynosoma	0	0	0	3	0	3
Callisaurus	0	0	0	1	0	1
Tropidogaster	0	0	0	1	0	1
Microlophus	0	0	0	4	0	4
Ecphymotus	0	0	0	1	0	1
Stenocercus	0	0	0	1	0	1
Strobilurus	0	0	0	1	0	1
Trachycyclus	0	0	0	1	0	1
Oplurus	0	0	0	2	0	2
Doryphorus	0	0	0	1	0	1
Sub-Family Acrodontes.						
Istiurus	0	2	0	0	1	3
Calotes	0	5	0	0	0	5
Lophyrus	0	4	0	0	0	4
Lyriocephalus	0	1	0	0	0	1
Otocryptis	0	1	0	0	0	1
Ceratophora	0	1	0	0	0	1
Sitana	0	1	0	0	0	1
Chlamydosaurus	0	0	0	0	1	1
Draco	0	8	0	0	0	8
Leiolepis	0	1	0	0	0	1
Grammatophora	0	0	0	0	4	4
Agama	0	2	8	0	0	10
Phrynocephalus	0	3	1	0	0	4
Stellio	1	1	0	0	0	2
Uromastix	0	1	3	0	1	5
	1	32	12	94	7	146

to appear orbicular, as in *A. orbicularis*, a South American reptile, which, from its thickened form and broadened head, seems at first sight a connecting link between the frogs and lizards.

The genus Trapelus, Cuv., has the teeth and general form of Agama, but the scales are small and spineless. There are no pores on the thighs. *T. Egyptius*, Geoff., is a small species, in which the body is sometimes inflated. It can change its colour even more rapidly than the chameleon. This genus is not easily distinguished from some thick and slightly spined species of Agama, to which indeed the genera *Leiolepis*, *Tropidolepis*, and *Leposoma*, are nearly allied, and for the descriptive characters of which we may refer the reader to systematic works. The genus Calotes, Cuv., differs from Agama in being regularly covered with scales disposed tile-ways, often keeled and pointed, as well on the body as on the limbs, and tail, which is of great length. The scales on the middle of the back are more or less raised and compressed, forming a crest or ridge of variable extent. There are neither wattles nor pores upon the thighs, —characters which sufficiently distinguish them from the *Iguanas proper*. The best-known species is that called the galeot lizard (*L. calotes*, Linn.), of a variable colour, but usually of a fine light blue, with transverse lines of white upon the sides. There are two rows of spines behind the ear, and a lengthened ridge along the back. Its eggs are fusiform, or spindle-shaped. This curious reptile is native to the East Indies, and is called *chameleon* in the Moluccas, though it scarcely changes its colour. It is said to wander about upon the roofs of houses in quest of spiders; and Lacépède observes that it is reported to prey even on rats, and to fight with serpents. When out of temper, its throat becomes so inflated as to give it a frightful aspect. If authors are correct, its distribution must be very extensive, as it is said to occur not only in the East Indies, but in Arabia and Barbary. It certainly, however, does not inhabit Spain, as some have said. In the genus Lophyrus, Duméril, the scales of the body resemble those of *Agama*, and the palisade-like ridge upon the back is even higher than in *Calotes*. The tail is compressed. To this genus belongs *Agama gigantea* of Khul, remarkable for the height of its crest above the neck. Two bony ridges continued from the muzzle terminate in a point on each side above the eye, and join upon the temples. It is a native of India. In Lyriocephalus, Merrem, we find a species in which the bony crest above the eyes is even more marked than in the preceding, and terminates behind on each side in a sharp point. This strange reptile is found in Bengal and other parts of the East, and is said to live on grain. See Plate CCCCXXXI. fig. 5.

The preceding generic groups, from Agama downwards, are all more or less allied to the *Agamæ* of Daudin. We now proceed to a brief consideration of certain genera, of which the relationship is more remote.

The genus Istiurus of Cuvier is distinguished by an elevated cutting crest, which extends to a portion of the tail, and is supported by the high spinal processes of the vertebræ. This crest is scaly like the rest of the body, and the scales of the abdomen and tail are small, and rather of a square form. There are no teeth on the palate, but those of the other parts of the mouth are strong, compressed, and without dentation. The thighs bear a row of pores. The skin of the throat is loose, but does not form a dewlap. To this genus belongs that very remarkable animal the Amboyna lizard (*L. Amboinensis*, Gm.), first described by Valentyn, and afterwards with great accuracy and an excellent figure by Dr Albert Schlosser in 1768. The back is spined, but the regular ridge only commences at the base of the tail, over a portion of which it extends, like a broad upright fin. The head and neck are green, varied by transverse whitish undulations; the back and tail are brown, with a slight cast of blue or purple; and the sides and abdomen are grayish, spotted by means of round white scales. It resides, according to Valentyn, in the vicinity of fresh waters, and is frequently observed on the banks of rising grounds as well as on the lowlier kinds of shrubs which vegetate near the water, but does not ascend the taller trees. When disturbed by the approach of man or beast, it instantly dives, and hides itself among the rocks or stones beneath the banks. When captured, it does not in any way defend itself, but seems stupified. It may be caught by a noose or snare, and its flesh is said to be white and sweet, although of a penetrating odour. It is highly esteemed as food by many, and is itself accustomed to prey both on insects and vegetable substances. It sometimes attains a length of nearly four feet.

The genus Draco, Linn., may be distinguished at a glance from all other Saurian reptiles, by the singular peculiarity of six false ribs, which, instead of conforming as usual to the shape of the body, extend from it at right angles, and supporting a produced portion of the skin, present the appearance of a pair of wings. They support the animal in the air, as it leaps from branch to branch, but have no propelling power, and so cannot raise it in the least degree. In relation to their other characters, these so-called dragons are of small size, and covered all over by imbricated scales, of which those on the tail and limbs are keeled. The tongue is fleshy, not very extensile, and slightly notched. Beneath the throat there is a long pointed dewlap, supported by the tail of the hyoid bone; and on its sides are two others of smaller size, sustained by the horns of the same bone. The tail is long; there is a small dentation on the nape of the neck; and the thighs have no pores. Each jaw is furnished with four small incisor teeth, with a pair of long-pointed canines, and twelve triangular three-lobed grinders. The genus may be said to combine the scales and dewlaps of the Iguanas, with the head and teeth of the Stellions. See Plate CCCCXXXI. fig. 6.

All the known species of Draco inhabit the East Indies, and have derived their generic appellation from their supposed resemblance to the fictitious Dragons of antiquity. In all ages, and in most countries, the imagination of timid or fantastic men has produced a belief in the existence of fabulous beings, of monstrous forms and irresistible ferocity, which carried devastation into provinces, guarded the entrance to sacred places, or watched over "sunless heaps" of hidden gold. The heroic history of Greece, and the darker superstitions of the Germanic people, are alike pervaded by these fond beliefs. "Rendered celebrated," says Lacépède, "by the songs of Greece and Rome, the principal ornament of pious fables imagined in more recent times, conquered by heroes, and even by youthful heroines, who were contending for a divine law, and adopted by a second mythology, which placed the fairies on the throne of the enchantress of old, the Dragon became the emblem of the splendid actions of valiant knights, and has enlivened modern as it animated ancient poetry. Proclaimed by the severe voice of history, everywhere described, everywhere celebrated, everywhere dreaded; exhibited under all forms, always clothed with tremendous power, and immolating his victims by a single glance; transporting himself through the midst of clouds with the rapidity of lightning, dissipating the darkness of night by the terrific splendour of his glaring eyes, uniting the agility of the eagle, the strength of the lion, and the magnitude of the giant serpent; sometimes presented under a human figure, endowed with an intelligence almost divine, and adored, even in our own days, in the great empires of the East,—the Dragon, in short, has been all in all, and everywhere to be found, except in nature."

The existence of these animals has not been altogether discredited, even in modern times. About the middle of last century, a Hamburg merchant greatly prided himself on the possession of a famous dragon, which he valued at 10,000 florins. It was however discovered by the penetrating eye of the then youthful Linnæus to be a gross deception, formed by a combination of the skins of snakes, the teeth of weasels, and other absurd and heterogeneous elements, "non Naturæ sed artis opus eximium." It is said that the great Swedish naturalist was obliged to flee the city to avoid the wrath of the enraged proprietor. A similar fraud seems to have been practised in our own country towards the close of the seventeenth century, and is thus related by Dr Grainger, from a note of Dr Zachary Grey, in his edition of Hudibras. "Mr Smith of Bedford observes to me, on the word *dragon*, as follows: Mr Jacob Robart, botany professor[1] of Oxford, did, about forty years ago, find a dead rat in the Physic Garden, which he made to resemble the common picture of dragons, by altering its head and tail, and thrusting in taper sticks, which distended the skin on each side, till it mimicked wings. He let it dry as hard as possible. The learned immediately pronounced it a dragon; and one of them sent an accurate description of it to Dr Magliabechi, librarian to the Grand Duke of Tuscany; several copies of verses were wrote on so rare a subject; but at last Mr Robart owned the cheat; however, it was looked upon as a masterpiece of art, and as such deposited in the museum, or anatomy school, where I saw it some years after."

We need hardly here observe, that the actual dragons, or *Dracones* of naturalists, are harmless animals, of small size though extraordinary forms, which inhabit chiefly the insular forests of the Indian Ocean. (See Plate CCCCXXXI. fig. 6.) In these umbrageous places they pursue their insect prey, descending but rarely to the ground, on which they walk with difficulty. According to Van Ernest, a Dutch naturalist, they couple among the branches, and the female deposits her eggs in hollow trees, under favour of a south exposure. We are doubtful regarding their amphibious propensities, as reported by M. Palisot de Beauvois, who remarked one in the *kingdom of Benin*, which he was unable to procure, because it was swimming in the water. Now Baron Cuvier states that "les espèces connues viennent toutes *des Indes Orientales*."

Three distinct species of Draco are described by M. Daudin, who was the first to discriminate their characters. *D. lineatus* (*volans*, Linn.) has the body varied above with blue and gray, the wings brown, with longitudinal stripes of white. *D. viridis* is green, the wings gray, with brown bands. This is the species described by Seba under the name of *winged dragon of America*, and afterwards figured by that author as the *flying dragon of Africa*, in neither of which countries is it ever found. It is said by Bontius to be not uncommon in Java, where it will shoot from tree to tree for a distance of thirty yards, producing a perceptible noise by the vibration of its wings. With a view to render itself specifically lighter, it inflates its yellowish goitres when it flies. *D. fuscus* is brown above, paler beneath; the wings likewise brown. Eight species are now known to naturalists.

The genus SITANA, Cuv., possesses the teeth of the preceding; the limbs and body are covered with scales imbricated and keeled, the thighs are without pores, but the false ribs are not expanded. The species are distinguished by an enormous dewlap, which extends as far as the middle of the abdomen, and is more than twice the height of the body. We know not that there is any other described than the Pondicherry species (*Sit. Ponticeriana*), a small reptile of a fawn-colour, with a range of large rhomboidal spots along the back. See Plate CCCCXXXI. fig. 7.

SECT. 2.—*Teeth on the Palate.*

Genus IGUANA, Cuv. *Iguanas properly so called.* These have the body and tail covered with small imbricated scales. A row of spines or raised scales, compressed and pointed, prevails along the back; and beneath the throat there is a compressed and pendant dewlap, or gular pouch, of which the margin is supported by a cartilaginous production of the hyoid bone. The thighs bear a line of tubercular pores like those of lizards, and the head is covered with plates. Each jaw supports a range of compressed triangular teeth with dentated cutting edges, and there are moreover two small rows of teeth on the posterior margin of the palate.

The common iguana (*I. tuberculata*, Laur., *Lac. iguana*, Linn.) is naturally of a greenish-yellow colour above, mottled with pure green, the tail ringed with brown; the under parts of a paler hue. The scales of the dorsal crest are large and spinous, and there is a conspicuous rounded plate beneath the tympanum, at the angle of the jaws. The sides of the neck bear some pyramidal scales mingled with the others, and the anterior edge of the dewlap is dentated like the back. This species measures from four to five feet in length, and is extensively spread over many of the warmer countries of America, where it is held in high esteem as an article of diet, though by many regarded as by no means healthful. It dwells chiefly among trees, feeding on fruits, grain, and leaves, and is sometimes seen to enter the water. The female deposits her eggs in the sand. They equal in size those of a pigeon, have scarcely any albumen, and afford excellent eating. The common method of catching this reptile is by casting a noose over its head, and then drawing it from its position. It seldom makes an effort to escape, but stands staring at its antagonist, at the same time inflating its throat in a most extraordinary manner.

"Guanas," says Catesby, "are of various sizes, from two to five feet in length; their mouths are furnished with exceeding small teeth, but their jaws armed with a long beak, with which they bite with great strength; they inhabit warm countries only, and are rarely to be met with anywhere north or south of the tropics. Many of the Bahama Islands abound with them, where they nestle in hollow rocks and trees; their eggs have not a hard shell, like those of alligators, but a skin only, like those of a turtle, and are esteemed a good food. They lay a great number of eggs at a time in the earth, which are there hatched by the sun's heat. These guanas are a great part of the subsistence of the inhabitants of the Bahama Islands, for which purpose they visit many of the remote *kayes* and islands in their sloops to catch them, which they do by dogs trained up for that purpose, which are so dexterous as not often to kill them, which, if they do, they serve only for present spending; if otherwise, they sew up their mouths to prevent their biting, and put them into the hold of their sloop till they have catched a sufficient number, which they either carry alive for sale to Carolina, or salt and barrel up for the use of their families at home. These guanas feed wholly on vegetables and fruit, particularly on a kind of fungus growing at the roots of trees, and on the fruits of the different kinds of *annonas*. Their flesh is easy of digestion, delicate, and well tasted; they are sometimes roasted; but the more common way is to boil them, taking out the leaves of fat, which are melted and clarified, and put into a calabash or dish, into which they dip the flesh of the guana as they eat it. It is remarkable that this fat, which adheres to the inside of the abdomen, imbibes the colour of the fruit the animal eats last, which I have frequently seen tinged of a pale red, yellow, or sometimes of a purple colour, which last was from eating the *prunus maritima*, which fruit, at the same time, I took out of them. Though they are not amphibious, they are said to keep under water above an hour. When they swim, they use not their feet, but clap them close to their body, and guide themselves with their tails; they swallow all they eat whole. They cannot run fast, their holes being a greater security to them than their heels. They are so impatient of cold that they rarely appear out of their holes but when the sun shines."

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[1] He was rather superintendent of the garden than professor properly so called.

"The guana," observes Browne, in his Natural History of Jamaica, "like most of the tribe, lives a very considerable time without food, and changes its colour with the weather, or the native moisture of its place of residence. I have kept a grown guana about the house for more than two months; it was very fierce and ill natured at the beginning, but after some days it grew more tame, and would at length pass the greatest part of the day upon the bed or couch, but it went out always at night. I have never observed it to eat anything, except what imperceptible particles it had lapped up in the air; for it frequently threw out its forked tongue, like the cameleon, as it walked along. The flesh of this creature is liked by many people, and frequently served up in fricassees at their tables, in which state they are often preferred to the best fowls. The guana may be easily tamed while young, and is both an innocent and a beautiful creature in that state."

The horned iguana of St Domingo (*Ig. cornuta*, Cuv.) is distinguished from the common kind by an osseous conical point between the eyes, and two raised scales upon the nostrils. The neck is not tuberculated. This species measures about four feet in length, and is frequently found on the hills of St Domingo, between Artibonite and Gonaïves. It lives on fruits, insects, and small birds, which it seizes with surprising agility, and during the day it couches on trees and rocks to watch for its prey. During the night, and throughout the greatest heats of the hot season, it retires among the chambered rocks, or into the hollows of old trees, and there passes many months in a state of lethargy. This iguana is considered by the negroes as a great delicacy, and they accordingly search for it with avidity. According to the report of the colonists, its flesh resembles in flavour that of the roe-buck, and the maroon dogs make great slaughter among these reptiles.[1]

The naked necked iguana (*Ig. nudicollis*, Cuv.) resembles the preceding species in its dorsal crest, but it does not possess either the large plates beneath the tympanum, nor the scattered tubercles on the sides of the neck. The upper part of the cranium is furnished with gibbous plates, the occiput is tubercular, and the dewlap or gular pouch is slightly dentated, and only on its anterior portion. Its native regions are Brazil and Guadaloupe, not India, as Laurenti supposes. (See Plate CCCCXXXI. fig. 8.) Several other species are described by naturalists.

In the genus *Ophryessa*, Boié, the scales are small and imbricated; a dorsal crest, not greatly projecting, is prolonged upon the tail, which is compressed. The teeth resemble those of the preceding genus, but there is neither dewlap nor pores. The supercilious lizard of the older authors (*Oph. superciliosa*) may be named as an example. It is an American species, of a fawn-colour, with a festooned band of brown along the flanks, and measures from twelve to sixteen inches. It derives its specific name from a peculiar membranous ridge which occupies the region of the eyebrow.

The genus Basiliscus, Daudin, has the scales of small size, and the raised ridge on the back and tail is continuous, and supported by the spiny processes of the vertebræ, after the fashion of the tail in the Amboyna lizard, as already mentioned in our brief notice of the genus *Istiurus*.

The name of Basilisc as naturally recalls to mind the fabled stories of antiquity as that of Dragon. It was supposed to be the most poisonous and malignant of creatures, its very aspect being regarded as fatal to the unhappy beholder. It exercised its tyrannous sway amid the burning and desert sands of Africa, and obliged each meaner reptile to keep at a respectful distance.

> Sibilaque effundens cunctas terrentia pestes,
> Ante venena nocens, late sibi submovet omne
> Vulgus, et in vacua regnat Basiliscus arena.

But the animals now known to naturalists under the name of Basilisc, we are happy to say, are harmless creatures, of very innocent manners, although of most extraordinary aspect. They do not occur in Africa, as Lucan feigns, nor in India, as Seba alleges, but in South America, especially Guiana, as Daudin has determined. The best known is the mitred species (*B. mitratus*, *L. Basiliscus*, Linn.), distinguished by a membranous crest upon the occiput, somewhat in the form of a cowl or hood, and supported by cartilage. It is of a bluish colour, with two white bands, one behind the eye and another behind the maxillæ. It measures from two to three feet in length, and feeds on grains.

In the genus Polychrus, Cuv. there is no dorsal crest, the head is covered with plates, and the tail is long and slender. The extensile skin of the throat is capable of being formed into a gular pouch at the will of the animal, and this genus possesses the power of changing colour like the cameleons. Their lungs are likewise very voluminous, filling up a great portion of the body, and subdividing into various branches. Their false ribs, too, like those of the cameleon, encompass the abdomen, and so unite as to form entire circles. The marbled lizard (*Lac. marmorata*, Linn.) may be named as an example. It is of a reddish-gray colour, marbled with transverse irregular bands of brownish red, sometimes mingled with blue. The tail is of great length. This species is frequent in Guiana.

The genus Anolius, Cuv. combines with the form of the preceding a very peculiar and distinctive character, the skin of the toes being enlarged beneath the ante-penultimate joint, into an oval disk, transversely striated on the under surface, which aids the animal in climbing, which it is otherwise enabled well to do by means of its crooked claws. The body and tail are moreover chagrined with minute scales, and the majority bear a dewlap or goitre-like expansion beneath the throat, which they not only inflate, but cause to change both in form and colour, in accordance with their various moods of love or anger. Indeed several of the species at least equal the cameleon in their power of assuming frequent and rapid alternations in the colour of their skin. Like these creatures, too, and the genus *Polychrus*, the ribs form entire circles. The species are peculiar to America, and several of them are even naturally of familiar habits, frequenting the vicinity of human habitations.

In some there is a crest upon the tail, supported by the spiny processes of the vertebræ, as in *Istiurus* and *Basiliscus*. Such is the great crested Anolis (*An. velifer*, Cuv.), which measures about a foot in length. The crest extends over one half of the tail, and is supported by from twelve to fifteen rays; the dewlap reaches to beneath the belly. (See Plate CCCCXXXII. fig. 2.) It is found in the Antilles.

In others the tail is round, or only slightly compressed. The species of this section of the genus are numerous, and have been frequently confounded under one or two specific names. They inhabit the warmer parts of continental America and the West Indies, and change colour with surprising facility, especially in warm weather. They feed on insects, and scarcely equal the size of the gray lizard of Europe. They capture their prey with great alacrity; and the different individuals are said to fight fiercely when they meet each other. We may mention as an example the red-throat lizard, called by Catesby the green lizard of Jamaica (*L. bullaris*, Linn.). Its muzzle is short, speckled with brown, the eyelids projecting, and the prevailing colour a grassy green. It is common in Jamaica, where it frequents hedges and trees, but does not enter houses. When approached or angered it protrudes its gular pouch, which speedily becomes as bright as a cherry. This peculiar change may be regarded as a kind of menace, to deter its enemy from closer quarters. It is incapable of inflicting the slightest injury by its bite or otherwise. Another species is Catesby's green Carolina lizard (*An. Carolinensis*), which is of a beautiful golden green, the muzzle flat and elongated. This kind is said by Catesby to be very common in Carolina, where it frequents houses, and becomes in a manner familiar, so as to sport about tables and windows, catching flies with great dexterity. It is seen chiefly in summer, retreating in winter into hollow trees, where it assumes the torpid state. Sometimes, when tempted by delusive sunshine, it re-appears, and on the return of chilly weather becomes enfeebled by the cold and dies. Its colour changes frequently from green to brown, according to the temperature.

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[1] Griffith's *Animal Kingdom*, ix. 225.

FAMILY IV.—GECKOTIDÆ.

This family consists of what may be termed the nocturnal lizards, all of which bear a strong resemblance to each other. Baron Cuvier regards them as constituting a single genus, divisible according to the form and structure of the toes, as after mentioned.

The genus Gecko may be characterized as consisting of Saurian reptiles, of not so lank a form as those of the preceding genera. They are rather of a flattened shape, especially about the head; the feet are of medium size, and the toes of nearly equal length. Their gait is heavy and crawling. Their eyes are large, and the pupil extremely contractile under the influence of light, so that they usually keep themselves concealed throughout the day in dark or sombre places. Their eyelids are very short, and withdraw entirely between the eye and the orbit, which bestows on these animals a very peculiar physiognomy. Their tongue is fleshy, not extensile; the jaws are furnished all around with a row of very small close-set teeth; the palate is toothless. The skin is chagrined above with very small granular scales, among which some larger tubercles are often dispersed; the under parts are covered by flattish scales scarcely so small, and imbricated. The pores on the thigh are not here regarded as a generic character, being absent in some and present in others. The tail is marked by circular folds, as in the genus *Anolis;* but when mutilated, it has been noticed to renew itself without these folds. This genus is numerous and widely spread, occurring both in the old world and the new.[1] The dull and doleful aspect of the geckoes, and a certain resemblance which they bear to toads and newts, render them liable to the imputation of poisonous properties,—an assumption without proof, and altogether against analogy.

The majority of the species have the toes enlarged for a greater or less extent, and furnished beneath with regular folds upon the skin, which, by some peculiar action, enable them to adhere to smooth surfaces, to ascend perpendicular walls, and even to creep in a reversed position along a ceiling. The claws are retractile in different ways, and preserve their points and cutting edges; and these characters, combined with the contractile nature of the pupil, has induced a comparison of the geckoes among reptiles to the feline tribes among carnivorous quadrupeds. The claws, however, vary in the different species, and in some are altogether wanting. It is in accordance with the particular structure of the toes in different species that the geckoes have been subdivided into several separate groups, which some authors regard as constituting so many distinct genera.[2]

SECT. 1.—PLATYDACTYLI. Toes widened throughout, and furnished beneath with transverse scales.

In certain species of this section of the genus the nails are entirely wanting, and the thumb is very small. They are rather ornamental in their aspect, covered over by tubercles, and adorned by lively colours. They occur in the Isle of France. Some have no pores upon the thighs: such are *G. inunguis*, Cuv., of a violet colour above, white beneath, with a black line along the sides; and *G. ocellatus*, Oppel, of a gray hue, covered with brown spots, with white centres. Some possess the pores, as *G. Cepediensis*, a yellowish-red coloured species, marbled with blue, and marked with white along the sides.

In other platydactylous geckoes the nails are wanting only on the thumbs, and on the second and fifth toes of all the feet, and there are no pores upon the thighs. To this little group belongs the wall-gecko, a European species (*G. fascicularis*, Daud.), called *Terrentola* by the Italians. It is of a deep-gray colour, with a rough head; all the upper parts beset with tubercles, each of which is formed of three or four others of smaller size. It is a creature of a most unseemly aspect, which hides itself in the holes of walls, or beneath heaps of stones, and moreover covers its body with dust and ordure. It, however, delights also in sunshine, and is said not to occur in damp or very sombre situations. In winter it lies inert, but not torpid. It inhabits the countries around the Mediterranean, and ventures as far north as Provence and Languedoc. A nearly allied species occurs in Egypt and Barbary,—*G. Ægyptiacus*, Cuv. Its tubercles are round and simple, more projecting on the sides.

The greater number of the platydactylous species want the nails only on the four thumbs, and have a range of pores anterior to the anus. *G. guttatus*, Daud. has a reddish coloured body, spotted with white, and beset by round-

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[1] The following table exhibits a view of the geographical distribution of the *Geckotidæ*, so far as known at this time:

Generic Groups.	Europe.	Asia.	Africa.	America.	Australasia and Polynesia.	Locality Unknown.	Total Species.
Platydactylus	1	5	5	2	3	1	17
Hemidactylus	1	5	1	1	3	1	12
Ptyodactylus	0	0	2	1	0	1	4
Phyllodactylus	0	0	1	3	3	1	8
Spheriodactylus	0	0	0	3	0	0	3
Gymnodactylus	0	3	2	2	2	0	9
Stenodactylus	0	0	1	0	1	0	2
Totals	2	13	12	12	12	4	55

[2] See *Erpétologie Générale*, iii. 290.

ed slightly projecting tubercles. The scales on the under part of the tail are square and imbricated. Seba describes this as a Ceylonese species, and adds, that the name of *gecko* is applied to it on account of its cry resembling that word. It is believed to occur throughout the Indian Archipelago. A belief prevails in the native country of this and other species, that an acrimonious fluid exudes from the lamellæ of the feet, and remaining on fruit, or other edible vegetation, is productive of injury to those who swallow it. A species is described by Bontius in his history of Java, under the name of Indian Salamander; and that old author states that the Javanese are said to hold it up by the tail until it discharges a foam or sanies from the mouth, with which they poison their arrows.

SECT. 2.—HEMYDACTYLI. Base of the toes furnished with an oval disk, formed beneath by a double row of scales *en chevron*; from the centre of this disk the second joint springs, and bears the third or nail at its extremity.

All the known species of the hemydactylous division have five nails on each foot, and a range of pores on each side of the anus. The scales beneath the tail are in the form of broad bands, like those of many serpents. A grayish red kind (*G. verruculatus*, Cuv.) occurs in the southern countries of Europe. The body is beset with small, conical, slightly rounded tubercles, and circles of the same surround the tail. A nearly allied species (*G. mabuia*, Cuv.) is widely spread over the warmer parts of the new world, where it often enters dwelling-houses, occurring apparently identical both in Bengal and Pondicherry. Cuvier presumes it may have been transported thither accidentally in ships. A species more peculiar to India is *G. marginatus*, Cuv. of which the body is margined, and the tail flattened horizontally, with its edges sharp and slightly fringed.

SECT. 3.—THECADACTYLI. Toes enlarged throughout their entire length, and furnished with transverse scales, which are divided by a deep longitudinal furrow, wherein the claw may lie entirely concealed.

Such as are clearly known do not want the claws except upon the thumbs. They have no pores upon the thighs, and the scales upon the tail are small. As an example, may be named the smooth, or, as it is sometimes called, the perfoliated gecko (*G. lævis*, Daud., *Stellio perfoliatus*, Schneid.). The tail of this species in the natural or normal state is long, and surrounded by the usual fold; but it is easily fractured, and the reproduced portion often assumes a bulbous form, with a tapering termination, not unlike a small turnip with its root. In this accidental condition it was formerly described as a distinct species, under the title of *Lacerta rapicauda*.

SECT. 4.—PTYODACTYLI. Toes dilated only at the tips, and striated below. The dilatation is cleft, and the nail placed in the fissure. The whole of the toes are furnished with curved claws.

In some the toes are free, and the tail rounded. Such is *G. lobatus*, Geoff., sometimes named the house-gecko. It is smooth, or at least both scales and tubercles are very small, the general colour reddish-gray speckled with brown. This species is common in houses in many of the countries on the southern and eastern parts of the Mediterranean. It is known in Cairo by the unlovely name of *abou burs*, or *father of the leprosy*, because it is supposed to produce that dreadful malady by poisoning provisions with its feet. Hasselquist relates that he saw at Cairo two women and a girl at the point of death, in consequence of their having eaten some cheese over which this creature chanced to crawl. He likewise mentions a man who, having laid hold of a gecko, his hand became instantaneously covered with red inflamed pustules, which were as itchy as those produced by the stinging of a nettle. Cats are said to eat these reptiles; and they are driven from the Egyptian kitchens by the odour of garlic. The house-gecko feeds on insects, and its eggs are equal in size to a small nut. Its voice resembles that of a frog.

In others the tail is bordered on both sides by a membrane, and the feet are semi-palmated. Baron Cuvier is of opinion that they are probably aquatic. The species are truly singular in their external aspect. Such is the fimbriated gecko (*G. fimbriatus*, Cuv.), of which the form is much depressed, and the tail bordered by a lateral margin, which is also visible on the sides of the body, where, however, it becomes fringed or slashed. It is a native of Madagascar, where it is erroneously held in great dread. In Lacépède's opinion, it connects together the cameleons, geckoes, and water-newts. It measures eight or nine inches in length; and lives in trees, leaping from branch to branch. The colours of this species, like those of the cameleon, are very changeable, at least on the upper surface, the under portion being usually of a bright yellow. "These changes," says Dr Shaw, "we are informed, have been observed in the living animal by Mons. Bruyeres in its native country, viz. Madagascar, where it is not very uncommon, and where, though a harmless animal, it is held in great abhorrence by the natives, who consider it of a poisonous nature, and fly from it with precipitation, pretending that it darts on their breast, and adheres with such force by its fringed membrane, that it cannot be separated from the skin without the assistance of a razor. The principal cause of this popular dread of the animal is its habit of running open mouthed towards the spectator, instead of attempting to escape when discovered. Its chief residence is on the branches of trees, where it lives on insects, holding itself secure by coiling its tail, short as it is, half round the twig on which it sits. It chiefly appears in rainy weather, when it moves with considerable agility, often springing from bough to bough. On the ground it walks but slowly, the fore-legs being shorter than the hinder."[1]

An equally singular species of this section is the scollop-tailed gecko (*G. caudiverbera*), which has no fringe upon the body, but a very peculiarly indented margination on each side of the tail. It is of a blackish colour, measures above a foot in length, and was found by M. Feuillé in a fountain of the Cordilleras. Some confusion exists in systematic works between this species and that figured by Seba under the name of *Salamandra aquatica ex Arabia*.

SECT. 5.—SPHERIODACTYLI. Toes terminated by a small cushion without folds; the claws retractile.

Such species as have the cushion double or notched in front are natives of the Cape of Good Hope and the East Indies. Example, *G. porphyrius*, Daud. More frequently the cushion is rounded and simple, as in the species called the spitting gecko (*G. sputator*, Lac.), a small reptile, pleasingly marked by transverse bands of brown upon a reddish ground. It inhabits houses in St Domingo. A lizard described by Sparman under the same specific name, if not identical with the species just named, no doubt pertains to this genus. It is said when disturbed by a near approach to eject from its mouth a black and acrimonious fluid into the face of the spectator, causing an inflammation of the skin, which, however, is allayed by rubbing the part affected with camphorated spirits of wine.

Finally, there are Saurians which, with all the characters

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[1] *General Zoology*, iii. 274.

Sauria. Chamæleonidæ.

of the geckoes, exhibit no enlargement of the toes, although their claws, five in number, are nevertheless retractile. They at present compose three genera, as follows:

In Stenodactylus the tail is round, the toes striated beneath, and dentated on the edges. *Sten. guttatus* is an Egyptian species, of a gray colour, sprinkled with whitish spots; the skin smooth. In Gymnodactylus, Spix, the toes are slender and bare, and the tail rounded. Example, *Gym. geckoides*, Spix. In Phyllurus, Cuv., the toes resemble those of the preceding; but the tail is flattened horizontally, and shaped like a leaf. The only known species is *Ph. platura*, from New South Wales, described by White under the name of broad-tailed lizard.[1] It measures about six inches in length, and is of a brownish-gray colour, beset with tubercles. (See Plate CCCCXXXII. fig. 3.)

FAMILY V.—CHAMÆLEONIDÆ. CAMELEONS.

This family consists solely of the genus Chamæleo, distinguished by the following characters. The entire surface is chagrined with small granular scales, the body is compressed, the dorsal edge narrow; the tail is rounded and prehensile. There are five toes on each foot, arranged as it were in two groups, three in one, and two in the other, in some measure resembling the foot of a scansorial bird; but the toes of each group are connate, or enclosed within the skin, as far as the claws. The tongue is fleshy, cylindrical, extensile, and of great length. The teeth are trilobed. The eyes are large in themselves, but almost entirely covered over by the skin, except a small opening opposite the pupil; and each eye has the power of movement independent of the other. There are no external ears, and the occiput rises in a pyramidal form. The first ribs unite with the sternum, and the succeeding ones meet each other so as to form a circle around the abdomen. The lungs are of vast extent, and according to their state of collapse or inflation, greatly affect the form and aspect of the animal. This, with its long power of abstinence, may have given rise to the common belief that it feeds on air.[2]

Cameleons are insectivorous reptiles, of which the slow pace, the extraordinary form, the awkward movements, the vivacity of eye, and the marvellous rapidity of tongue, have excited the wonder of mankind from the earliest ages. Their change of colour, by no means so marked or sudden as supposed, has nothing to do with the hue of the objects by which they are surrounded, but bears relation physically to the degree of light or obscurity to which they are exposed, morally to the state of their own feelings of fear or anger, and physiologically and directly to the action of the lungs upon the circulating system. "En effet," says Cuvier, "leur poumon les rend plus ou moins transparents, contraint plus ou moins le sang à refluer vers la peau, colore même ce fluide plus ou moins vivement, selon qu'il se remplit ou se vide d'air." "The general or usual colour in the chameleon," says Dr Shaw, "so far as I have been able to ascertain from my own observation of such as have been brought into this country in a living state, are from a bluish-ash colour (its natural tinge) to a green and sometimes yellowish colour, spotted unequally with red. If the animal be exposed to a full sunshine, the unilluminated side generally appears, within the space of some minutes, of a pale yellow, with large rounded patches or spots of red brown. On reversing the situation of the animal the same change takes place in an opposite direction, the side which was before in the shade now becoming either brown or ash colour, while the other side becomes yellow and red; but these changes are subject to much variety, both as to intensity of colours and disposition of spots."[3]

Authors of all ages have differed greatly in opinion regarding the causes of the change of colour in cameleons. The phenomenon, though remarkable, and strongly exemplified in these creatures, is by no means peculiar to them, but occurs, as we have noted in the course of this article, among many others of the reptile race, especially in such as, the general envelope not adhering closely to the muscles, receive a portion of air beneath the skin. It is also observable in many mollusca, particularly the cuttle-fish tribe. But to recur to the cameleon. Aristotle and many other authors have maintained that the change of colour only took place when the animal inflated itself. Pliny repeats the opinion (which has since prevailed) that it assumed the colours of the bodies by which it was surrounded, with the exception of red and white. Wormius was among the first to maintain that the changes in question were due to the emotions of the reptile. Solinus assigns as the cause the reflexion of the luminous rays. Kircher supports the theory of volition and emotion. Goddard adopts the same explanation, with the addition that the colours at the same time bear a relation to neighbouring bodies. Hasselquist and Linnæus refer to the pigmentum as the cause. Finally, the majority of modern authors who have written on the subject (and their name is legion) have sought to explain the phenomenon either by the modifications of the respiratory system, by these modifications combined with the state of the pulmonary circulation, or by the transposition of the various layers which are believed to exist in the pigmentum.[4]

We may state briefly in regard to the geographical distribution of the cameleons, that Africa is their characteristic country. Of the fourteen species known to naturalists, the whole occur there or in the adjacent islands, especially Madagascar; three species, however, are not exclusively African, *Cham. dilepis*, Leach, being found in Georgia, *Cham. vulgaris* in the south of Europe, and *Cham. bifidus* in continental India, the Moluccas, Isle of France, and New Holland. They are thus entirely unknown in America.

These reptiles dwell habitually among shrubs or trees. "Nous avons observé," says M. Bory de St Vincent, "des caméléons en liberté, fixés sur les rameaux des arbustes, qu'ils tenaient fortement serrés entre leur doigts, à peu près comme le font les perroquets dont le pied présente une certaine analogie avec les leurs; ils étaient aussi immobiles que s'ils eussent été des imitations artificielles. Leurs yeux seulement, dont la prunelle brillait comme une pierre précieuse au milieu d'une globe blanchâtre percé d'un petit trou étincelant, roulaient en tout sens, et tandis que l'un regardait par devant, l'autre observait les objets situés en arrière. Quelquefois le mouvement anguleux d'une pate comme disloquée, lentement suivi de celui de la suivante et du déroulement de la queue, qui servait de cinquième point d'appui au caméléon, déterminait un tardif avancement de quelques lignes. Dans cet état de paix, au milieu du feuil-

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[1] *Voyage to New South Wales*, pl. 32; and *Naturalist's Miscellany*, pl. 65.

[2] "All which considered," says Sir Thomas Brown, in his *Vulgar Errors*, "severer heads will be apt enough to conceive the vulgar opinion of this animal to be not much unlike that of the *Astomi*, or men without mouths, in Pliny; suitable unto the relation of the mares in Spain, and their subventaneous conceptions from the western wind; and in some way more unreasonable than the figment of *Rabican*, the famous horse in *Ariosto*, which, being conceived by flame and wind, never tasted grass, or fed on any grosser provender than air; for this way of nutrition was answerable unto the principles of his generation; which being not airy, but gross and seminal in the *chameleon*, unto its conservation there is required a solid pasture, and a food congenerous unto the principles of its nature."

[3] *General Zoology*, iii. 256.

[4] For a summary on this subject, see a paper by Dr Spittal in the *Edin. New Phil. Journ.* for 1829, p. 292.

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lage des lentisques, sa couleur était d'un blanc assez pur, tirant sur le jaunâtre. Saisi, il se gonflait d'abord et ne faisait nul effort pour éviter le danger; sans doute il en sentait l'inutilité; mais bientôt on voyait circuler sur toutes les parties de son corps des teintes diverses dues au sang, poussé vers la peau par la dilatation de ses vastes poumons. Le caméléon, rendu à lui-même, ne tardait point à reprendre sa couleur blanchâtre que la mort rembrunit. Du reste, le plus innocent de tous les animaux, ce caméléon changeant, qui ne cherche jamais à mordre, vit de mouches qu'il guette; lorsque celles-ci passent à sa portée, son corps, sa tête, ses membres demeurent immobiles; mais il a calculé la portée de sa langue, il la lance comme un trait; et l'animal ailé, malgré son agilité et la promptitude de son vol, se trouve collé au bouton visqueux qui le rapport en un clin-d'œil dans la bouche de son ennemi.

"On a imprimé, dans la plupart des livres d'histoire naturelle, qu'on ne trouvait des caméléons que dans les parties les plus chaudes des régions intertropicales. Ces animaux s'y plaisent sans doute, mais non seulement ils dépassent les tropiques, ils s'élèvent encore beaucoup au nord dans la zône tempérée, puisque nous en avons trouvé fréquemment dans le midi de l'Espagne. L'espèce de Barbarie y est aussi commune autour de la baie de Cadix, où lorsque, pour les opérations de la siége, nous faisions abattre des pins sur la rive gauche du Guadalète, nous en trouvions communément entre les rameaux dont se formaient la cime de ces arbres. On en voit dans quelques maisons, qui demeurent fort longtemps, sans remuer, suspendus à des ficelles sur lesquelles on les a placés comme objets de curiosité; les chats en sont assez friands, et ceux qu'on tient en captivité finissent ordinairement par les griffes de ces tigres domestiques."[1]

The best-known species is *Cham. vulgaris*, often called the African cameleon (*Lac. Africana*, Gm.), an ill-selected name, in as far as several other kinds occur in Africa, and the species in question spreads from the south of Spain through many intermediate countries into India. The hood is pointed, and raised into a ridge on its anterior portion, the dorsal ridge is dentated as far as the middle of the back, the inferior one as far as the anus. The granules of the skin are equal and closely set. In the female the hood is of smaller size, and the dentations of the ridge less strongly marked. It is to this species, which measures about a foot and a half in length, that our preceding quotations apply, and that is also referred to in most of the general observations on cameleons found in books. See Plate CCCCXXXII. fig. 1.

The female deposits her eggs to the number of thirty, in an excavation which she hollows in the ground, and afterwards covers over with loose earth, "servendosi," says Valisnieri, "a questo lavoro delle sole zampe di dietro, come i gatti, quando nascondono et cuoprono le loro sozzure, non contenta della cavata terra vi ramassò e ammonticello delle foglie secche, della paglia, e degli stecchetti avendovi inalzato sopra una collinetta di copertura.[2]

We shall here mention briefly a few of the most distinctly known of the other species of the genus.[3] *Cham. tigris*, Cuv., has the hood or helmet small, and is distinguished by a compressed dentated wattle beneath the end of the lower jaw. Its body is beset with black points, and the granules are fine and equal. It inhabits the Seychelle Islands. An allied species (*Cham. verrucosus*, Cuv.) has larger granules mingled with the others, and there is a series of parallel warts on the sides of the back. It is a native of the Mauritius. *Cham. pumilus*, Daud., has the hood directed backwards, and scattered warts upon the sides, limbs, and tail; and beneath the throat are numerous compressed finely-toothed wattles, which vary in different individuals. It occurs in the south of Africa, the Isle of France, and the Seychelles. Cuvier is of opinion, that *Cham. Seichellensis* of Khul is merely the female of this species. The Senegal kind, *Cham. planiceps*, Merr. (*Lac. chameleon*, Gm.), has the hood flattened, almost without ridge, and horizontally of a parabolic form. It occurs in Barbary, and has likewise been seen in Georgia. *Cham. pardalis*, Cuv., from the Isle of France, is marked irregularly with black round spots, bordered with white. A peculiar species from the Moluccas is distinguished by two large compressed prominences projecting in front of the muzzle. It is the *Cham. bifurcus* of M. Brogniart.

Sauria. Scincidæ.

FAMILY VI.—SCINCIDÆ.

Distinguishable by their short legs, their unextensile tongue, and their scales of equal size, which cover the body and tail like tiles.

In the genus Scincus, Daud., the legs are rather short, the body of almost equal size with the tail, without any occipital enlargement, crest, or dewlap, the scales uniform, shining, and disposed like those of a carp. Some of the species assume a fusiform or spindle shape, others are nearly cylindrical, and more or less lengthened, resembling certain serpents, especially those of the genus *Anguis*, with which they are likewise connected by several internal relations. The tongue is fleshy, little extensile, and but slightly cleft; and the jaws are furnished all around with small close-set teeth. The toes are free.

A few have teeth upon the palate. Of these is the common or officinal scink (*Sc. officinalis*, Schn., *Lac. scincus*, Linn.), which measures six or eight inches in length. The tail is shorter than the body, and the proportional length considerable from the snout to the shoulder. The general colour is a silvery yellow hue, with transverse blackish bands. It is very abundant in Libya, Syria, Arabia, and Egypt, and is frequently imported from Alexandria into Europe. It frequents rather dry and sandy soils, and is remarkable for the extraordinary rapidity with which it burrows, vanishing almost instantaneously, and seeming, as Bruce has well expressed it, "rather to have found a hole than to have made one." This is the reptile called *el adda* by the Arabs. It was once held in high estimation as an article in the Materia Medica, its flesh being regarded as advantageous in leprous and many other cases. A much larger species (*Sc. Cyprius*) occurs in the Levant, and some of the Mediterranean Islands, *Sc. rufescens* is widely spread over India, and *Sc. trivittatus* is common at the Cape of Good Hope. To this group also belongs the galley-wasp of Jamaica (*Sc. occidua*, Shaw), a large reptile of nearly two feet in length. We are not acquainted with its modern history, and doubt its poisonous properties, though Browne, in his Natural History of Jamaica, informs us that it is reckoned the most venemous reptile in the island, and that it is believed no creature can recover from its bite. The author, however, justly regards this as a popular error.

Other species of this genus have no teeth upon the palate. Such is *Sc. ocellatus*, Schneid., well known in the southern countries of Europe, the Mediterranean Islands, Egypt, &c. The West Indies, the Moluccas, and New Holland, produce analogous kinds, some of them remarkable for their size.

The genus Seps of Daudin differs from the preceding in having the body so elongated as to resemble that of a serpent (a conformation well expressed by the names *Lacerta*

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[1] *Diction. Class. d'Hist. Nat.*, iii. 96.

[2] *Istoria del Cameleonte Africano.*

[3] See a paper by Mr Gray, in the *Philosophical Magazine*, vol. ii. p. 209; and *Erpétologie Générale*, iii. 203.

Sauria. Scincidæ.

serpens, *Anguis quadrupes*, &c. which certain species bore); their legs are extremely small, and the two pairs placed at a great distance from each other. (See Plate CCCCXXXII. fig. 4.) The lungs in this genus begin to exhibit an inequality of size. Indeed, we may here observe, that in the few remaining groups of Saurian reptiles with which we are still to be engaged, there is a manifest approximation to the true serpents or ophidian race, in the diminution of the feet, the entire disappearance, in certain species, of either the anterior or posterior pair, and the elongated form of the body. Indeed, on the one hand, *Lacerta apoda* of Pallas is actually now classed with the Ophidians (being placed at their head), although on each side of the anus there is a prominence containing a small bone analogous to the femur, and pertaining to a true pelvis concealed beneath the skin; while on the other, certain systematic writers range our *Anguis fragilis*, and other snakes usually so called, among the Saurian reptiles. But to return to our remaining genera, which may really be said to hold their legs and feet by a precarious tenure, so subject are they to variation—the five-toed seps (*S. pentadactylus*, *Lac. serpens*, Linn.) inhabits the East Indies, while a four-toed species (*S. tetradactylus*), and a third with only three toes (*S. tridactylus*), both being viviparous, occur in the Isle de Crès. Another three-toed species (*S. chalcides*) is native to the south of Europe, and is named *cecella* by the Italians. It dwells in meadows, feeding on spiders, slugs, &c. and runs rapidly by means of a snake-like wriggling motion, without using its feet. It is also viviparous. A more peculiar kind, known under the name of serpent-lizard (*S. monodactylus*, *Lac. anguina*, Linn.), occurs at the Cape of Good Hope. Its legs are nothing more than small footless undivided appendages. This is the *vermis serpentiformis ex Africa* of Seba, said by some authors to be found "in great plenty in the water and about the rocks in Table Bay."

The genus Bipes, Lacép., makes a still nearer approach to the serpents, as its name indicates. It scarcely differs from *Seps*, except in the entire absence of the fore-legs. It forms as it were the stepping-stone to *Anguis*. (See Plate CCCCXXXII. fig. 5.) A species from New Holland (*B. lepidopoda*, Lacép.), examined by Baron Cuvier, although its hinder extremities showed themselves externally only under the form of a pair of small oblong scaly plates, was yet found on dissection to possess a femur, tibia, peroneum, and four metatarsal bones without phalanges. To this genus likewise belongs an African species, the *Anguis bipes*, Linn., and another of larger size from Brazil, described by Spix under the name of *Pygopus cariococca*.

The genus called Chalcides by Daudin is likewise characterized by a long and serpent-like body, but there are four legs (as in *Seps*), and the scales, instead of overlapping like tiles, are rectangular, and form transverse bands, which do not encroach upon each other. See Plate CCCCXXXII. fig. 6.

Certain species have a groove on each side of the body, and the tympanum still very obvious. Of these, an East Indian kind (*Chal. seps*, *Lac. seps*, Linn.) has five toes, while another (*Chal. tetradactylus*) has only four. Others have the tympanum concealed, and conduct directly to *Chirotes*, and through it to the ophidian genus *Amphisbæna*. Examples, *Chal. pentadactylus*, which, as its name implies, is a five-toed species, and *Chal. heterodactylus* (*Het. imbricatus*, Spix), which has four toes to the front feet and five to the hinder. *Chal. abdominalis*, Thunberg, has four toes on each foot. Lastly, *Chal. flavescens*, Gray (*Chal. monodactylus*, Daudin), is distinguished by five anterior and three posterior toes, so reduced in size as to resemble small tubercles, and so ill defined by nature (to our perceptions, though no doubt wisely formed in relation to the end in view) that zoologists still differ as to their exact amount. The species alluded to is native to Guiana.

The genus Chirotes, Cuv. resembles *Chalcides* in its verticillated scales, and is allied to *Amphisbæna* by the blunted form of its head; but it is distinguished from the former by the absence of the hind legs, and from the latter by the presence of the fore ones. (See Plate CCCCXXXII. fig. 7.) The only known species is the lumbriciform lizard of Shaw (*Chir. lumbricoides*,—*canaliculatus* of Lac.), a native of Mexico, and first described by Lacépède. It has two short anterior feet (each with four toes, and the rudiments of a fifth), well organized interiorly, and attached to a small sternum by means of shoulder-blades and clavicles; but the head, vertebræ, and the general skeleton, closely resemble those of the genus Amphisbæna. It is of a flesh colour, and measures eight or ten inches long, with a circumference like that of the little finger. It is surrounded by about 220 semi-rings upon the back, and as many on the abdomen, which meet upon the sides in alternation. The tongue of this species is but slightly extensile, and terminates in two little horny points. Its eye is extremely small, and the tympanum invisible outwardly, being covered by the skin. On dissection Baron Cuvier could detect in this reptile only a single large lung, with the vestige of a small one, as in serpents. It preys on insects.

Order III.—OPHIDIA. OPHIDIAN REPTILES.

This great division is distinguished by the absence of legs and other external members, and includes all manner of snakes and serpents. The expected completion of the *Erpétologie Générale* of MM. Duméril and Bibron would have enabled us to present a more satisfactory sketch of their history and habits (which have been greatly embroiled by many modern authors), than we can otherwise attain to; but the French writers just named have not as yet published the result of their labours among the ophidian tribes. In the mean time, we think it advisable to delay their consideration to a future time. Therefore see in this work the term Serpents.

Order IV.—BATRACHIA. BATRACHIAN REPTILES.

We now proceed to the fourth order of the class Reptilia, the Batrachia, a name derived from Βατραχος, *a frog*, and expressive of a general resemblance which very distinctly marks the majority, although in truth many resemble lizards, and a few have more the appearance of eels or serpents. This tribe is one of the most singular in nature; for, besides the naked body and remarkable sanguineous circulation, they possess another peculiarity, which is regarded by many naturalists as sufficient to constitute them a distinct class rather than an order, viz. the change of form which they undergo in their progress from the young to the adult state.

In this concluding order are ranked all those reptiles which have neither the carapace of the Chelonia nor the scales of the other orders.[1] Their bodies therefore are naked; their head is without any distinct neck or division; their toes are always distinct and without claws; they have no external organs of reproduction, and usually undergo metamorphoses. This change of form constitutes the Batrachia the principal step in the transition between terrestrial and aquatic vertebrata or fishes, and is one of the most singular phenomena presented by animal life. Bred after the manner of fishes, from spawn-like ova, they possess for a time the essential characters of the finny race; and yet, on the lapse of a few brief weeks, their housed pisciform appearance vanishes, and leaving the water, they crawl or leap about upon the earth, or climbing the stems of forest trees, they dwell among the umbrageous branches. In some the transition state, if we may say so, continues permanent, the gills existing simultaneously with feeble lungs, and a tail being combined with short external members. Of the structure of these curious animals more will be said hereafter.

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[1] A curious link, we perceive, has recently been discovered in South America, between the Batrachia and the Chelonia, which is nothing less than a frog furnished with a carapace and plastron.

The *ovum* or *egg* of these reptiles is a round mass of transparent nutritive jelly, in the centre of which appears a small black globule. By degrees this shapeless globule exhibits the appearance of a head and tail, and in this state it emerges from its prison, and moves about briskly in the water. It is provided with a long fleshy tail, and a small horny beak, and has no other visible member, except two feathery tufts on the sides of the neck, which float loosely, and without protection, in the surrounding fluid. These, however, are mere temporary organs; for they serve the purpose of respiration only until the proper gills are formed, and then shrink or disappear.[1] The true gills or branchiæ are contained within the body, three or four in number on each side, constructed on a plan similar to those of fishes; the water entering by the mouth, and escaping in some species by two openings, and in others by one only. Retaining their aquatic constitution, the *tadpoles* (as in this intermediate state they are often called) rapidly increase in size and activity for some weeks. In the mean time the legs, of which no trace was at first apparent, have commenced their growth. The hind ones are the first to make their appearance externally, although the anterior pair are as soon developed, and may be seen at an early period folded beneath their transparent covering. The animal at this period wears a very ambiguous appearance, partaking both of the form of the frog and lizard, and swimming as well by the inflection of the tail as by the irregular impulse of the feet.[2] At this time the beak falls off, and the true jaws, which originally were hid under the skin, appear. The eye, too, which had been seen only through a transparent spot in the tadpole's skin, appears complete and prominent. This interval is also employed in acquiring the faculty of respiring atmospheric air. The animal every now and then rises to the surface and takes a mouthful of air, which is received into the newly formed lungs, and then discharged. When the necessary internal changes are at length completed, the tail, which has now become a useless member, diminishes and disappears. The gills, too, have by this time shrunk, their function being superseded by the lungs, and the animal emerging from the water, begins a new mode of existence as a perfect reptile.

During its aquatic state the tadpole lives principally on vegetable food, but in its perfect form much more upon various insects; and there is a remarkable and corresponding change in its digestive organs, which assume the character of those of a carnivorous creature. Most of the Batrachia, we may also remark, are oviparous, whilst not a few of them are ovo-viviparous. It should, moreover, be observed, that most of the species of this group, during their aquatic condition, possess the extraordinary power of suffering the privation of a part, or the whole, of one or more of their members without vital injury, and of afterwards renewing them as if no loss had been endured; a property of which we have already made mention in our summary account of lizards, and to which we may again briefly return in our notice of the aquatic salamander

We shall now take a nearer view of the vascular and respiratory systems of these animals. The *circulation*, in the tadpole state, is in every respect analogous to that of fishes: the blood is transmitted from a simple bilocular or two-lobed heart to the branchial arches, and, after *aeration* by the water, returns, and is circulated through the system. The transition from this condition to that which the vascular organs present in the perfect reptile state is very striking. Originally three or four branchial trunks pass off from each side of the heart, and terminate in the minute network of the gills; from this network the returning vessels take their origin, one from each of the gills, the first of which goes to the head, and the other two conjoining, convey the blood to the rest of the system, as in fishes. But in addition to these vessels, there are some small undeveloped ones, which effect a communication between the vessels which go to the gills and those which return from them; as also another which, given off from the heart, unites with the aorta, to be distributed to the as yet rudimentary lungs. After the metamorphosis is begun, the branches which connect the arteries of the gills with the returning veins are greatly enlarged, so that a part of the blood flows continuously through them without proceeding to the gills at all, and the proper branchial vessels relatively diminish; and the last-named trunk, which was the smallest of all, becomes the largest, and an increased proportion of blood is sent to the lungs. By a continuance of these changes, the branchial vessels are finally obliterated, and the communicating branches, at first only secondary and irregular, now constitute part of the continuous and permanent system of circulation.

The *respiration* of the Batrachia, after they have arrived at their permanent mode of existence, is not less singular than their circulation; and this chiefly in two particulars,—as it regards the lungs, and the function of the skin. If we take a frog, for example,[3] and watch its respiration, we cannot readily discover that it breathes at all; for it never opens its mouth to receive air, and there is no motion of the sides to indicate that it respires; and yet, on any sudden alarm, we see the animal blowing itself up, as if by some internal power, though its mouth all the while continues closed. We may perceive, however, that its throat is in frequent motion, as if the frog were economizing its mouthful of air, and transferring it backwards and forwards between its mouth and lungs; and if we direct our attention to the nostrils, we may observe in them a twisting motion at each movement of the jaws; for it is through the nostrils that the frog receives all the air which it breathes. The jaws are never open but for the purpose of eating; and the sides of the mouth form a sort of bellows, of which the nostrils are the inlets; and by their alternate contraction and relaxation, the air is swallowed and forced into the windpipe, so as to inflate the lungs. The tongue also contributes its share in carrying on this function. This organ is remarkable in its connection, being fixed very differently in these from what it is in most other animals. Its root is not situated deep down the throat, but is attached superficially at the fore-part of the lower jaw; it is remarkably long, and instead of inclining forward, is turned backwards, extending down the throat, and so acts as a valve, affecting the entrance and exit of air from the lungs. If the mouth of the frog be forcibly kept open, it is suffocated, because it is deprived of the power of swallowing the required air; and if the nostrils be closed, it in like manner can no longer breathe. Hence the frog and allied genera may be said rather to swallow air than to inhale it. Respiration, again, is not carried on, as in most animals, by the chest, but by the compression of the muscles of the abdomen; and if these are in any way injured or destroyed, the breathing ceases, and the individual speedily dies. Nor is the function of respiration in the Batrachia confined to the lungs; for the blood which circulates through the capillaries of the skin is likewise aerated by communication with the atmosphere. This kind of respiration, closely connected with the extraordinary perspiration for which these animals are celebrated, is of such importance to them, that if impeded by covering the skin with oil or other unctuous substance, death will take place almost as soon as if the lungs were removed; and, on the other hand, the animal may be supported by it alone, for a considerable time, if the temperature be not too high,—a physiological fact which, we apprehend, goes a great way to account for the extraordinary power possessed by many of these creatures (to which we shall afterwards allude), of enduring, without detriment, a long protracted burial, enclosed in wood or stone

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[1] This change or conversion from external to internal gills is not very satisfactorily described by physiological observers. "Dès le moment où les Batraciens sortent de l'œuf, ces branchies sont apparentes au dehors, elles representent des espèces de franges ou de panaches colorés situés sur les parties laterales du cou, et attachés sur les bords des fentes qui correspond à la gorge; elles persistes sous cette forme, dans tous les Batraciens qui conservent leur queue, tant que leurs poumons ne sont pas assez developpés pour servir uniquement à la respiration. Dans les Grenouilles et autres genres voisins sans queue, le premier etat ne dure que pendant un temps très court. Bientôt l'animal prend une autre forme, celle d'un tétard à ventre énorme confondu avec la tête et avec une longue queue. *Les branchies sont alors cachées, et contenues dans une cavité*; l'eau arrive dans la bouche par les orifices des narines," &c. (*Erpétologie Générale*, i. 182.)

[2] It appears that the great Lord Bacon had not practised his inductive philosophy so far as young frogs are concerned, for in his *Sylva Sylvarum* he makes mention of their being sometimes observed with tails, in such years as have been more than usually pestilential or unhealthy; and he then draws the conclusion that the appearance of such tailed reptiles, "argueth a great disposition to putrefaction in the soile and aire.

[3] See Roget's *Bridgewater Treatise*, ii. 339.

The *reproductive act* in these reptiles, somewhat intermediate between what occurs in terrestrial animals and fishes, is so remarkable that it must not be passed by. We shall borrow our illustration from what occurs in the frog, the genus by much the best known in the order. The embraces of the male occur only once a year, and in spring. As soon as the sun's influence is felt in their wintry resorts, the black spongy knob at the base of the thumb of the male augments in size, and his abdomen swells. On finding his mate, he mounts on her back, extends his arms round her chest, and so locks the fingers of his hands into each other, that, from the peculiar structure, they cannot be separated. The two animals are thus inseparably joined, and so live and swim together for fifteen or twenty days, or even for a month. If, under these circumstances, the thumbs be cut off, the junction is at an end; but if the animal be decapitated, the grasping apparatus still performs its mechanical office. During the period of this long embrace, the spawn, as in fish, escapes in long floating cords or chaplets, of a gelatinous fluid, crowded with the ova, which is bedewed with the milt of the male. When the spawning is completed, the male frog is able to dismount, the fingers speedily regaining their flexibility, and the thumbs their ordinary form. The reproductive power is very great, the ova amounting to from 600 to upwards of 1000. Swammerdam once reckoned 1100 from a single individual, and Montbeillard 1300.

It is remarked that these animals live to a great age, if fortunate enough to escape the attacks of their enemies; an instance will be given in the sequel, of an individual whose history was traced for forty years. Their foes, however, are very numerous. A number of quadrupeds, birds, reptiles, and fishes, live habitually at their expense. Serpents, pikes, vultures, and storks, destroy an immense number of them. Without the intervention of the last-named birds, Egypt, in particular, would swarm with frogs. In several countries, certain species are sought after by man; and they are considered by competent judges as an agreeable and wholesome food. The Batrachia have no weapons either of offence or defence. Taken as an order, they are certainly as harmless to man as any tribe of animals; and, as has been well remarked, though the forms of many of the species offend our notions of beauty, and their love-songs have gained them the character of "horrible musicians," there is certainly nothing to justify the aversion and disgust with which they are so usually regarded.

The Batrachia generally feed upon the larvæ of aquatic insects, on worms, small mollusca, flies, &c., and always choose a prey which is living and in motion. Dead and motionless animals are rejected by them. To obtain their prey, they often remain fixed in one situation, with wonderful patience, watching till they believe it is within their reach, and then darting at it with great rapidity, they at the same time protrude their lengthened tongue, bedewed all over with a viscid fluid. If we watch a frog when an insect has approached sufficiently near it, we are surprised to observe the insect suddenly disappear without our being able to perceive what has become of it. This arises from the frog having darted its tongue upon its victim with such extreme quickness, and again withdrawn it with the adhering insect, that it is scarcely possible for the eye to follow it in motion. Thus from the nature of their food, so far from being prejudicial, they are very useful in gardens, by extensively destroying those small slugs, &c. which are so detrimental to plants of every kind.

FAMILY RANIDÆ.[1] FROGS IN GENERAL.

All the members of the frog family (corresponding to the great genus Rana of Linnæus), have in their perfect state four extremities and no tail. Their head is flat, their muzzle rounded, their mouth very large. In the greater number the tongue is not attached to the deeper part of the throat, but to the edge of the lower jaw, and thence proceeds backwards, and down the throat. Their front feet have only four toes, and their hind five, sometimes exhibiting the rudiments of a sixth.

We cannot better bespeak a favourable consideration for this despised group than in the words of an enthusiastic naturalist. "We shall have considerable difficulty," says the eloquent Lacépède, "in assigning to frogs the place which they should occupy in the minds of our readers, such as it really is in nature; but it is not less true, that if toads had never existed, if we had not before our eye this horrid object of comparison, which caricatures by its resemblance, as it defiles by its approach, the frog would appear to us as agreeable from its conformation, as distinguished by its qualities, and interesting from the phenomena it exhibits at the different periods of its existence. We would behold it as a useful animal, from which we have nothing to fear, whose instinct is harmless, which unites an elegant form with supple and slender limbs, and is adorned with pleasing colours, rendered more vivid from the kind of natural varnish with which the animal is constitutionally provided. And who can regard with pain a being whose form is light, whose movements are nimble, whose attitudes are graceful? Let us not deprive ourselves of an additional source of pleasure;

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[1] Although the patronymic termination in *idæ* is not classically correct in cases where the primitive has a feminine termination, we nevertheless follow in this matter the suggestion of Mr Kirby, and the example of Mr Macleay, who regards it as preferable to any other yet devised, as well on account of uniformity, as *euphoniæ gratia*. See *Horæ Entomologicæ*, p. 23.

and, in our peregrinations through the smiling fields, let us not regret to see the banks of rivulets adorned by the colours of these harmless creatures, and animated by their light and lively gambols. Let us contemplate their little manœuvres; observe them in the midst of stilly lakes, the solitude of which they diminish without troubling the repose; see them exhibit, under sheets of water, the most agreeable tints, cleave the bosom of the tranquil stream, and vary its silvery surface with many a circling furrow."

In summer these Ranidæ are usually found in humid places, in grassy meadows, and on the banks of streamlets, into which, when approached, they usually leap and dive. They swim admirably, by means of their webbed hind feet. Frequently at the close of warm rains they spread themselves through the country, and are so numerous as to be crowded and pressed against each other in places where they had never been observed before. To this appearance is owing the popular belief of *rains of frogs*, which undoubtedly is usually a mistake; but raised by a hurricane, and thereby transported to a great distance, such an occurrence is yet, we believe, quite within the range of possibility. As soon as the summer is over, and the weather begins to get cold, these reptiles lose their natural activity, and give over feeding. When the cold becomes more considerable, they protect themselves from its rigour by sinking into the mud in deep water, in the holes of fountains, and even in the earth. The quantities which sometimes thus collect in one place are so considerable, that they have been known to cover the soil to a foot in depth, and thousands may be taken in a few minutes. Hearne informs us, in his voyage to the Icy Sea of North America, that he many times found under the moss frozen frogs, whose legs might be broken without their exhibiting any sign of life, but which resumed their energy with returning warmth.

GENUS RANA, Laurenti, Cuv. *Frogs proper.* This first genus of the Ranidæ has the body slender, the hind feet very long, and more or less webbed; their skin is smooth; their upper jaw is furnished all round with a row of minute sharp teeth, and there is an interrupted transverse range in the middle of the palate. The males have on each side, beneath the ears, a fine membranaceous bag, which they expand with air when they croak. They leap and swim admirably. See Plate CCCCXXXIII. fig. 1.

The skeleton of the frogs does not present any trace of ribs; and the breast-bone, very large, with collar-bones attached, is merely cartilaginous. The cranium is almost prism shaped, flattened above, and very broad behind, and is less round than in the toads. The vertebræ are ten in number. The muscles have a considerable resemblance in arrangement to those of man, and are very strong, very irritable, and very sensible to the action of galvanism. The muzzle in frogs is somewhat more acute than that of toads; and the nostrils are visible at the summit. Their orbits are large, and are directed upwards; the eye is large and brilliant, and surrounded by a bright golden circle. The lids are three in number, and all horizontal; the upper one is a mere projection of the skin; the lower is more mobile; and the third, which is quite transparent, moves from below upwards, and is most of all in action. We have already dwelt so fully on the habits of the whole group, that little requires to be added in this place. It is, however, a curious circumstance, that these animals, like many other inhabitants of the water, can become habituated to the very high temperatures of thermal springs. Thus Reaumur mentions that he had known one found alive in water about 111° Fahrenheit; and Spallanzani mentions an example of this kind where, in the baths of Pisa, they were exposed to a temperature of 138°.

The power of voice in frogs, commonly called croaking, is exercised by the different species in very different degrees; a remark which is also applicable to the genus *Bufo* in their more limited range of expression. It is more particularly during the time of rain, and in hot days, in the evening and morning, that they indulge in their harmonious concert. The noise which they make becomes sometimes insupportable. It is principally the males which croak; their voice being stronger in consequence of the two sacs which they possess on the sides of the neck, and which swell out under the effort. As for the female, she has only a slight swelling in her throat, and produces but a feeble note. During the feudal regime in France, when all the castles were surrounded by water, it is said that it was the business of the serfs to attack the frogs, and prevent them from disturbing the morning repose of the lordly inmates.

It is rather remarkable that these creatures should be so much esteemed as delicious food in some countries, and so much despised and even abhorred in others. The ancients appear not to have discovered the nutritive virtues of frogs, nor their value in the science of gastronomy. In the sixteenth century, however, they were served up at the best tables on the continent. In Britain this kind of aliment is held in detestation, whilst in France and other European countries a very great consumption takes place. They are captured in various ways; either with lines, or small nets, or by means of a rake. Sometimes they are pursued at night, and with torches, the light of which attracts them. In Vienna, where they are rather favourites, they are fattened in *froggeries* constructed for the express purpose. Though one species of frog is called par excellence the *edible*, yet several others partake of this distinction. In Germany all parts of these animals are eaten, the skin and offals excepted. In France it is the hinder quarters alone which are used. They are dressed like fish, with white sauce, and in wine, or they are fried or even spitted. A foreign species of great size, to be afterwards mentioned (*R. grunniens*), which abounds in the West Indies, is often domesticated there for the use of the table. The flesh is white and delicate; it is fricasseed like fowl; and two frogs make a good dish. Nor is it *frogs proper* alone which are used in this way. The abhorred toads are habitually eaten by the negroes, both in Africa and America; and there seems to be little doubt that even in Paris the thighs of these animals are constantly sold for those of frogs.

We now proceed to a rapid sketch of the most remarkable species.

R. esculenta, Linn. The *edible frog*, *green frog*, or *common frog of France*. The colours of the green frog vary so much, that different individuals might almost be taken for a diversity of species. It is often of a beautiful green colour, spotted with black, with three yellow stripes on the back, and the belly yellowish. This description generally holds good in the environs of Paris. Those in the rivers and ditches of Lombardy have the back of a uniform green colour. Another variety, which has been observed in Holland, has the lips black, round black spots on its sides, and the belly entirely white; in Provence it has a reddish belly; and in the neighbourhood of Beauvois, sombre green, with transverse brownish spots upon the limbs, is found to be the prevailing hue. It varies in size from two to three inches, measured from the snout to the end of the body. It abounds in all dead and still waters, and is pre-eminent for its croaking powers. It is very common in France, Italy, and Germany; but is rare in Britain. It supplies, in the former countries, a very wholesome and agreeable food. It deposits its ova in small bundles, in the pools. This species seldom removes far from the margin of some quiet streamlet, into which it plunges on the least noise. It swims in the same manner as man, with its head above the surface. It may be often seen amusing itself among aquatic plants, darting after insects on the wing, mounting upon the umbrageous leaves, or squatted on the bank, with its snout projecting as if to court the rays of the sun, in which it delights, even during the most scorching days. It is indeed

Batrachia.
Ranidæ.

most agile in this kind of weather, and leaps with the greatest liveliness. It feeds solely upon living objects, and will swallow no animal whose motions do not prove it to be in life. Its voracity is so extreme, that it may be captured with almost anything which is made to move, and will dart at a hook when baited with a rose or poppy leaf. With the warmth of autumn the gaiety of the green frog ceases; and as winter becomes severe, it entirely disappears, plunging deep into the mud to secure an asylum from the cold. Here they often crowd together, as if for the purpose of keeping each other warm.

R. temporaria, Linn.; *R. fusca terrestris*, Roes. The *common frog of Britain*. The *red frog* of the French. This species, the most common in Britain, and also abundant throughout Europe, has the same elegant and slender form as the preceding, and differs from it merely in its colour, which is often of a russet hue, like that of decayed leaves, varied in front with black spots between its brilliant eyes and upper lip. These spots sometimes assume the form of whiskers passing down the neck. It is of the same size as the preceding, and is met with from early spring-time till towards the close of autumn, leaping in woods and meadows, sheltering itself beneath hedges, and penetrating into cottage-gardens, where it ought to be protected, as waging deadly war with destructive snails and insects. It proves quite as good eating as the green frog, and in France is often placed upon the table. It is by no means so great a croaker as the preceding species; and those accustomed to the latter think it does not croak at all. It is most generally found upon land in the summer season; and while the green frog rarely abandons the immediate neighbourhood of still or gently flowing waters, this species is often found in brushwood, remote from the banks of streams. At the approach of winter it retires into fountains and ponds of pure water, usually, it is alleged, avoiding miry places. Nor does it bury itself in mud like its congener; for numbers of these frogs may be taken during the winter by making holes in the ice. It lays its ova at a later season than the green frog, and the development of its tadpole is slower. Like the preceding, it presents many varieties of colour, which it would be tedious here to name.

Under the appellation of *R. cultripes*, Cuv., may be noted a frog which occurs in the south of France, bespeckled with black spots, its feet extensively webbed, and especially remarkable for having a vestige of a sixth toe, armed with a horny and cutting nail. The spotted frog (*R. punctata*, Daudin) occurs in the neighbourhood of Paris, though not very common. It rarely exceeds an inch in length. Its gray colour is relieved by a number of green spots over the body, and a black spot behind the eye, and it is said to change its colour when alarmed. Its toes are only partially webbed. The folded frog (*R. plicata*, Daudin) is found in the most southern parts of France. It is of the same diminutive size as the last, of a brown colour above, and gray beneath; the fingers quite free, the toes semi-palmated. It is particularly distinguished by having two folds of the skin on each flank; and there are four large brown spots on the chest and arms. Our knowledge of the *brawling frog* (*R. clamitans*, Bosc) is due to the indefatigable Bosc, who discovered it in the marshes near Charlestown, United States. It is about two inches long, of a dull ash colour, spotted with black, the upper lip green. Its vivacity is extreme, and it is by far the most lively of all known frogs, so that it is extremely difficult to catch it if it once makes its escape. It does not remove far from water, and when hunted, shoots into the stream with a sharp cry. Its continual croak is almost insupportable.

The *bull-frog* of the Americans, *R. pipiens*, Linn., is one of the largest species of the genus, being three or four inches broad, and six or eight long; and when measured with extended legs, its entire length is about eighteen inches. The hind limbs are long, stout, and deeply palmated. It is of a dull green colour, varied with black, and relieved by a coppery yellow circle which surrounds the tympanum, and marks the situation of the ear. It abounds in Carolina and Virginia, remaining at the entrance of its hole, near some fountain, into which it precipitates itself on the least alarm. Catesby affirms that it utters sounds very much resembling the bellowing of a bull, and with greater force when at the bottom of the water. During the summer evenings, and in dry weather, it makes indeed a most astounding noise. It is exceedingly partial to young ducks and goslings, which it swallows whole, and will proceed to a considerable distance from its home in search of prey. As the voracity of this species is proportioned to its bulk, it is rare to find more than a single pair in each marsh. This frog is very difficult to catch; it is only during the night, and when it removes a little from its haunt, that it is possible to procure an individual. When on level ground it makes leaps of from six to eight feet in length. Baron Cuvier justly remarks, that several species go under the general name of bull-frog in America.

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The *grunting frog*, *R. grunniens*, Daudin, is of the same large dimensions as the preceding, and inhabits the Floridas and the West Indies, where it has been accurately observed by M. Moreau de Jonnès. It is vulgarly designated a toad, because it frequents shady and humid places, and not the vicinity of waters, as the other frogs. In its habits it is nocturnal, and its strength is so great that at a single spring it can clear a wall five feet high. It is very torpid during the dry season, but resumes its vivacity when the rains set in. It is this frog which is often domesticated in the West Indies for the use of the table, and becomes tolerably familiar; the flesh is white and delicate, and two frogs form a very good dish. The *argus frog* of Shaw, *R. ocellata*, Linn., is often mistaken for the preceding. It inhabits Pennsylvania and Carolina, and was first figured by Seba. It is one of the largest of the genus, equalling if not exceeding the bull-frog in size, and being stronger; it is of a pale reddish-brown colour, striped with chestnut; the feet are unwebbed, and each joint is furnished with a kind of tubercle. The *laughing frog*, *R. ridibunda*, Gmel., according to Pallas, is common about the Ural and the Caspian Sea. It is of great size, weighing half a pound. It always keeps in the water, and in the evening utters its croakings in a way that resembles a horselaugh. The *paradoxical frog*, *R. paradoxica*, Linn., the jackie of the French, is remarkable for the great size of its tadpole state in proportion to the adult animal. The loss of its enormous tail, and of the envelopes of its body, induces a great diminution in bulk; its length in the tadpole state being seven or eight inches, while that of the body when transformed is only three. Thus many of the first observers were led to the conclusion that it was the frog which was metamorphosed into the tadpole, or, as they declared, into a fish. This species is green, spotted with brown, and is especially recognised by irregular stripes of a brown colour running along the limbs. The male has a gular sac, and the hind foot is provided with a supplemental toe. It inhabits Guiana. Our readers will bear in mind that in the preceding list we have not attempted more than to give a specimen of the distinctive characters and habits of some of the best-established species. Many more have been described and catalogued in systematic works.

Genus Ceratophris, Boié, Cuvier. This genus is distinguished by the great size of the head, by the skin being rough, and engrained in whole or in part, and by a membranous or horn-like prominence on each eye-lid. (See Plate CCCCXXXIII. fig. 2.) In certain species the tympanum is hid beneath the skin. The species are found in South America and Asia. The *horned frog*, *C. varius*, Boié, *Rana cornuta*, Seba, is certainly one of the most singular of the Batrachia, having an aspect exceedingly deformed. This arises not so much from the general shape of the animal, as from the extraordinary structure of the upper eyelids, which are so formed as to resemble a pair of strange sharp-pointed horns, while the width of the mouth exceeds that of its congeners, and equals half the length of its body. Seba, in fact, describes it as having two sharp horns on its head, within which its eyes are situated; and Schneider more accurately, as a pair of accuminated callous processes, of a conical shape, placed upon the eyelids. The colour is grayish yellow, striped with brown. The body is rough, with pointed spines. The head is very large and thick, and the tongue proportionably so. Baron Cuvier assigns five species to this genus, from the works of Seba, Daudin, Spix, and Prince Maximilian. In Mr Gray's catalogue an additional one is furnished by Mr Wagler, the habitat of which is Asia.

Genus Dactylethra, Cuv. The south of Africa, according to Cuvier, produces a group of Batrachians which resemble the frogs in their teeth, their smooth skin, their pointed toes, those of the hind feet being deeply webbed, and the inner three having their extremity enveloped in a conical nail, which is black; their head is small, and their mouth not very large. The tongue, attached deep in the throat, is fleshy and large; their tympanum not apparent. These numerous distinctive characters have induced the baron to constitute a new genus under the above name, from *δακτυληϑρα, a thimble.* The *smooth toad, crapaud lisse* of Daudin (*Pipa bufonia* of Merrem), belongs to it.

Genus Hyla, Laurenti; *Calamita*, Schn. The *tree-frogs* of the English,—*Rainettes* of French authors. The Hylæ were first separated from the frogs and toads by Laurenti, and his arrangement is now universally followed. They differ from the other genera in having all the extremities of their toes enlarged, and rounded into a kind of disk or cushion, usually covered with a viscid humour, which enables them to attach themselves firmly to foreign bodies, and to climb trees. (See Plate CCCCXXXIII. fig. 3.) Trees, in fact, constitute their abode during the whole of summer, and there they hunt for food. They, however, produce their ova in water, and shelter themselves in the mud during winter. They have a gular pouch, and are good croakers.

The disks with which the toes of the tree-frogs are provided are simply fleshy, and in the form of lentils. Examined with the microscope, they appear like porous sieves, from which a glutinous fluid slowly exudes; they are usually somewhat concave, and are sometimes furnished with a distinct fold. By means of this apparatus the species can attach themselves to smooth surfaces; they can leap from branch to branch, and can traverse twigs when agitated by the wind. They may be regarded as among the most nimble of their kind. They are, however, more tranquil than many, and watch most patiently for prey. In the day time, and especially when the sun's heat is great, they are said to shelter themselves among the thick foliage, putting themselves in motion on the approach of evening, and then sporting with delight. The croaking of these animals is similar to that of the proper frogs, but stronger, though not quite so sharp. It is most frequently heard in wet weather; but on a beautiful summer evening the traveller is sometimes surprised by a vast group of these hoarse musicians, assembled on the tops of the highest trees. They feed on the insect tribes. Late in the season they retire to the water, where they pass the winter in a kind of lethargy, and remain there till the spawning season has elapsed. Some Indian species deposit their eggs on the under side of leaves hanging over water; and General Hardwicke has observed them place their ova on a leaf which stood over a pail of water, so that the young dropt into the fluid beneath. There is not a single species of the tree-frog in the British isles; they occur, however, frequently in the more favoured climes of Europe, and superabound in warmer regions. The number of ascertained species is not inferior to that of the frogs proper. They are among the most interesting of the race, and many of them are very beautiful.

H. Arborea, Cuv.; *R. Arborea*, Lin. *Common tree-frog.* In beauty of colouring, as well as in elegance of form, and general agility of movement, the tree-frog exceeds every other European species. It is found in France, Germany, and Italy; but more towards the south than north. It avoids dry situations and mountainous forests, and delights in humid woods, in hedges bordering on marshes, and in parks and gardens ornamented with water. Its principal sojourn during the summer months is the upper parts of trees, searching for insects, which it catches with extreme alacrity, stealing softly upon them, as a cat towards a mouse, and seizing them with a sudden spring of frequently more than a yard in height. It often suspends itself by its feet, or by a single foot, or even by its abdomen and drawn-up toes from a twig, or the under portion of a leaf, thus continuing beneath the shade. It is among the smallest of European frogs. Its colour is green above, more or less bright; its belly whitish, and covered with numerous small tubercles; a dark violet-coloured streak runs along the flanks; and the limbs are reddish. The body is smooth above, and rather short and plump; the hind legs are very long and slender. The fore feet have four toes, the hind five, and all of them terminate in dilated flattish tips. The surface of the abdomen is very remarkable, being so granular, adhesive, and elastic, that it enables the animal to adhere almost to anything, even, it is said, to polished glass, at whatever inclination, or in whatever position it is placed. The spawn is deposited towards the end of April, and the perfect animal appears in August, when it ascends the neighbouring trees, and assorts with its parents. Being very noisy on the approach of rain, this species is considered as an excellent barometer; and in the German *Ephemerides* there is an account of one which was kept in a state of domestication for seven years, and gave the greatest satisfaction from being peculiarly weather-wise.

The *Zebra hyla, H. calamita*, Gray, *Calamita maxima*, Schn., appears to be one of the largest of these slender-bodied frogs, a specimen described by Seba having attained the length of five inches. It is a native of Carolina and Virginia. It is of a rufous-brown colour, striped with chestnut bands; all its feet are webbed, and the toes orbicular. The *Merian hyla, H. Meriana*, Gray, *Rana Meriana*, Shaw, first depicted and described by Maria Merian, in her *Surinam*, merits a distinct notice. It is about three times the size of the common hyla; and on each side of the neck has a remarkable protuberance, resembling an obtusely conical inflated pouch; its hind feet are distinctly webbed. It is of a brownish-green colour above, and is variegated with patches of yellow. It is found sometimes on trees, and sometimes in water. Mad. Merian states that they have external ears, and that the balls on their toes facilitate their progress over the soft marshes which they frequent. The *H. tibiatrix*, Laurenti, is an American species, and is said by Seba to croak in a melodious manner during very hot weather after the setting of the sun, while in the cold and rainy season it is silent, concealing itself at the bottom of the waters.

H. lateralis, Catesby, has been observed in Carolina, and also, it is said, in Surinam. It is usually found attached underneath the leaves of trees, concealing itself, and lying secure from birds and serpents, its most dangerous foes. They are sometimes found in vast heaps, the bushes and woods being completely covered with them; and their croaking may be heard at the distance of whole leagues. They make prodigious leaps, and hence in the United States are called the crickets of the savannahs, their cry also resembling the noise made by that insect. *H. tinctoria*, Cuv. *R. tinctoria*, Lin. or *Dying Hyla*, has a singular property assigned it, apparently on good authority. It is said that by its means the American Indians partially change the plumage of their parrots from green to red. With this object in view, they pluck out the green feathers when the bird is young, and rub the wounded skin with the blood of the hyla, after which the feathers spring up of a fine red or yellow colour. It inhabits Surinam and Guiana, frequenting the woods nearly the whole year, concealing itself in clefts of trees, and under the bark in cold nights, and resorting to water only for the purpose of reproduction. Cuvier has enumerated, as among the largest and most beautiful, the *H. bicolor* of Daudin and Spix; it is of a celestial blue colour above, and of a rosy tint below. He has catalogued several additional species; and Mr Gray's list is very extensive, including some species from New Holland.

Genus Bufo. The generic characters of this group, which includes the toads, are, a body thick, short, clumsy, and generally covered with warts and pimples, with a glandular pad behind the ears, from all of which distils a milky fetid humour; there are usually no teeth; the hind feet are frequently short, and hence the species rather crawl than leap; and they are generally found at a considerable distance from water. By Linnæus they were incorporated in the same genus with the frogs, and so close is their resemblance, that that arrangement is still sometimes followed. Toads have in all times and places been regarded as disgusting animals, and sometimes even as objects of horror. They are usually believed to be venomous, and are consequently subjected to proscription and extermination. It will be found, however, on examination, as has been observed by a noted naturalist, that these animals are comparatively harmless, that the study of their organization involves much interest, and that their history presents a crowd of facts equally curious and important. A slight sketch of the structure and habits of these despised animals having already appeared in our general remarks on the order, we shall here allude only to a few distinguishing traits.

The European toads are stated to have only eight vertebræ, and some as few as seven. Though generally described as wanting teeth, yet some species have them on the gums, large and curved. The tongue is not forked, as in most of the frogs; nor do they possess the gular pouches, which give to the frogs their peculiarly resounding voices. The glandular cushion-like body behind the ears, sometimes stated as the most distinct mark of the genus, is considered by Schneider as nothing else than the parotid gland, well known in man as the seat of that disease called the mumps,—with what degree of accuracy we are not prepared to say. The toads, in general, are heavy sluggish animals in comparison with frogs, and sometimes even crawl with difficulty.

The cuticular excretion usually regarded as so offensive is possessed by frogs as well as toads; but is much more abundant in the latter. It is alleged that the toad can at will increase the secretion of this viscous humour, and cause it to distil like dew from all its pores. The most important use, as previously suggested, is probably connected with respiration; the one usually assigned is, that it defends the animal from the heat of the sun and the dryness of the air. This abundant perspiration must, of course, maintain the species at a low temperature; and Adanson states the fact to be so well known, that the negroes in traversing the burning sands of Senegal are in the habit of applying a live creature of this kind to the forehead for the purpose of cooling it. These reptiles have the power of emitting another secretion, which is regarded as a weapon of defence and offence. It is discharged from the lower gut, is shot forth in a small stream, and often occasions apprehensions from its supposed venomous nature. When toads are surprised and alarmed, instead of seeking safety in flight, they make a dead halt, swell out their body, making it hard and elastic, and distil this humour from its surface in augmented quantities. They also make efforts to bite, without, however, inflicting any injury. The direct application of the fluids proceeding from the common toad to the human skin is innocuous, and the idea that it confers a poisonous quality upon vegetables, fruits, and mushrooms, is entirely groundless.

The process of spawning in the toad is carried on much in the same way as in the frog. In the latter the ova appear imbedded in a glary continuous mass, which has been compared to a cord or chaplet: in the toad two of these cords appear together, the united length of which would extend to about twenty feet. Ten or twelve days after deposition, the eggs acquire double their volume; the tadpoles issue forth about the twentieth day, and acquire their gills two or three days after.

Though the taste is not likely to become prevalent, there is no doubt that toads have been made familiar pets. Mr Pennant gives a curious account of one having lived in a kind of domestic state for the space of more than forty years, and of having been, in a great degree, reclaimed from its natural shyness and desire of concealment. On the approach of its master, and on the lighting of the candles at night, it left its retreat, and came to demand its regular evening meal. It grew to a very large size, and attracted many curious visitors. It was often brought to table, and fed upon various insects, which it seized with avidity, without being embarrassed by the presence of company. Its favourite retreat was beneath the steps of the house-door; and it had all the appearance of surviving many additional years, when it was attacked and destroyed by a raven.

But the most curious trait in the history of the toad, is its alleged power of being encased and buried for a long period of time without food or respiration, and of reviving again when reintroduced to light and air. Not that the toad is singular among the Batrachia for this faculty, for its congeners are likewise celebrated on account of it. Nor would it appear to be confined to this order, for similar stories are told of serpents, and even of fish, insects, &c. The attention of the French academy was directed to this subject about the year 1771, from its having been stated, that upon pulling down a wall of a mansion belonging to the Duke of Orleans, and which was forty years old, a toad which proved to be alive, was found in it, its hind feet being actually entrapt and imbedded in the mortar. Stimulated by the interest which this story excited, M. Herrisaut, in presence of the academy, enclosed three toads in as many boxes, surrounding them with a thick coating of plaster, and deposited them in an apartment of the academy. Here they were left untouched for eighteen months, when, on being examined, two of them were found alive, and the third dead. The former were re-enclosed, and on a second examination some months after, were found dead. The animals were completely impacted and imbedded, without leaving any space for surrounding air. Notwithstanding the apparently conclusive nature of these experiments, the possibility of such long endurance was still denied by many,—the more so, as the fact was as inexplicable as extraordinary. Dr Edwards, however, performed somewhat similar experiments in Paris in the year 1817, by shutting up toads effectively in plaster, when he found that they lived for a long period; and additional light was thrown upon the subject by that observer discovering, that when the plaster was made impervious to air, as by sinking the whole mass in water, the toads speedily perished. From this it follows, that owing to the porosity of the plaster, a portion of air still penetrates to the imprisoned toad, sufficient to maintain its vital functions in that low state in which we often see these reptiles during hybernation, or when completely frozen. The importance, under these circumstances, of the cuticular respiration already mentioned, is obvious. Analogous phenomena are observable in other classes of the animal kingdom. Thus, the reviving powers of the *Rotifer redivivus*, though so astonishing, are now undisputed; and no one doubts Franklin's anecdote of the apparently dead flies, which he took from a fresh-drawn bottle of Madeira, and revived in the sun. Many drowned insects, to all appearance dead, are made to renew their vital powers when sprinkled over with dry warm sand, or pounded plaster; and it appears that in like manner, a certain feeble life, capable under altered circumstances of quick and strong increase, lingers long in many reptiles.

The great majority of the instances of imprisoned toads and frogs is said to have occurred in growing trees, hard wood, coal, and in sandstones and other rocks not of a very dense or impenetrable consistence. The fact has been long and frequently alleged, and the difficulty of accounting for it forms the chief ground of the prevailing scepticism. The wonder produced is forcibly though quaintly expressed in a Latin inscription written in letters of gold, framed with a coat of arms, and hung over a mantle-piece of sandstone, formerly in Chillingham Castle. In this sandstone there was a deep excavation, believed for ages to have been the living tomb of one of these creatures. We give a translation of a part of this document.

Hither, Stagyrite!
If you would see a phenomenon more wonderful than Euripus,
Come hither;
Let seas ebb and flow as they may, and let him be a lunatic
Who despoils the moon of her honours.
Behold here a novelty, such as neither Africa presents to thee,
Nor the Nile with her fabulous sands;
A fire and pure flame
Existing, though shut out from vital air,
From the dark recesses of the cut rock which you see,
The hands of the obstetrical stone-cutter gave light
To a living toad!!

In illustration of this alleged phenomenon, we shall adduce but a single recent instance out of many. On the 25th of July 1832, four men made affidavit, "that they were astonished, on splitting a large block of millstone grit on Stainmore, more than a ton weight, by a living yellow frog springing out of a cavity in the centre of the said solid rock, where *it had been as closely imbedded as a watch in its outer case*, without any communication with the surface nearer than eight inches. This frog was conveyed to Brough, Westmoreland, and given to Mr Rumney, surgeon, in whose possession it now (Jan. 21, 1833) continues in a healthy living state."

We have already mentioned, that however disgusting may be their qualities in the apprehension of many, toads are eaten greedily by savage tribes, and not seldom, though unwittingly, by the more fastidious inhabitants of the gay and splendid capitals of Europe. We now proceed to allude more particularly to a few of the species.

The *common toad* (*B. vulgaris,—Rana bufo*, Linn.) is of a russet or brownish-gray colour, sometimes olive, and even blackish. It is covered with numerous round tubercles on the back, and with smaller ones beneath. The hind feet are semi-palmated. It is found throughout Europe (most abundantly in its western parts), and is common in this country. It usually sojourns in obscure and sheltered places, and passes the winter in holes which it finds or makes for itself. It spawns in water in March and April; the ova are very small and numerous, suspended in two cords of transparent jelly. The tadpole is blackish, and remarkably small when it loses its tail and acquires its feet. The branchial aperture is on the left side. This toad is long lived, fifteen years being assigned as not unfrequent. Its cry has a distant resemblance to the barking of a dog, and during summer it croaks feebly

Many toads possess a strong disgusting smell. Of this kind are the *rush toad* (*Rana bufo calamita*, Gmel.), of which the colour and size much resemble those of the common toad, the cushions behind its ears being somewhat less. Its hind feet are not at all webbed, and it has a pouch or sac under its throat. Its pace differs from that of most of the toad tribe, as it runs nearly after the manner of a mouse, with the body and limbs somewhat raised. It is chiefly a nocturnal animal. The ova are contained in two cords; and the evolution of the ova is so speedy, that the tadpoles liberate themselves in the space of five or six days. During spring it frequents places overgrown with reeds, and croaks loudly. When handled or irritated it pours forth its cutaneous exudation, and squirts its other fluid to a distance of three or four feet, and thus diffuses an intolerable odour, resembling the smoke of gunpowder, but stronger, and so permanent, that if it fall upon furniture it cannot be got rid of for months. Analogous to, if not identical with the preceding, is *B. calamita* of Laurenti, the *natter-jack* of British Erpetologists,—*mephetic toad* of Dr Shaw. In general appearance it resembles our common toad, but the eyes are more projecting, with the eyelids greatly elevated above the crown, and there is a line of bright yellow along the middle of the back. This reptile was first remarked as British by the late Sir Joseph Banks, in Lincolnshire, and has since been met with on many heaths near London, as well as in Cambridgeshire and Norfolk. Except during the spawning season, it appears to affect dry and sandy districts. It is of much more active habits than the common toad, its pace "being a kind of shuffling run."[1] It never leaps. The *brown toad, B. fuscus*, Laurenti, is also distinguished by an offensive discharge; but in addition to the gunpowder-smoke smell, and overpowering it, there is an extremely strong odour of garlick or onions, which produces the same effects upon the eyes as do these vegetables. The whole of the skin of this animal is nearly smooth, and the hind limbs are long and deeply webbed. It leaps well, and prefers the neighbourhood of water. Its ova are deposited in a single cord, which, however, is thicker than the double one of the common toad. The tadpole of this species arrives at a great size before it attains its complete form, so that, according to Roësel, it is considered by the country people as a kind of fish, and is eaten accordingly. The *variable* or *green toad, B. variabilis*, Cuv., *Rana variabilis*, Gmel. and Pallas, *B. viridis* of Schneider and Shaw, is a third species, likewise characterized by a most disagreeable smell, resembling that of the rank and deadly nightshade, but more powerful, and soon contaminating any close apartment. This kind is a native of Germany, the south of France, and other parts of Europe. It derives its specific name from the tints of its colour undergoing striking changes as it sleeps or wakes, or is exposed to sun or shade. It is called the green toad from its spots being of that colour. Pallas's account of it is as follows: The general colour is pale or whitish, becoming in hot sunshine entirely gray; when asleep the spots only appear gray, and when torpid the general hue is flesh-coloured.

The *obstetric toad, B. obstetricus* of Laurenti, is a small grayish reptile which inhabits France, and affords an example of a very curious instinct. The process of spawning is not conducted by this species in the water, but on land, and there the male assists the female to get rid of her eggs, which amount to about sixty. These he attaches in small bundles to his thighs by means of an adhesive fluid, and for weeks carries them about with great care. When the young are ready to escape, he seeks some stagnant water, and there deposits them in safety, the tadpole soon issuing forth, and swimming immediately. The *prickly toad*, *B. spinosus* of Daudin, which derives its name from strong projections on its tubercles, seems also to possess a singular peculiarity. It is never met with on the surface of the soil, and is only procured by means of the plough. The country people are persuaded it never leaves its retreat voluntarily; and Daudin suspects that it deposits its ova in the earth, in humid places, near the subterranean sources of water.

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[1] Jenyns's *British Vertebrate Animals*, 303.

Most of the toads of tropical climates are remarkable for their great size. Of this we give an instance in the *marine toad*, *Rana marina*, Gmel., a native of South America, the length of whose body extends to nearly a foot. It is also remarkable for its *post-aural* projections, which are an inch long, and oval shaped. The feet are not webbed; the toes are terminated with round knobs, and furnished with short claws resembling the human nails in miniature. There are many other recorded species of toads proper, on which, however, we cannot dwell; and we now proceed to several genera which have recently been separated from the group.

GENUS BOMBINATOR. This genus differs from the other toads only in having the tympanum, or soft covering of the ear, hid under the skin. RHINELLA of Fitzinger (OXYRHYNCUS of Spix) is distinguished by a prolonged muzzle. (See Plate CCCCXXXIII. fig. 4.) M. Gay has lately informed us (*Ann. des Sc. Nat., Avril* 1836, p. 224), that in Chili there is a genus allied to Rhinella, consisting of several agreeably coloured species, which are always viviparous. In the same locality he made a similar remark regarding several species of snakes. To these two genera succeed the OTILOPHA of Cuvier, which has also an acute snout, and on each side of the head a projecting crest extending to the gland called parotid. In the genus BREVICEPS of Merrem (part of Fitzinger's genus ENGYSTOMA), neither the tympanum nor parotids are apparent; the body is oval, the head and mouth are remarkably small, and the feet scarcely at all webbed. (See Plate CCCCXXXIII. fig. 5.) We shall here introduce a very few species belonging to these genera.

To the genus Bombinator belongs *B. bombinus* (*Rana bombina*, Gmel.), which is the smallest and most aquatic of the European toads. It is gray or brown above, blackish blue with orange spots beneath. The hind feet are completely webbed, and nearly as long as those of frogs, so that it leaps nearly as well as they do. It affects morasses. Of the genus Rhinella, Spix has depicted and described five species, most of which, according to Cuvier, it is difficult to distinguish from the proper toads. The *mitred toad* of English writers, the *margaritifera* of Gmelin, is usually adduced as a type of the genus Otilopha. It is a native of Brazil, and about the size of the common toad; it is rufous brown above and whitish beneath, beset with numerous small tubercles of a bluish or pearly cast, whence the French name *crapaud perlé;* but its principal characteristic is the subtriangular form of its head, the sides of which, beyond each eye, project into an angular protuberance. From the nose likewise an elevated white line runs along each side of the head, over the shoulder, to the sides; the fore feet are unwebbed, the hind are partly so. Genuine specimens of the genus Breviceps present animals not a little singular in their forms. Such are the *short-headed* and the *indistinct toad* of British authors, the *Rana breviceps* and *R. systoma* of Schneider. They are oval-shaped like eggs, with scarcely any projecting head; and one of them has actually been called the *headless toad* (*Rana acephala*, Schn.). The *short-headed toad* is a very small animal, about half the size of the common toad; the head is completely blended and incorporated with the thorax, and the surface is rather wrinkled than tuberculous. It is a native of Africa. *R. systoma* comes from the East Indies, and has a thick rounded body, with a head so lost in the general outline that the mouth is scarcely apparent; the legs, too, are peculiarly short, and appear almost as if imbedded in the wrinkled skin of the sides.

We now advance to the genus PIPA, which is universally distinguished from the toads. Its generic characters are the following: The body is flattened horizontally; the head is broad and triangular; the tongue is so adherent that it appears to be wanting (it is often said to be so); the tympanum is hid beneath the skin; the small eyes are placed toward the margin of the lower jaw; the extremities of all the fingers are divided into four small points; and finally, the male has an enormously sized larynx, like a triangular osseous box, which encloses two moveable ossiculi which occasionally close the branchiæ. Of this genus, that well-known and most singular animal commonly called the Surinam toad (*Pipa Surinamensis*, Laurenti,—*Rana pipa* of Linnæus), may be taken as a type. It seems to have been introduced to the notice of naturalists at the close of the seventeenth century, and was first described by the celebrated Ruysch. It is one of the most uncouth and hideous of nature's creatures, and is especially signalized for some of the most extraordinary phenomena regarding the growth of its young which are to be found throughout the range of the animal kingdom. The size of the Surinam toad considerably exceeds that of our common species. The mouth is very wide; the hands are tetradactylous; the fingers long and slender, and each divided at the tip into four distinct processes, all of which, when narrowly inspected with a glass, are found to be again subdivided in nearly a similar manner. The web of the hind feet reaches to the tips of the toes. The male is rather larger than the female, sometimes attaining the length of seven inches. The back is studded with granules, which are somewhat more numerous and larger on the female; the skin round the neck, in both sexes, forms a kind of loose wrinkled collar. The general colour of both is a dark blackish brown. This reptile has been long celebrated for the manner in which its young are perpetuated; and on this account it has become the object of much attention. It was for a time supposed that the ova issued from the deeper seated parts of the back, and were then enclosed in small cells on its surface till they were regularly hatched. Later observations in correcting this mistake have demonstrated a not less peculiar history. The precise truth was first made known by Dr Fermin, who had an opportunity, during his residence at Surinam, to investigate the creature's structure in a more satisfactory manner than had previously been practicable. His account is, that the female Pipa spawns at the brink of some stagnant water, and that the male immediately collects and amasses the heap of ova, and after impregnation deposits them with great care on the back of the female, where they are received into cellules which at this period are open for their reception, but speedily close upon them. They are there retained to the time of their second birth, which happens in somewhat less than three months. During this period the cells gradually enlarge, till the young emerge from the back of the parent in a completely formed state. During the time of their concealment, however, they undergo the usual change which is effected upon their congeners, being first hatched from the ova in the form of a tadpole; and then, after gradually acquiring their perfect shape, losing their tail, and so forth, they are extruded from the cellules. This strange process has since been examined and verified by Camper, Spallanzani, Blumenbach, and other naturalists, and is now established as a phenomenon equally true as extraordinary. Fermin found the brood he observed amount to seventy-five, and the period of their extrusion as young Pipas occupied five days. When they had made their escape, the female, having rubbed the epidermis from her back on some hard substance, returned to land. This species lives in the fresh waters of South America, and sometimes in obscure houses in Cayenne and Surinam, where it is called *tedo* and *curucu*. According to Seba and Madame Mérian, the negroes of the colonies use its flesh as food.

Spix has figured another species, *P. curururu*, nearly resembling the above, which affects the bottoms of lakes in Brazil. That author assures us that the female does not receive and hatch its young in the alveola on her back. Another kind is preserved in the Paris museum,—a true Pipa, according to Cuvier, from the Rio Negro. It is quite smooth, and has a narrower head than the common species. The baron names it *Pipa lævis*.

FAMILY SALAMANDRIDÆ. NEWTS OR SALAMANDERS.

We have now reached a group of which the name has been celebrated from remote antiquity, and the history encompassed by fables in every age. "It was on the fortunate soil of ancient Greece, in the bosom of a wise and warlike nation, where imagination, favoured by a happy clime, exaggerated even the wonders of creative power, that the reputation of the salamander originated."[1] It was among that fanciful people that an obscure and changeful reptile was as it were consecrated to posterity by a fantastic but immortal name.

But the times of superstitious fiction regarding the once famous salamander are now for ever passed and gone, and it is only to be regretted that they have not carried along with them the ignorant prejudice which still remains respecting a few harmless reptiles. "The daughter of fire," with her "frame of icy crystal," is now nearly forgotten; and for unchanging love and unflinching courage, other and more fitting emblems have been long invented. The ancient story of the salamander enduring fire and extinguishing flame is now recognised only as an idle tale; and scarcely less so its faculty of poisoning vegetables, and its other pernicious powers. These gross errors being swept away, more room is left to investigate whatever is instructive in the history of those once widely abused, but really interesting creatures.

As the salamanders resemble in many respects the foregoing genera of the order, many of the details which have previously been stated equally apply to them. This remark relates also to the extraordinary metamorphoses they undergo, but with some striking variations. We here find examples of a species of reproduction not uncommon among fish, and met with, as already mentioned, among certain lizards. We allude to that mode of birth known under the name of *ovo-viviparous*. The mode we have been hitherto contemplating resembles that of birds in being strictly *oviparous*. The ova or eggs are extruded from the parent, and under the influence of heat the young are in due time hatched. In the salamanders, however, another stage intervenes. When the ova have arrived at the state in which, in the other Batrachia, they are wont to be expelled, in these they are retained for some time after their development has begun. The eggs are, in fact, never laid, but are hatched in the interior of the parents; so that they bring forth living offspring, although originally contained in eggs. These eggs, by a natural process, are deposited in certain bags, which are called *oviducts*. In the salamander there are five of these, each of which contains six, or eight, or more young, and there they are nourished by a peculiar fluid, and do not issue forth till they have undergone their metamorphoses, that is, have acquired their feet and other organs. They are deposited in or near marshes.

In our general remarks on the Batrachia, we traced, in a few words, the changes which take place in the respiratory system of this group. We saw that being first exercised in water, it was for a time precisely analogous to that of fishes; and that terminating on land, it perfectly corresponded with that of land animals. In the salamanders there is this peculiarity,—that while one section of them ere long become terrestrial in their structure and habits, another division continues aquatic for life. But so far as respiration is concerned, the same complete metamorphosis takes place in these latter as in the former; their gills vanish, regular lungs are completed, and yet the aquatic salamander, water-newt, or triton as it is sometimes called, continues a constant inhabitant of the water. The species are in fact habitual inmates of that element, and yet inhale the vital breath of heaven; and in this respect completely correspond to the cetaceous or whale tribes, with whose peculiarities, on a scale so greatly more gigantic, naturalists have been long acquainted. Like them they must regularly come to the surface, inflate their lungs, descend to their weedy homes, and after a time return again for air,—repeating this process as often as their exigencies may require. Peculiar characters distinguish the circulating system of the Cete, as compared with that of other Mammalia; and we have little doubt that parallel features occur among the tritons, although we are not aware that this point has been as yet investigated.

When speaking of toads, we took occasion to make a few remarks on the cuticular secretion, for which they, in common with other Batrachia, are remarkable. The salamanders have on this account been still more celebrated; and there seems no reason to doubt that the fable of their withstanding the effects of fire has originated from this peculiarity. The humour is in them found to possess more concentric virtue, having withal a more offensive odour, and a more acrid taste. Count Lacépède says, that if a drop of it come in contact with the tongue, it produces the sensation of burning; so that it really proves a defence against many animals which would otherwise devour them. It is more especially when they are irritated and alarmed, and particularly if exposed to fire, that they distil the secretion in quantities, and envelope themselves in a damp covering, which, for a brief period, might possibly prevent their being consumed. Hence, then, may have originated the ancient opinion that these animals could live not only on land and in water, but also in fire; and from the slender germ of that same peculiarity has no doubt spread the monstrous statement of Pliny, that these creatures infested the herbage of a country to such a vast extent as even to cause the extinction of entire nations!

Another remarkable peculiarity of the salamanders, more especially of the aquatic kind, which has been successfully elucidated by Spallanzani, is common to them, and in some measure to the tadpole state of the other Batrachia. We allude to that surprising power whereby, when repeatedly deprived of even an important portion of their body, that portion is as frequently renewed. This property is not unknown among some of the lower orders of creation, but in none is it more striking than in these reptiles. Thus, in the triton, the whole limb may be removed, and by and by we find it completely restored, and furnished with perfect bones, muscles, nerves, &c. In other instances an eye has been extracted, and speedily a new and perfect one is found to have supplied its place. These renewals are more complete than such as take place among the true lizards, formerly alluded to.

The salamander group are distinguished by the following peculiarities. They have an elongated body, four feet, and a lengthened tail, which gives them a general resemblance to the lizards. Their head is flat, and the ear entirely hid in the flesh, without any apparent tympanum, there being only a small cartilage over the external aperture. Both jaws are furnished with numerous small teeth, and two similar rows occur upon the palate. The tongue resembles that of frogs, but there is no third eyelid. They have a skeleton with fourteen dorsal vertebræ, and remarkably small rudiments of ribs, but without any osseous sternum; the pelvis is simply suspended from the spine by ligaments. They have four fingers and five toes. As we have already stated, they respire like the preceding genera. The arms of the tadpole are developed before the legs, contrary to what happens in the animals already reviewed.

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[1] Griffith's *Animal Kingdom*, ix. 464.

Salamanders are divided into the terrestrial and aquatic. We commence with the former.

Genus Salamandra, Laur. *Terrestrial salamanders.* (See Plate CCCCXXXIII. fig. 6.) In their perfect state these reptiles have a round tail; they remain in water only during their tadpole state (which is brief), or while in the act of reproduction. Their ova are enclosed in oviducts.

These salamanders, though not unfrequent in Europe, and in warmer regions, seem never to have been observed in Britain. They take up their abode in damp ground, and amidst brushwood, in ditches and shady places, in subterranean caverns and among old ruins. They are feeble, timid, stupid creatures, which live on worms, snails, flies, and other insects, and apparently on rich mould. They appear almost entirely deaf and dumb, and show no dread either of man, or of other animals stronger than themselves. If thrown into water, they immediately attempt to escape from it. They are capable of enduring most serious mutilation without apparently suffering from it; if, however, they are plunged into vinegar or alcohol, or are sprinkled with salt or tobacco, they are killed in a moment. We may now enumerate a few of the species. The *spotted salamander, S. maculosa,* Laur., of the usual length of six or eight inches, sometimes more, is one of the largest, and most widely spread through Europe. It is of a shining black colour, with two bright yellow stripes on its flanks, and of a livid blue colour beneath. It has conspicuous glands (parotids) behind its occiput, and along its sides are rows of tubercles, from whence, when alarmed, a milky humour flows, bitter to the taste, of a strong smell, and injurious to the life of very small animals. Its tail is of a roundish or cylindrical form, tapering to the extremity. It affects humid places, and retires into subterranean holes, under large stones and roots of trees. The brain of this reptile is said to be so small as not to equal the diameter of the spinal marrow, and its perceptive powers are proportionally dull. The *black salamander, S. atra,* Laur., is not above half the size of the foregoing; it is black, and devoid of spots above, and of a yellowish hue beneath. It is rare in France, but is found in the Alps, and is abundant in the mountainous regions of Southern Germany. (See Plate CCCCXXXIII. fig. 6.) The *funereal salamander, S. funebris,* is six or eight inches long, of a deep-brown colour. It was observed by Bory St Vincent in the hottest and dampest parts of Andalusia. This species issued in dozens from their retreats at night, and speedily advanced towards destruction near the bivouac fires, by which they were attracted. Into these they would apparently have themselves advanced, had not the soldiers cast them amid the flames, where they remained for a few moments as if unhurt, thus far supporting their incombustible reputation. We need scarcely add, however, that they very speedily died *roasted,* as any other small animal would have done under a similar predicament.

Among the foreign salamanders a great number inhabit North America; and these are said to be destitute of the occipital glands. Palisot and Bosc have each described a new species. Thunberg has also discovered one in Japan, to which the natives ascribe medicinal virtues of the most valuable kind. The *spectacled salamander, S. perspicillata* of Savi, has only four toes on the hind feet. It is black above, and yellow spotted with black beneath, with a yellow line between the eyes. It is found in the Apennines.

Genus Triton, Laur. *Aquatic salamanders.* We now turn to the aquatic group, commonly called newts, which have a tail always compressed vertically, and pass a great portion of their lives in water. (See Plate CCCCXXXIII. fig. 7.) These are the animals experimented on by Spallanzani, and so celebrated for their reproductive powers. Another faculty scarcely less singular, is that which M. Dufay has recognised them as possessing,—we mean their power of remaining frozen for a length of time in ice without mortal injury. Their ova are fecundated by the milt being mixed with the ambient water, and penetrating with it into the oviducts. After a certain sojourn there, the young issue in long gelatinous cords, from which they do not effect their escape till several days after their extrusion. The branchiæ continue for a longer or shorter period in different species. Few have been accurately observed in Europe, and doubts remain about their specific determination, because they change their colours with their age, and differ according both to sex and season. The crests and other ornaments of the males, also, are only fully developed during spring. If winter surprises them still wearing gills, these parts are then maintained throughout the colder season, and even continue to increase.

The following are species which have been accurately characterized. The *marbled salamander, S. marmorata,* Lat. (*Triton Gesnerii* of Laurenti), has the skin chagrined, pale green above, spotted with large irregular brown blotches, and brown spotted with white beneath. A red line runs along the back, which in the male forms a kind of crest, marked with black spots. The *crested triton, S. cristata,* Lat., has the skin chagrined, brown above spotted with black, and orange beneath similarly spotted; the flanks are spotted with white. The crest of the male is high, acutely serrated, and embroidered with violet during the love season. This is our great water-newt (*T. palustris,* Flem. and Jen.), by no means uncommon in Britain during summer in ponds and ditches, and sometimes found in autumn out of water, in damp and shady situations. M. Bibron, who lately read a paper on these tritons to the London Zoological Society, stated that he had found this and the preceding species indigenous to Britain; and that the distinguishing characteristic consists in this, that in the crested species the upper lip is so largely developed that it overlaps the under one posteriorly when the jaws are closed, a condition never present in the *marmorata.* The *spotted triton, S. alpestris,* Bechst., has a chagrined skin, and is slaty and brown coloured above, and orange or red beneath; whilst *S. punctata,* Lat. (*T. punctatus,* Bonap.), has a smooth skin, light brown above, pale reddish beneath, and spotted everywhere with black. The crest is festooned, and its toes somewhat enlarged, but not webbed. This is the common (or smaller) water-newt of Britain. It is subject to considerable variation, and is often found on land. A third British species is the striped eft, *T. vittatus* of Gray. Finally, *T. palmata,* Lat., is brown on the back, black and brown on the head, lighter on the flanks, and spotted with black. The male has three small crests on its back; the toes are dilated and webbed, and the tail terminates in a slender membranaceous fin. North America is rich in aquatic salamanders; but our knowledge of these, as of many European species, is too obscure to admit of their precise classification. Baron Cuvier has well remarked, that a good monograph of this interesting group, with accurate plates, is a great desideratum.

We have now to conclude the present article with a few brief notices of certain very remarkable genera, some of

atrachia.
Genus
Ienopoma.

which differ considerably from all the members of the two preceding families, while others are by no means remotely allied to the salamanders. They are all aquatic; and while some lose their gills at so early a period as to have misled observers into the belief that they never at any time possessed these organs, others retain them throughout their lives, even after the development of internal lungs,—thus exhibiting, as we observed at the commencement of our treatise, the only truly amphibious animals of the vertebrated kingdom.

a. No apparent branchiæ.

Genus Menopoma, Harlan; *Abranchus*, ejusd. We have here a form resembling that of the salamanders. The eyes are obvious, the feet well developed, and there is an orifice on each side of the neck. Besides the range of delicate teeth around the jaws, there is a parallel range upon the anterior portion of the palate. The only species known is the great salamander of North America (*S. gigantea*, Barton), called Hellbender in the United States. It measures from fifteen to eighteen inches in length, the colour of a blackish blue, and dwells in the rivers of the interior, and the great lakes.[1] See Plate CCCCXXXIII. fig. 8.

Genus Amphiuma, Garden. The species of this genus have also an orifice on each side of the neck; but the body is much lengthened, and the legs and feet but slightly developed. Their palatine teeth form two longitudinal rows. *Amph. tridactylum*, Cuv. is distinguished by three toes to all the feet.[2] Another species, *Amph. didactylum*, (*Amph. means*, Garden and Harlan), has only two toes. The body is long and cylindrical, the head depressed and obtuse; the tail compressed, with a sharpened ridge above, but blunt below. The fore feet are formed like tentacula. The colour is blackish gray above, and pale beneath, without spot or stripe. The observed size varies from six inches to two feet. This species inhabits ponds in the vicinity of New Orleans, and is met with in other parts of the southern states. It is sometimes found deeply sunk in mud, lying concealed like an earthworm, even at the depth of several feet. It is greatly dreaded, though without any reason, by the negroes, who name it the serpent of Congo.

b. Branchiæ apparent and persistant.

Genus Axolotus. The only known species of this genus, which we may name *Ax. pisciformis* (the specific title bestowed by Shaw), so entirely resembles the larva state of an aquatic salamander, that it is even yet regarded by some as an incompleted reptile. It was so regarded by Baron Cuvier in his contribution to Humboldt's *Voyage*;[3] and even in his latest work he yielded rather to the opinion of others than his own conviction. "Ce n'est encore qu'avec doute que je place l'axolote parmi les genres à branchies permanentes, mais tant des témoins assurent qu'il ne les perd pas, qui je m'y vois obligé."[4] The species in question measures from eight to ten inches in length, and is of a gray colour, spotted with black. It has four toes to the anterior feet, and five to the hinder, and there are three long tufted branchiæ on each side. (See Plate CCCCXXXIV. fig. 1.) It inhabits the lake on which the town of Mexico stands, and is naturally subjected at times to a low temperature. The specimens brought home by Mr Bullock were from an elevation of 8000 feet. That collector informed us that at certain seasons they stock the markets, and are eaten in great quantities by the peasants. Sir Everard Home has published an account of their anatomical structure. He is decidedly of opinion that they are not larvæ, but completed reptiles.[5]

Batrachia.
Genus
Siren.

Genus Menobranchus, Harlan; *Necturus*, Rafinesque. Here there are only four toes to each foot. (See Plate CCCCXXXIV. fig. 2.) There is a single range of teeth on the intermaxillaries, and another, parallel, but more extended, on the maxillaries. The best-known species is *M. lateralis* (*Triton lateralis*, Say), a large reptile, which sometimes attains the length of two or three feet, and inhabits the great lakes of North America.[6]

Genus Proteus, Laurenti. Distinguished by having three toes to the anterior feet, and only two to the hinder. The only known species is *P. anguinus* (*Siren anguina*, Schneid.), an animal resembling an eel with legs, of a pale rose or flesh colour, and measuring from ten to twelve inches in length, with a diameter seldom exceeding half an inch. The muzzle is depressed and elongated; both jaws are furnished with teeth, and the tongue is free in front, but not very moveable. The eye is excessively small, and covered over by a kind of tegument. The ears are also covered over more substantially, as among the salamanders. Besides the internal lungs, there are three feathered gills or branchiæ on each side of the posterior portion of the head. The skeleton resembles that of the salamanders, except that there are many more vertebræ, and fewer rudiments of ribs. The osteology of the head, however, is entirely different, and approximates that of the siren. The heart, composed of a single ventricle and auricle, is placed between the fore legs, and the lungs have the form of simple slender tubes, terminated by a vesicular dilatation. This truly remarkable reptile is found occasionally in a noted and romantic lake called Zirknitz (the Lugea Palus of the ancients), about six German miles from Labac, in the duchy of Carniola. From this lake, as extraordinary as its slimy inhabitant, the waters retire during the summer season by numerous subterranean outlets, leaving the ground fit for pasture and the cultivation of millet. In the month of October they return again with great force, springing out of the subterranean passages from a vast depth, till the lake is amply filled. It is situated in a hollow or valley, surrounded by rocky and wooded hills, in which are great caverns, and is supplied by rivulets running into it from the adjoining mountain regions. According to M. Schreibers, to whom we owe the first correct account of the proteus,[7] its proper locality is Lake Sittich, one of several which communicate with that already named. Its more characteristic abode is probably among the subterranean canals which are known to connect together those peculiar lakes of Carniola. All its characters, in fact, present the aspect of a subterranean animal. It has a pale, bleached, ghost-like aspect, and its small, opake, skin-covered eyes bear but small resemblance to the brilliant visual organs of other reptiles.

We come, finally, to the genus Siren, Linn., in which the posterior legs are entirely wanting, and the anterior pair furnished with four toes. We have it in our power to state several particulars in the history and structure of a species of this genus from personal observation,—a mode of acquiring knowledge which, however desirable, has by no means been granted us in regard to the majority of the groups discussed in this exposition of the reptile race. We never, like Colonel Bory St Vincent, tossed a salamander into the fire,—we never, like Mr Waterton, rode on the back of an alligator,—we never waded waist deep, with Mr Audubon, among hundreds of these huge reptiles,—we never sailed, like Wordsworth's Highland boy, in a turtle's shell,—and our practical experience, even of green fat, is far from extensive;—but we have watched a siren from the far west; and as the history of the species in question cannot fail to throw light on the nature and attributes of others to which it is related, and as it is in itself a very extraordinary and interesting reptile, we shall make no apology for the length of the following observations.

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[1] *Annals of the Lyceum of New York*, i. pl. 17.

[2] *Mém. du Mus.* xiv. pl. 1; and *Journal of the Academy of Sciences of Philadelphia*, vol. iii.

[3] *Recherches sur les Reptiles douteux*, p. 123.

[4] *Règne Animal*, ii. 119.

[5] *Phil. Trans.* for 1824, part ii.

[6] *Annals of the Lyceum of New York*, i. pl. 16.

[7] *Phil. Trans.* for 1801.

The Gardenian siren (*Siren lacertina*, Linn.), so named in remembrance of Dr Garden, by whom it seems to have been first observed, in its general form and aspect bears a great resemblance to an eel, but is at once to be distinguished from a fish by its anterior arms. The fine specimen long preserved alive by Dr Patrick Neill of Edinburgh was originally transmitted by Dr Farmer of Charlestown, South Carolina, to Dr Monro. It measured one foot five inches in length, and about four inches in circumference. (See Plate CCCCXXXIV. fig. 3.) Its colour was deep blackish brown, rather paler beneath, where it was partially tinged with a bluish hue, and marked all over with numerous small, irregular, pale, ashy-brown spots, not very perceptible except on a rather close inspection. The muzzle was blunt, depressed, sub-rounded or slightly square, and considerably narrower than the hinder portion of the head. The nostrils, which are inconspicuous, are placed near the anterior angle of the upper jaw. The head is broad and flat. The eyes are dim, of an obscure blue, and there is no very obvious distinction of colour between the iris and pupil, both appearing as if seen through a semi-transparent membrane. The gills consist of three fleshy peduncles, which increase in size from the first to the last. They are beautifully branched from beneath and along their lateral and terminal edges, and these little branches are divided and subdivided into still more minute ramifications. This elegant fringe-work forms the true gills, the central and fleshy stalks serving merely as their support. Beneath, and rather in advance of these bodies, are three vertical clefts, through which the water is ejected backwards from the interior of the mouth upon the gills, though with a much more languid and less perceptible action than in fishes. These clefts or branchial perforations are sustained and kept in separation by four arches, which Garden, Ellis, and Camper appear to have mistaken for gills, although both Linnæus and John Hunter took a more accurate view of the matter.[1]

The general surface of this siren is very smooth and shining; and if there are any scales, as some have said, they are not apparent to the naked eye. Towards the tail its form becomes thin and compressed, and that part is margined for several inches both above and below, as well as around its terminal point, by a narrow membrane or fin, which no doubt greatly aids its movements through the water.

The earliest notice of this singular reptile appears to have been communicated by Dr Garden to Linnæus through the medium of Mr Ellis in the year 1765. He described the simultaneous existence of lungs and gills, and concluded that it was a perfect animal, chiefly because there did not exist in Carolina any species of salamander, or other aquatic creature, of equal size, of which it could be regarded as the larva. It was in consequence of the information received regarding this species that Linnæus, though with hesitation, founded his order of *Amphibia meantes*, of which the most peculiar character consisted in there being "branchiæ et pulmones simul." The great Swedish naturalist appears to have been particularly interested by the peculiarities of the siren; for in his reply to Mr Ellis, acknowledging receipt of Dr Garden's "very rare two-footed animal with gills and lungs," he observes that nothing had ever exercised his thoughts so much, nor was there anything he so greatly desired to know, as the real nature of so extraordinary a creature.

Although Ellis and Hunter wisely regarded the siren as a perfect animal, the propriety of this opinion was by no means universally admitted. Pallas, not perceiving that such metamorphoses as he supposed were rendered impossible by the absence of any germ of the hinder extremities, even in the skeleton, still insisted that the siren was nothing more than the larva of a four-footed salamander.[2] A similar opinion was maintained by Hermann,[3] Lacépède,[4] and Schneider.[5] About twenty years after the original discovery of the animal, Camper (in 1785) examined a specimen in the British Museum, the condition of which was so bad that he was unable to detect the lungs; whereupon he took up and promulgated an entirely new view, according to which, without reference to the existence of feet, he declared that the siren was a *fish*. Gmelin, of course, immediately classed it with the eels, and it thus became the *Muræna siren* of his edition of the *Systema Naturæ!* Whatever may be thought of Dr Garden's skill as an anatomist, Camper's conclusion was certainly somewhat precipitate, in the face of so great an authority as that of John Hunter.

In the year 1800, Baron Cuvier received a young siren from M. de Beauvois. The great French anatomist, whose splendid labours have thrown such a flood of light on so many obscure subjects of zoological science, was not likely to lose the opportunity of settling this still disputed point. In his first observations,[6] and in an after and more ample memoir,[7] he has, we think, successfully shown that both the proteus and siren are perfect, that is, completed animals, belonging to different genera of Batrachian reptiles, but quite distinct from either lizards or salamanders in any of their progressive stages. Yet the opposite opinion (so tenacious is error) does not continue without adherents. In an elaborate essay by two Italian authors, Sig. Configliachi and Rusconi, in which the siren is incidentally mentioned, these naturalists infer from analogy, that as the canal of the nostrils is not so perforated as to open into the interior of the mouth, so it must be incapable of respiring atmospheric air, and would speedily die if removed from its liquid element.[8]

Now, the value of the living siren observed by Dr Neill for six or seven successive seasons, consisted in this,—that it demonstrated *de facto*, what had been previously a matter of mere logical inference on the part of the anatomist. During the long period of its confinement no change whatever took place, either in its general aspect, or in the form or structure of the feet and gills. Had it been a larva, it would assuredly have lost these last-named organs during the time of observation. But the most curious result regarding this specimen was obtained accidentally, and happily illustrates the very point on which it was most desirable to obtain information. It is thus related by Dr Neill: "Although I certainly would not have made the experiment of the fragility of the siren, by throwing it on the ground, and although I would have hesitated to keep the animal out of the water for several hours, while I knew that respectable naturalists doubted if it would live more than a few minutes out of that element, yet it so happened that the creature on one occasion made of its own accord an experiment (if it may be so called) illustrative of both points. The water-box itself (in which the siren dwelt) was ten inches deep: it was placed on a plant-trellis or shelf, close by the lower end of the sloping roof-sash of the green-house, and thus stood nearly three feet from the ground. At that pe-

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[1] See *Phil. Trans.* lvi. 191 and 307.

[2] *Nov. Comm. Petrop.* xix. 438.

[3] *Tabula Affinitatum Animalium*, 256.

[4] *Hist. Nat. des Quadrupèdes Ovipaires*, 611.

[5] *Historia Amphibiorum*, fascic. 1, 48.

[6] *Bulletin des Sciences*, an. 8, p. 106.

[7] *Recherches Anatomiques*, &c. in Humboldt's *Recueil d'Observations de Zoologie*, 98–117.

[8] *Del Proteo Anguino di Laurenti Monographia*, Pavia, 1819.

Batrachia.
Genus
Siren.

riod the box happened to leak; and the gardener therefore filled it up with water between seven and eight o'clock in the evening, at which time the siren was seen safely lodged in the box. The door of the green-house was locked as usual over night, and before it was opened in the morning, the siren, to the great surprise of the gardener, was found lying on a footpath which passes round the exterior of the green-house. I was speedily apprized of the circumstance, and on examining the spot, we could most distinctly trace, by a shining glaze, derived from its skin, the passage of the animal through an edging of heath (*Erica herbacea*), and across a narrow flower-border, to a hole which he had scooped out under the brick-wall of the green-house, in escaping from within. The foundation of this wall, it may be remarked, had intentionally been made shallow, or near to the surface, for the purpose of permitting the roots of some shrubs, planted in the conservatory style within, to penetrate to the exterior border. We possess no data for fixing with certainty the number of hours during which the animal had been out of the water. The box, as already mentioned, being leaky, was filled near to the brim between seven and eight in the evening; it seems likely that this filling up had disturbed the animal, and that it had been enabled partly to crawl and partly to glide over the margin, while the water yet stood high, or early in the night; for the water had subsided five or six inches before morning. The escape of so much water had formed, of the soil below, a kind of sludge, probably somewhat analogous in character to the 'stiff clay' of its native swamps, in which it is said sometimes to burrow; and this must have greatly facilitated the first underground operations of the siren. Still, however, as the excavation made was not less than eight inches in depth, and nearly three feet in length, for the ascending aperture on the outside sloped at an angle of about 30°, it seems reasonable to conclude that the siren must have been several hours hard at work in forming so extensive a tunnel for itself. In further proof of its exertions, it may be observed, that a considerable part of the dark-coloured epidermis, or covering of minute indistinct scales, was worn off its snout, and the skin of the upper part of the back was in different places ruffled. The morning was very cold, and the mercury in a register-thermometer kept in the green-house had been as low as 33° Fahrenheit at one period of the preceding night. The animal was observed about seven A. M. lying doubled, or with the body bent round, but not coiled, on the footpath. He was exceedingly benumbed, being just able to show signs of life when lifted by the gardener. Considering the evidence of long-continued active exertions during the night, it seems reasonable to ascribe his almost torpid state when found, to the freezing cold which he had encountered when he had made his way fairly to the outside. When first restored to the watery element, the animal breathed hard, rushing to the surface, and opening his mouth with a wide gape to inhale air. He soon after sunk down, and let several strings of air-bubbles escape. The branchiæ were doubtless to a certain degree dried, and thus obstructed; and it evidently took some time before they could freely perform their accustomed office. When, however, I again examined him several hours afterwards, he seemed perfectly contented to remain wholly under water; and on being touched, appeared as lively and as well as ever. The decorticated portions of the back and snout showed us the colour of the true skin below, which was of a pale leaden hue."[1]

During the first year and a half of the siren's captivity at Canonmills, his box (filled with moss and water) was placed in a green-house, which merely excluded the severity of winter. He was very sluggish all this time, exhibited few signs of appetite, and from October to May entirely declined food. In the spring of 1827 he was placed in a hot-house intended for the culture of tropical plants, where the temperature was generally about 65°. He there became much more lively, and soon began his song, which, unlike the delusive voice of the ancient sirens, differed little from the croaking of a frog. He then devoured small earthworms with some avidity, and continued the practice without any lengthened intermission till his death in October 1831, after a captivity of nearly six years and a half, during which long period no structural change took place, nor was the slightest tendency to any such change discernible. The death of this reptile was occasioned, we doubt not, as Dr Neill supposes, by the drying up of the fimbriæ of the branchial apparatus, consequent on its having again escaped from its watery reservoir. Though truly amphibious, the siren may certainly be regarded more as an aquatic than a terrestrial creature. Dr Mitchell, indeed, seems to think it most probable that the air-sacs called lungs do not perform any direct respiratory function, but are mere receptacles of air, performing only an auxiliary service, by occasionally furnishing the gills with atmospheric air.[2]

We observed that the siren breathed air rather through the mouth than the nose, and expelled it in the same manner when put into the water, from which it may be inferred, that the nasal organ is in a rudimentary state (in the proteus it is said not to exist at all), so far at least as concerns the act of respiration. The eyes of the siren are dim and motionless; and we did not perceive that an increase of light caused any appearance of contraction or other change. Yet the sight must be tolerably acute, as in pressing a fly downwards under water with the point of a hair pencil, on the side of the vessel in which the reptile lay, it made a catch at the insect almost the moment it touched the surface, and immediately snapped it in two.[3]

Besides the species to which the preceding history and observations apply, two others are known to naturalists as inhabitants of the southern states of North America, viz. the *Siren striata* of Le Conte, and the *Siren intermedia* of that author.[4]

(T.)

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[1] Jameson's *Journal*, January—April, 1828.

[2] See *New York Med. and Phys. Journ.* for June 1824; and Dr Neill's additional notice in *Edin. New Phil. Journ.* xii. 298 (1832).

[3] *Illustrations of Zoology*, vol. 1st, art. *Siren*.

[4] See *Annals of the Lyceum of New York*, vol. i.; and Harlan's *American Herpetology*, p. 6.

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REPTON, an ancient market-town of the county of Derby, situated in the hundred of Repton cum Gresley, four miles from Burton-on-Trent, and 124 from London. It is a place of great antiquity, having been the residence of the Saxon kings of Mercia during the heptarchy, several of whom are buried in the church, which is still a handsome Gothic building, with a lofty spire. It had once a market, but it is now fallen into neglect. The population amounted in 1801 to 1424, in 1811 to 1648, in 1821 to 1802, and in 1831 to 1758.

REQUENA, a city of Spain, in the province of Cuença, and the capital of a district of the same name. It stands on a height in a valley watered by the river Magro, which is fertile as regards meadows, and produces great quantities of rich fruits. The city contains three churches, seven monasteries, and 6500 inhabitants, who make silk goods from the worms fed on the mulberries growing in the vicinity.

RESENTMENT means a strong perception of good or ill, generally a deep sense of injury, and may be distinguished into *anger* and *revenge*.

RESHD, or RESHT, a town of Persia, and the capital of the province of Ghilan. It is a large town, with a considerable trade, and well-furnished shops and warehouses. It is so enveloped in trees, that no idea can be formed of it taken in any one point of view. Exclusive of the bazaars, which occupy a considerable space in the centre of the town, it is composed of small compartments, divided for the most part by narrow and obscure alleys. There are not many principal streets; and only some of them are paved, whilst others have merely a little gravel thrown in the centre for the water to run on, and some are left unfashioned in any way, except in having a raised pathway at the sides for foot-passengers, which is of great convenience in wet weather. The bazaars or shops, of which there are said to be 1200, are extensive, regular, clean, and well kept. They are well paved, but not entirely covered in from the weather. Instead of arched or domed roofs, extending from one side of the street to the other, the roofs only project nearly to the centre of the street, covering the shops and foot-passengers. There is in this town a bustle and hum of business, more than is seen in most of Persian towns. Natives of various countries are seen passing and repassing on the pavement below; and persons of every occupation, busily following their several callings, animate the scene, and enliven it with their gay costumes. This town swarms with beggars of all descriptions, beyond what can easily be conceived. They are covered with leprosy, and cutaneous disorders the most revolting. The opium-eaters are among the most miserable of these objects. The religious mendicants, or fakeers and dervishes, are also very numerous, and the most impudent of all. There were formerly Russians, Armenians, and Jews in this city; but they were forced away by the bigotry and intolerance of the inhabitants, who reviled every foreigner that professed a different creed from their own. Reshd is one of the most considerable entrepôts on the Caspian for exchanging the commodities of Persia with those of Astracan, and is the chief mart for silk, the staple produce of the province. The rate of interest for money is from four to twelve per cent. per month; but this last rate is seldom paid. Fraser, who visited this place in 1822, was at pains to ascertain the amount of the population; and from every inquiry he could make, he estimated the male inhabitants at between thirty and forty thousand; and, considering other circumstances, the appearance of the markets and other public places, he estimates the whole population at eighty thousand. Reshd is an inland town, and all its maritime trade is carried on through the port of Ezellee. Long. 49. 50. E. Lat. 37. 20. N.

RESIDUAL ANALYSIS, a calculus invented by Mr Landen, and proposed as a substitute for the method of fluxions. The design of it was to avoid introducing the idea of motion, and of quantities infinitely small, into mathematical investigation. The residual analysis accordingly proceeds by taking the difference of the same function of a variable quantity in two different states of the said variable quantity, and denoting the relation of this difference to the difference between the two states of the said variable quantity. This relation being first generally expressed, is next considered in the case when the difference of the two states of the variable quantity is $=0$; and by that means it is obvious that the same thing is done as when the function of a variable quantity is assigned by the ordinary methods.

The evolutions of the functions, considered in this very general view, require the aid of a new theorem, discovered by Mr Landen, and remarkable for its simplicity and great extent. It is, that if x and v are any two variable quantities

$$\frac{x^{\frac{m}{n}} - v^{\frac{m}{n}}}{x - v} = x^{\frac{m}{n} - 1} \times \frac{1 + \frac{v}{x} + \frac{v^2}{x^2} + \frac{v^3}{x^3} + \ldots\ldots(m)}{1 + \left(\frac{v}{x}\right)^{\frac{m}{n}} + \left(\frac{v}{x}\right)^{\frac{2m}{n}} + \left(\frac{v}{x}\right)^{\frac{3m}{n}} \ldots\ldots(n)}$$

where m and n are any integer numbers.

This theorem is the basis of the calculus, and from the expressions $x^{\frac{m}{n}} - v^{\frac{m}{n}}$, and $x - v$ having the form of what algebraists denominate *residuals*, the inventor gave to his method the name of the *residual analysis*.

Mr Landen published the first account of this method in 1758, which he denominated a Discourse concerning the Residual Analysis. The first book of the analysis appeared in 1764, and contained an explanation of the principles of the new calculus, with its application to problems of the direct method of fluxions; the second book, which solved several problems of the inverse method, was never published.

RESIDUAL *Figure*, in *Geometry*, the figure remaining after the subtraction of the less from the greater.

RESIDUAL *Root* is a root composed of two members only connected by the sign — or minus. Thus, $a - b$, or $5 - 3$, is a residual root; and is so called, because its true value is no more than the residue or difference between the parts a and b or 5 and 3, which in this case is 2.

RESINA, a town of Italy, in the kingdom of Naples, on the sea-shore. It is situated near to Portici, and is built on the ruins of Herculaneum, at the foot of Mount Vesuvius, and in the way by which it is commonly ascended. It contains about 7700 inhabitants, who are mostly cultivators of vines, and produce the wine lachryma Christi.

RESISTANCE OF FLUIDS.

RESISTANCE, or *RESISTING Force*, in *Philosophy*, denotes, in general, any power which acts in an opposite direction to another, so as to destroy or diminish its effect. See MECHANICS, HYDRODYNAMICS, and PNEUMATICS.

Of all the resistances of bodies to each other, there is undoubtedly none of greater importance than the resistance or re-action of fluids. It is here that we must look for a theory of naval architecture; for the impulse of the air, which is our moving power, must be modified so as to produce every motion we want by the form and disposition of our sails; and the resistance of the water, which is the force to be overcome, must also be modified to our purpose, in order that the ship may not drive like a log to leeward, but, on the contrary, may ply to windward; that she may answer her helm briskly, and be easy in all her motions on the surface of the ocean. The impulse of wind and water makes these elements ready and indefatigable servants in a thousand shapes for driving our machines, and we should lose much of their service did we remain ignorant of the laws of their action; they would sometimes become terrible masters, if we did not fall upon methods of eluding or softening their attacks.

We cannot read the accounts of the naval exertions of Phœnicia, Carthage, and of Rome, exertions which have hardly been surpassed by anything of modern date, without believing that the ancients possessed much practical and experimental knowledge of this subject. It was not, perhaps, possessed by them in a strict and systematic form, as it is now taught by our mathematicians; but the master-builders, in their dockyards, did undoubtedly exercise their genius in marking those circumstances of form and dimension which were, *in fact*, accompanied with the desirable properties of a ship, and thus frame to themselves maxims of naval architecture, in the same manner as we do now. The ancients had not made any great progress in the physico-mathematical sciences, which consist chiefly in the application of analysis to the phenomena of nature; and in this branch, in particular, they could make none, because they had not the means of investigation. A knowledge of the motions and actions of fluids is accessible only to those who are familiarly acquainted with the fluxionary mathematics; and without this key there is no admittance. Even when possessed of this guide, our progress has been very slow, hesitating, and devious; and we have not yet been able to establish any set of doctrines which are susceptible of an easy and confident application to the arts of life. If we have advanced farther than the ancients, it is because we have come after them, and have profited by their labours, and even by their mistakes.

Sir Isaac Newton was the first who attempted to make the motions and actions of fluids the subject of mathematical discussion. He had invented the method of fluxions long before he engaged in his physical researches, and he proceeded in these *sua mathesi facem præferente.* Yet even with this guide he was often obliged to grope his way, and to try various by-paths, in the hope of obtaining a legitimate theory. Having exerted all his powers in establishing a theory of the lunar motions, he was obliged to rest contented with an approximation instead of a perfect solution of the problem which ascertains the motions of three bodies mutually acting on each other. This convinced him that it was in vain to expect an accurate investigation of the motions and actions of fluids, where millions of unseen particles combine their influence. He therefore endeavoured to find some particular case of the problem which would admit of an accurate determination, and at the same time furnish circumstances of analogy or resemblance sufficiently numerous for giving the limits of those other cases that did not admit of this accurate investigation.

Newton figured to himself a hypothetical collection of matter possessing the characteristic property of fluidity, viz. the *quaquaversum* propagation of pressure, and the most perfect intermobility of parts, and forming a physical whole or aggregate, whose parts were connected by mechanical forces determined both in degree and in direction, so that the determination of certain important circumstances of the motion of the parts might be rendered susceptible of precise investigation. And he concluded that the laws which he should discover in these motions must have a great analogy with the laws of the motions of real fluids: and from this hypothesis he deduced a series of propositions, which form the basis of almost all the theories of the impulse and resistance of fluids which have been offered to the public since his time.

It must be acknowledged that the results of this theory agree but ill with experiment, and that, in the way in which it has been prosecuted by subsequent mathematicians, it proceeds on principles or assumptions which are not only gratuitous, but even false. But, with all its imperfections, it still furnishes (as was expected by its illustrious author) many propositions of immense practical use, they being the limits to which the real phenomena of the impulse and resistance of fluids really approximate; so that when the law by which the phenomena deviate from the theory is once determined by a well-chosen series of experiments, this hypothetical theory becomes almost as valuable as a true one. It continues to be the groundwork of all our practical knowledge of the subject.

We shall therefore lay before our readers a very short view of the theory, and the manner of applying it; we shall then show its defects (all of which were pointed out by its great author), and recount some of the attempts which have been made to amend it; and, lastly, we shall give an account of the chief sets of experiments which have been made on this important subject, in the hope of establishing an empirical theory, which may be employed with confidence in the arts of life.

We know by experience that force must be applied to a body in order that it may move through a fluid, such as air or water; and that a body projected with any velocity is gradually retarded in its motion, and generally brought to rest. Analogy leads us to imagine that there is a force acting in the opposite direction, or opposing the motion, and that this force resides in or is exerted by the fluid; and the phenomena resemble those which accompany the known resistance of active beings, such as animals; therefore we give to this supposed force the metaphorical name of RESISTANCE. We also know that a fluid in motion will hurry a solid body along with the stream, and that force is required to maintain it in its place. A similar analogy makes us suppose that the fluid exerts force, in the same manner as when an active being impels the body before him; therefore we call this the *IMPULSION of a Fluid.* And as our knowledge of nature teaches us that the mutual actions of bodies are in every case equal and opposite, and that the observed change of motion is only the indication and measure of the changing force, the forces are the same, whether we call them impulsions or resistances, when the relative motions are the same, and therefore depend entirely on these relative motions. The force, therefore, which is necessary for keeping a body immoveable in a stream of water flowing with a certain velocity, is the same with what is required for moving this body with this velocity through stagnant water.

A body in motion appears to be resisted by a stagnant fluid, because it is a law of nature that force must be employed in order to put any body in motion. Now the body cannot move forward without putting the contiguous fluid in motion, and force must be employed for producing this motion. In like manner, a quiescent body is impelled by a stream of fluid, because the motion of the contiguous fluid is diminished by this solid obstacle; the resistance, therefore, or impulse, no way differs from the ordinary communications of motion among solid bodies.

Newton's theory.

Sir Isaac Newton, therefore, begins his theory of the resistance and impulse of fluids, by selecting a case where, although he cannot pretend to ascertain the motions themselves which are produced in the particles of a contiguous fluid, he can tell precisely their mutual ratios. He supposes two systems of bodies such, that each body of the first is similar to a corresponding body of the second, and that each is to each in a constant ratio. He also supposes them to be similarly situated, that is, at the angles of similar figures, and that the homologous lines of these figures are in the same ratio with the diameters of the bodies. He farther supposes that they attract or repel each other in similar directions, and that the accelerating connecting forces are also proportional; that is, the forces in the one system are to the corresponding forces in the other system in a constant ratio, and that, in each system taken apart, the forces are as the squares of the velocities directly, and as the diameters of the corresponding bodies, or their distances, inversely.

This being the case, it follows, that if similar parts of the two systems are put into similar motions in any given instant, they will *continue* to move similarly, each correspondent body describing similar curves, with proportional velocities: For the bodies being similarly situated, the forces which act on a body in one system, arising from the combination of any number of adjoining particles, will have the same direction with the force acting on the corresponding body in the other system, arising from the combined action of the similar and similarly directed forces of the adjoining correspondent bodies of the other system; and these compound forces will have the same ratio with the simple forces which constitute them, and will be as the squares of the velocities directly, and as the distances, or any homologous lines, inversely; and therefore the chords of curvature, having the direction of the centripetal or centrifugal forces, and similarly inclined to the tangents of the curves described by the corresponding bodies, will have the same ratio with the distances of the particles. The curves described by the corresponding bodies will therefore be similar, the velocities will be proportional, and the bodies will be similarly situated at the end of the first moment, and exposed to the action of similar and similarly situated centripetal or centrifugal forces; and this will again produce similar motions during the next moment, and so on for ever. All this is evident to any person acquainted with the elementary doctrines of curvilineal motions, as delivered in the theory of physical astronomy.

From this fundamental proposition, it clearly follows, that if two similar bodies, having their homologous lines proportional to those of the two systems, be similarly projected among the bodies of those two systems with any velocities, they will produce similar motions in the two systems, and will themselves continue to move similarly, and therefore will, in every subsequent moment, suffer similar diminutions or retardations. If the initial velocities of projection be the same, but the densities of the two systems, that is, the quantities of matter contained in an equal bulk or extent, be different, it is evident that the quantities of motion produced in the two systems in the same time will be proportional to the densities; and if the densities are the same and uniform in each system, the quantities of motion produced will be as the squares of the velocities, because the motion communicated to each corresponding body will be proportional to the velocity communicated, that is, to the velocity of the impelling body; and the number of similarly situated particles which will be agitated will also be proportional to this velocity. Therefore the whole quantities of motion produced in the same moment of time will be proportional to the squares of the velocities. And, lastly, if the densities of the two systems are uniform or the same through the whole extent of the systems, the number of particles impelled by similar bodies will be as the surfaces of these bodies.

Now the diminutions of the motions of the projected bodies are (by Newton's third law of motion) equal to the motions produced in the systems; and these diminutions are the measures of what are called the resistances opposed to the motions of the projected bodies. Therefore, combining all these circumstances, we have the following proposition.

Prop. I. The resistances and (by the third law of motion) the impulsions of fluids on similar bodies, are proportional to the surfaces of the solid bodies, to the densities of the fluids, and to the squares of the velocities, jointly.

We must now observe, that when we suppose the particles of the fluid to be in mutual contact, we may either suppose them elastic or unelastic. The motion communicated to the collection of elastic particles must be double of what the same body, moving in the same manner, would communicate to the particles of an unelastic fluid. The impulse and resistance of elastic fluids must therefore be double of those of unelastic fluids. And thus the fundamental proposition of the impulse and resistance of fluids, taken in its proper meaning, is susceptible of a rigid demonstration, relative to the only distinct notion that we can form of the internal constitution of a fluid. We say *taken in its proper meaning*, namely, that the impulse or resistance of fluids is a pressure, opposed and measured by another pressure, such as a pound weight, the force of a spring, the pressure of the atmosphere, and the like. We apprehend that it would be very difficult to find any legitimate demonstration of this leading proposition different from this, which we have now borrowed from Sir Isaac Newton, Prop. 23, b. ii. *Princip.* We acknowledge that it is prolix, and even circuitous; but in all the attempts made by his commentators and their copyists to simplify it, we see great defects of logical argument, or assumption of principles which are not only gratuitous, but inadmissible.

Impulsi and resis ance equ and contrary.

Before we proceed farther, it will be proper to make a general remark, which will save a great deal of discussion. Since it is a matter of universal experience, that every action of a body on others is accompanied by an equal and contrary re-action; and since all that we can demonstrate concerning the resistance of bodies during their motions through fluids proceeds on this supposition (the resistance of the body being *assumed* as equal and opposite to the sum of motions communicated to the particles of the fluid, estimated in the direction of the body's motion), we are entitled to proceed in the contrary order, and to consider the impulsions which each of the particles of fluid exerts on the body at rest, as equal and opposite to the motion which the body would communicate to that particle if the fluid were at rest, and the body were moving with equal velocity in the opposite direction. And therefore the whole impulsion of the fluid must be conceived as the measure of the whole motion which the body would thus communicate to the fluid. It must therefore be also considered as the measure of the resistance which the body, moving with the same velocity, would sustain from the fluid. When, therefore, we demonstrate anything concerning the impulsion of a fluid, estimated in the direction of its motion, we must consider it as demonstrated concerning the resistance of a quiescent fluid to the motion of that body, having the same velocity in the opposite direction. The determination of these impulsions being much easier than the determination of the motions communicated by the body to the particles of the fluid, this method will be followed in most of the subsequent discussions.

The general proposition already delivered is by no means sufficient for explaining the various important phenomena observed in the mutual actions of solids and fluids. In particular, it gives us no assistance in ascertaining the modifications of this resistance or impulse, which depend on the shape of the body and the inclination of its impelled or resisted surface to the direction of the motion. Sir Isaac Newton found another hypothesis necessary; namely, that the fluid should be so extremely rare, that the distance of the particles may be incomparably greater than their diameters. This additional condition is necessary for considering their actions as so many separate collisions or impulsions on a solid body. Each particle must be supposed to have abundant room to rebound, or otherwise escape, after having made its stroke, without sensibly affecting the situations and motions of the particles which have not yet made their stroke; and the velocity must be so great as not to give time for the sensible exertion of their mutual forces of attraction and repulsion.

Keeping these conditions in mind, we may proceed to determine the impulsions made by a fluid on surfaces of every kind. The most convenient method of proceeding in this determination, is to compare them all either with the impulse which the *same surface* would receive from the fluid impinging on it perpendicularly, or with the impulse which the *same stream of fluid* would make when coming perpendicularly on a surface of such extent as to occupy the whole stream.

rms ined.

It will be convenient to premise the following definitions.

By a *stream,* we mean a quantity of fluid moving in one direction, that is, all the particles moving in parallel lines; and the *breadth* of the stream is a line perpendicular to all these parallels.

A *filament* is a portion of this stream of very small breadth, and it consists of an indefinite number of particles following one another in the same direction, and successively impinging on, or gliding along, the surface of the solid body.

The *base* of any surface exposed to a stream of fluid, is that portion of a plane perpendicular to the stream, which is covered or protected from the action of the stream by the surface exposed to its impulse. Thus the base of a sphere exposed to a stream of fluid is its great circle, whose plane is perpendicular to the stream.

Direct impulse expresses the energy or action of the particle or filament, or stream of fluid, when meeting the surface perpendicularly, or when the surface is perpendicular to the direction of the stream.

Absolute impulse means the actual pressure on the impelled surface, arising from the action of the fluid, whether striking the surface perpendicularly or obliquely; or it is the force impressed on the surface, or tendency to motion which it acquires, and which must be opposed by an equal force in the opposite direction, in order that the surface may be maintained in its place. It is of importance to keep in mind, that this pressure is always perpendicular to the surface.

Relative or *effective impulse* means the pressure on the surface estimated in some particular direction.

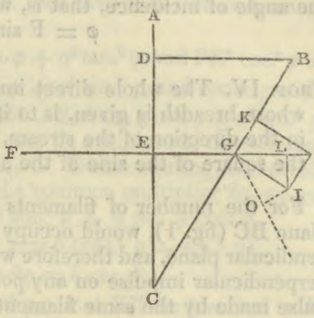
The *angle of incidence* is the angle contained between the direction of the stream and the impelled plane.

The *angle of obliquity* is the angle contained between the plane and the direction in which we wish to estimate the impulse.

Prop. II. The direct impulse of a fluid on a plane surface, is to its absolute oblique impulse on the same surface, as the square of the radius to the square of the sine of the angle of incidence.

Let a stream of fluid, moving in the direction FG (fig. 1), act on the plane BC. Draw CA perpendicular to FG, and equal to CB, and BD parallel to FG, meeting AC in D. Let the particle F, moving in the direction FG, meet the plane in G, and in FG produced take GH to represent the magnitude of the direct impulse, or the impulse which the particle would exert on the plane AC, by meeting it in E. Also draw GI and HK perpendicular to BC, and HI perpendicular to GI.

Fig. 1.



The force GH is equivalent to the two forces GI and GK; and GK being in the direction of the plane, has no share in the impulse. The absolute impulse, therefore, is represented by GI; the angle GHI is equal to FGC, the angle of incidence; and therefore GH is to GI as radius to the sine of the angle of incidence: Therefore the direct impulse of each particle or filament is to its absolute oblique impulse as radius to the sine of the angle of incidence. But further, the number of particles or filaments which strike the surface AC, is to the number of those which strike the surface BC as AC to DC: for all the filaments between A and D go past the oblique surface BC without striking it. But BC : DC = rad. : sin. DBC, = rad. : sin. FGC, = rad. : sin. incidence. Now the whole impulse is as the impulse of each filament, and as the number of filaments exerting equal impulses jointly; therefore the whole direct impulse on AC is to the whole absolute impulse on BC, as the square of radius to the square of the sine of the angle of incidence.

Let F represent the direct impulse, f the absolute oblique impulse, A the area of the plane, and i the angle of incidence; and let the tabular sines and cosines be considered as decimal fractions of the radius 1. The proposition gives us $\mathrm{F} : f = 1 : \sin.^2 i$, and therefore $f = \mathrm{F} \times \sin.^2 i$. Also, because impulses are in the proportion of the extent of surface similarly impelled, we have, in general, $f = \mathrm{FA} \times \sin.^2 i$.

The first who published this theorem was Pardies, in his *Œuvres de Mathématique,* in 1673. Newton, however, had investigated the chief proposition of the *Principia* before 1670.

Prop. III. The direct impulse on any surface is to the effective oblique impulse on the same surface, as the cube of radius to the solid, which has for its base the square of the sine of incidence, and the sine of obliquity for its height.

Let GO be the direction, and draw IO perpendicular to GO. Now, when GH represents the direct impulse of a particle, GI is the absolute oblique impulse, and GO is the effective impulse in the direction GO: But GI is to GO as radius to the sine of GIO, and GIO is the complement of IGO, and is therefore equal to CGO, the angle of obliquity; whence, assuming φ to denote the effective oblique impulse, and O = the angle of obliquity, we have

$$f : \varphi = \text{rad.} : \sin. \text{O}.$$

But $\text{F} : f = \text{rad.}^2 : \sin.^2 i$;

therefore $\text{F} : \varphi = \text{rad.}^3 : \sin.^2 i \times \sin. \text{O}$,

whence, since rad. = 1,

$$\varphi = \text{F} \times \sin.^2 i \times \sin. \text{O}.$$

Cor. The direct impulse on any surface is to the effective oblique impulse in the direction of the stream, as the cube of radius to the cube of the sine of incidence. For in this case GO coincides with GH, and the angle GIO becomes GIL (IL being perpendicular to GH), equal to BGH the angle of incidence, that is, we have $i = \text{O}$; whence

$$\varphi = \text{F} \sin.^3 i.$$

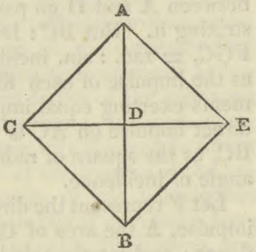
Prop. IV. The whole direct impulse of a stream of fluid whose breadth is given, is to its oblique effective impulse in the direction of the stream, as the square of radius to the square of the sine of the angle of incidence.

For the number of filaments which occupy the oblique plane BC (fig. 1), would occupy the portion DC of a perpendicular plane, and therefore we have only to compare the perpendicular impulse on any point E with the effective impulse made by the same filament FE on the oblique plane at G. Now GH represents the impulse which this filament would make at E; and GL is the effective impulse of the same filament at G, estimated in the direction GH of the stream; and GH is to GL as GH^2 to GI^2, that is, as $\text{rad.}^2 : \sin.^2 i = 1 : \sin.^2 i$.

Cor. 1. The effective impulse in the direction of the stream on any plane surface BC, is to the direct impulse on its base CD, as the square of the sine of the angle of incidence to the square of the radius.

Cor. 2. If an isosceles wedge ACB (fig. 2) be exposed to a stream of fluid moving in the direction of its height CD, the impulse on the sides is to the direct impulse on the base as the square of AD half the base to the square of the side AC, or as the square of the sine of half the angle of the wedge to the square of the radius. For it is evident, that in this case the two transverse impulses balance each other, and the only impulse which can be observed is the sum of the two impulses in the direction of the stream which are to be compared with the impulses on the two halves AD, BD of the base. Now AC : AD = rad. : sin. ACD, and ACD is equal to the angle of incidence; therefore, by the proposition, the direct impulse on AD is to the effective oblique impulse on AC, as $\text{AC}^2 : \text{AD}^2$, or as $1 : \sin.^2 \text{ACD}$.

Fig. 2.



Hence, if the angle ACB is a right angle, and ACD is half a right angle, the square of AC is twice the square of AD, and the impulse on the sides of a rectangular wedge is half the impulse on its base.

Also, if a cube ACBE be exposed to a stream moving in a direction perpendicular to one of its sides, and then to a stream moving in a direction perpendicular to one of its diagonal planes, the impulse in the first case will be to the impulse in the second as $\sqrt{2}$ to 1. Call the perpendicular impulse on a side F, and the perpendicular impulse on its diagonal plane f, and the effective oblique impulse on its side φ; we have

$$\text{F} : f = \text{AC} : \text{AB} = 1 : \sqrt{2},$$

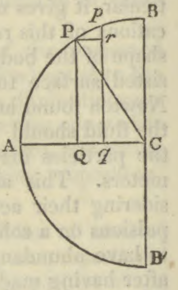
$$f : \varphi = \text{AC}^2 : \text{AD}^2 = 2 : 1.$$

Therefore $\text{F} : \varphi = 2 : \sqrt{2} = \sqrt{2} : 1$; or very nearly as 10 to 7.

The same reasoning will apply to a pyramid whose base is a regular polygon, and whose axis is perpendicular to the base. If such a pyramid is exposed to a stream of fluid moving in the direction of the axis, the direct impulse on the base is to the effective impulse on the pyramid, as the square of the radius to the square of the sine of the angle which the axis makes with the sides of the pyramid.

Prop. V. To compare the effective impulse on a cylinder, or half cylinder, with the direct impulse on a transverse plane passing through its axis.

Fig. 3.



Let BAB′ (fig. 3) be a section of the half cylinder perpendicular to the axis, supposed to be struck by the fluid in the direction AC. Take any point P in AB, draw PQ perpendicular to AC, and let pq be parallel to PQ at an infinitely small distance, and Pr parallel to AC. Let $\text{AQ} = x$, $\text{PQ} = y$, and $\text{AP} = z$; then $\text{P}r = dx$, $pr = dy$, and $\text{P}p = dz$.

By corollary 1 to last proposition, the effective impulse in the direction of the stream on Pp is to the direct impulse on pr as $pr^2 : \text{P}p^2 = dy^2 : dz^2$. Hence, if f denote the direct impulse on pr, the effective impulse on Pp is $f\dfrac{dy^2}{dz^2}$. Assume F to denote the whole direct impulse on the radius $\text{CB} = a$; we have then $f : \text{F} = dy : a$, whence $f = \text{F}\dfrac{dy}{a}$, and the effective impulse on Pp becomes $\text{F}\dfrac{dy^3}{adz^2}$. Hence the effective impulse on the arc APB is $\dfrac{\text{F}}{a}\displaystyle\int\dfrac{dy^3}{dz^2}$.

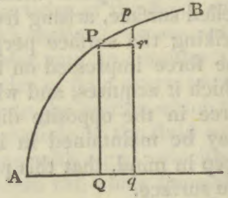
This expression is general, and gives the resistance on any curve whatever. In the present case, on joining PC, we have $pr : \text{P}p = \text{CQ} : \text{PC}$, or $dy : dz = a - x : a$, whence $\dfrac{dy^2}{dz^2} = \dfrac{(a-x)^2}{a^2} = \dfrac{a^2-y^2}{a^2}$; therefore $\dfrac{dy^3}{dz^2} = \dfrac{(a^2-y^2)dy}{a^2}$. The integral of this is $y - \dfrac{y^3}{3a^2} + \text{C}$, which from $y = 0$ to $y = a$ gives $\displaystyle\int\dfrac{dy^3}{dz^2} = a - \tfrac{1}{3}a = \tfrac{2}{3}a$. Multiplying by $\text{F} \div a$, we get

$$\text{impulse on AB} = \tfrac{2}{3}\text{F};$$

consequently the impulse on BAB′ is two thirds of the direct impulse on BB′, and the impulse on the half cylinder two thirds of the impulse on the plane passing through its axis perpendicular to the stream.

Prop. VI. To compare the effective impulse on a solid of revolution, in the direction of its axis, with the direct impulse on its base.

Fig. 4.



Let APB (fig. 4) be the generating curve, AC the axis, $\text{AQ} = x$, and $\text{PQ} = y$. By the last proposition, the oblique impulse on Pp in the direction of the stream, is proportional to $\dfrac{dy^3}{dz^2}$; whence, since the circumference described by the point P in a complete revolution is $2\pi y$ (π being the semi-circumference to radius 1), the oblique impulse on the ring formed by the revolution of Pp about the axis AC, is proportional to $2\pi y\dfrac{dy^3}{dz^2}$, and consequently the impulse on the whole surface to $2\pi\displaystyle\int y\dfrac{dy^3}{dz^2}$.

sistance Fluids.

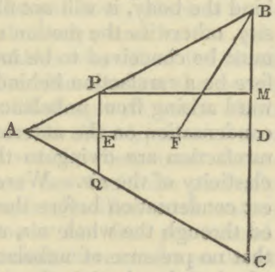
This is the general expression for the impulse on a solid of revolution. On eliminating $\frac{dy^2}{dz^2}$ by means of the equation of the generating curve, it gives the amount of the relative impulse in each particular case.

As an example, suppose APB to be the quadrant of a circle, the equation of which is $y^2 = 2ax - x^2$. From the last proposition we have $dz^2 = \frac{a^2\,dy^2}{a^2 - y^2}$, whence $2\pi \int y \frac{dy^3}{dz^2} = 2\pi \int \frac{a^2 y - y^3}{a^2}\,dy$, which, being integrated on the supposition that y varies from $y = 0$ to $y = a$, becomes $2\pi\left(\frac{1}{2}a^2 - \frac{1}{4}a^2\right) = \frac{1}{2}\pi a^2$. This is the oblique impulse on the sphere or hemisphere in the direction of the axis. The direct impulse on a great circle is proportional to its area, that is, to πa^2; therefore the impulse or resistance of a sphere is one half the direct resistance of the plane of its great circle.

As a second example, let AB be a straight line, the equation of which is $y = x \tan.\varphi$. In this case $dy^2 = dx^2 \tan.^2\varphi$, $dz^2 = (1 + \tan.^2\varphi)\,dx^2 = \sec.^2\varphi\,dx^2$; therefore $2\pi \int y \frac{dy^3}{dz^2} = 2\pi \sin.^2\varphi \int y\,dy = \pi y^2 \sin.^2\varphi$, which between the limits $y = 0$ and $y = a$, gives the whole effective impulse on the cone formed by the revolution of AP about AC proportioned to $\pi a^2 \sin.^2\varphi$, that is, to the area of the base multiplied by the square of the sine of the inclination of the sides to the axis.

Prop. VII. To determine the frustum of a triangular prism of a given base and altitude, which, moving in a fluid in a direction perpendicular to its base, is resisted the least possible.

Fig. 5.



Let BC (fig. 5) be the base, ED the altitude, of the frustum PBCQ of the wedge ABC, the axis of which is AD. Draw PM parallel to AD. By Proposition II. the oblique effective impulse on PB is equal to the direct impulse on MB, multiplied by the square of the sine of BPM. But by Proposition I. the direct impulse on MB is proportional to MB; therefore the oblique impulse on PB is proportional to MB sin.^{2} BPM. And the direct impulse on PE is proportional to PE; therefore the whole force acting on EP and PB (or on PQ, PB, and QC, that is to say, the whole resistance on the frustum), is proportional to PE + MB sin.^{2} BPM.

Let ED $= a$, DB $= b$, and the angle BPM (= BAD) $= \varphi$. We have then MB $= a \tan.\varphi$, and PE = DB — MB $= b - a \tan.\varphi$; hence the resistance on the frustum is proportional to $b - a \tan.\varphi + a \tan.\varphi \sin.^2\varphi$, that is, to $b - a \tan.\varphi\,(1 - \sin.^2\varphi) = b - a \sin.\varphi \cos.\varphi$. Now this will be a minimum when $a \sin.\varphi \cos.\varphi$ is a maximum. On differentiating $\sin.\varphi \cos.\varphi$, and making the result $= 0$, we have $\cos.^2\varphi = \sin.^2\varphi$, whence $\cos.\varphi = \sin.\varphi$, and consequently $\varphi = 45°$, or PM = MB.

Prop. VIII. To determine the frustum of a cone of a given base and altitude, which, moving in the direction of its axis, shall be resisted the least possible.

Let PBCQ (fig. 5) be the frustum, moving in the direction of the axis DE. The resistance to the frustum is equal to the direct impulse on PQ, together with the oblique impulse on the sides PB and QC. But by Prop. I. the direct impulse on the section PQ is proportional to PE^2; and if ABC be the whole cone, the resistance on the sides of the frustum PBCQ is equal to that on the whole cone, diminished by that on the cone APQ. Now, by Prop. VI. the resistance on the cone ABC is proportional to BD^2 $\sin.^2\varphi$, and that on the cone APQ is proportional to PE^2 $\sin.^2\varphi$; therefore on the conical surface of the frustum it is proportional to (BD^2 — PE^2) $\sin.^2\varphi$, and on the whole frustum proportional to PE^2 + (BD^2 — PE^2) $\sin.^2\varphi$ = PE^2 $\cos.^2\varphi$ + BD^2 $\sin.^2\varphi$.

Resistance of Fluids.

Let ED $= a$, and DB $= b$. We have then BM $= a \tan.\varphi$, and PE $= b - a \tan.\varphi$;
whence PE^2 $= b^2 - 2ab \tan.\varphi + a^2 \tan.^2\varphi$, and PE^2 $\cos.^2\varphi = b^2 \cos.^2\varphi - 2ab \sin.\varphi \cos.\varphi + a^2 \sin.^2\varphi$, and consequently PE^2 $\cos.^2\varphi$ + BD^2 $\sin.^2\varphi = b^2 - 2ab \sin.\varphi \cos.\varphi + a^2 \sin.^2\varphi$. In order that the resistance may be a minimum, the differential of this expression must be 0. Differentiating, and dividing by $d\varphi$, and leaving out the common multiplier $2a$, we get

$$0 = -b \cos.^2\varphi + b \sin.^2\varphi + a \sin.\varphi \cos.\varphi,$$

whence $$a \sin.\varphi \cos.\varphi = b\,(\cos.^2\varphi - \sin.^2\varphi),$$

or $$\tfrac{1}{2} a \sin.2\varphi = b \cos.2\varphi,$$

and therefore $b = \frac{1}{2} a \tan.2\varphi$. Let ED be bisected in F, and join FB; we have then BD = FD tan. BFD, or $b = \frac{1}{2} a$ tan. BFD, so that BFD $= 2\varphi$; whence, since BFD = FAB + ABF, it follows that ABF is equal to FAB, and consequently AF = FB. This property determines the frustum, for F is a given point.

From the same principles, Sir Isaac Newton determined the form of the curve which would generate the solid which, of all others of the same length and base, should have the least resistance. The investigation, however, is not introduced here, for reasons which will soon appear.

The reader cannot fail to observe, that all that has hitherto been said on this subject relates to the comparison of different impulses or resistances. We have always compared the oblique impulsions with the direct, and by their intervention we compare the oblique impulsions with each other. But it remains to give absolute measures of some individual impulsion, to which, as an unit, we may refer every other. And as it is by their pressure that they become useful or hurtful, and they must be opposed by other pressures, it becomes extremely convenient to compare them with that pressure with which we are most familiarly acquainted, the pressure of gravity.

Resistances compared with the pressure of gravity.

The manner in which the comparison is made is this. When a body advances in a fluid with a known velocity, it puts a known quantity of the fluid into motion (as is supposed) with this velocity; and this is done in a known time. We have only to examine what weight will put this quantity of fluid into the same motion, by acting on it during the same time. This weight is conceived as equal to the resistance. Thus, let us suppose that a stream of water, moving at the rate of eight feet per second, is perpendicularly obstructed by a square foot of solid surface held fast in its place. Conceiving water to act in the manner of the hypothetical fluid above described, and to be without elasticity, the whole effect is the gradual annihilation of the motion of eight cubic feet of water moving eight feet in a second. And this is done in a second of time. It is equivalent to the gradually putting eight cubic feet of water into motion with this velocity, and doing this by acting uniformly during a second. The question then arises, what weight is able to produce this effect? Now the weight of eight feet of water, acting during a second on it, will, as is well known, give it the velocity of thirty-two feet per second; that is, four times greater. Therefore, the weight of the fourth part of eight cubic feet, that is, the weight of two cubic feet, acting during a second, will do the same thing, or the weight of a column of water whose base is a square foot, and whose height is two feet. This will not only produce the effect in the same time with the impulsion of the solid body, but it will also do it by the same degrees, as any one will clearly perceive, by attending to the gradual acceleration of the mass of water urged by one fourth of its weight, and comparing this with the gradual production or extinction of motion in the fluid by the progress of the resisted surface.

Now it is well known that eight cubic feet of water, by falling one foot, which it will do in one fourth of a second, will acquire the velocity of eight feet per second by its weight; therefore the force which produces the same effect in a whole second is one fourth of this. This force is therefore equal to the weight of a column of water whose base is a square foot and whose height is two feet; that is, twice the height necessary for acquiring the velocity of the motion by gravity. The conclusion is the same whatever be the surface that is resisted, whatever be the fluid that resists, and whatever be the velocity of the motion. In this inductive and familiar manner we learn, that *the direct impulse or resistance of an unelastic fluid on any plane surface, is equal to the weight of a column of the fluid having the surface for its base, and twice the fall necessary for acquiring the velocity of the motion for its height;* and if the fluid is considered as elastic, the impulse or resistance is twice as great. See Newt. *Princip.* b. ii. prop. 35 and 38.

Comparison of theory with experiment.

It now remains to compare this theory with experiment. Numerous experiments have been made; but it is much to be lamented that, in a matter of such importance, there is so great a disagreement in the results. Those of Sir Isaac Newton were chiefly made by the oscillations of pendulums in water, and by the descent of balls both in water and in air. Many were made by Mariotte (*Traité de Mouvement des Eaux*). Gravesande has published, in his *System of Natural Philosophy*, experiments on the resistance or impulsions on solids in the middle of a pipe or canal. They are extremely well contrived, but are on so small a scale that they are of very little use. Daniel Bernoulli, and his pupil Professor Krafft, have published, in the *Comment. Acad. Petropol.*, experiments on the impulse of a stream or vein of water from an orifice or tube; these are of great value. The Abbé Bossut has published others of the same kind in his *Hydrodynamique.* Mr Robins has published, in his *New Principles of Gunnery*, many valuable experiments on the impulse and resistance of air. The Chevalier de Borda, in the *Mém. Acad. Paris*, 1763 and 1767, has given experiments on the resistance of air, and also of water, which are very interesting. The most complete collection of experiments on the resistance of water are those made at the public expense by a committee of the Academy of Sciences at Paris, consisting of the Marquis Condorcet, D'Alembert, the Abbé Bossut, and others. The Chevalier Du Buat, in his *Hydraulique*, has published some most curious and valuable experiments, where many important subjects are taken notice of, which had never been attended to before, and which give a view of the subject totally different from what is usually taken of it. Don George d'Ulloa, in his *Examen Maritimo*, has also given some important experiments similar to those adduced by Bouguer in his *Manœuvre des Vaisseaux*, but leading to very different conclusions. All these should be consulted by such as would acquire a practical knowledge of this subject. We must content ourselves with giving their most general results.

1. It is in accordance with experiment that the resistances are proportional to the squares of the velocities. When the velocities of water do not exceed a few feet per second, no sensible deviation is observed. In very small velocities the resistances are sensibly greater than in this proportion, and this excess is plainly owing to the viscidity or imperfect fluidity of water. Sir Isaac Newton has shown that the resistance arising from this cause is constant, or the same in every velocity; and when he deducted a certain part of the total resistance, he found the remainder was very exactly proportionable to the square of the velocity. His experiments for the purpose of ascertaining this point were made with balls a very little heavier than water, so as to descend very slowly; and they were made with his usual care and accuracy, and may be depended on.

Causes o discrepancy.

In the experiments made with bodies floating on the surface of water, there is an addition to the resistance arising from the inertia of the water. The water heaps up a little on the anterior surface of the floating body, and is depressed behind it. Hence arises a hydrostatical pressure acting in concert with the true resistance. A similar thing is observed in the resistance of air, which is condensed before the body and rarefied behind it, and thus an additional resistance is produced by the unbalanced elasticity of the air, and also because the air which is *actually* displaced is denser than common air. These circumstances cause the resistances to increase faster than the squares of the velocities; but, even independently of this, there is an additional resistance arising from the tendency to rarefaction behind a body moving very swiftly; because the pressure of the surrounding fluid can only make the fluid fill the space left with a determined velocity.

We have had occasion to speak of this circumstance more particularly under GUNNERY and PNEUMATICS, when considering very rapid motions. Mr Robins had remarked that the velocity at which the observed resistance of the air began to increase so prodigiously, was that of about 1100 or 1200 feet per second, and that this was the velocity with which air would rush into a void. He concluded that when the velocity was greater than this, the ball was exposed to the additional resistance arising from the unbalanced statical pressure of the air, and that it was necessary to add this constant quantity to the resistance arising from the air's inertia in all greater velocities. This is very reasonable; but he imagined that in smaller velocities there was no such unbalanced pressure. But this cannot be the case; for although in smaller velocities the air will fill up the space behind the body, it will not fill it up with air of the same density, otherwise the motion of the air into the deserted place must be conceived to be instantaneous. There must therefore be a rarefaction behind the body, and a pressure backward arising from unbalanced elasticity, independent of the condensation on the anterior part. The condensation and rarefaction are owing to the same cause, viz. the limited elasticity of the air. Were this infinitely great, the smallest condensation before the body would be instantly diffused through the whole air, and so would the rarefaction, so that no pressure of unbalanced elasticity would be observed; but the elasticity is such as to propagate the condensation with the velocity of sound only, *i. e.* the velocity of 1142 feet per second. Therefore the additional resistance does not commence precisely at this velocity, but is sensible in all smaller velocities, as is very justly observed by Euler. But we are not yet able to ascertain the law of its increase, although it is a problem which seems susceptible of a tolerably accurate solution.

Precisely similar to this is the resistance to the motion of floating bodies, arising from the accumulation or gorging up of the water on their anterior surface, and its depression behind them. Were the gravity of the water infinite while its inertia remains the same, the wave raised up at the prow of a ship would be instantly diffused over the whole ocean, and it would therefore be infinitely small, as also the depression behind the poop. But this wave requires time for its diffusion; and while it is not diffused it acts by hydrostatic pressure. We are equally unable to ascertain the law of variation of this part of the resistance, the mechanism of waves being but very imperfectly understood. The height of the wave in the experiments of the French academy could not be measured with sufficient precision (being only observed *en passant*) for ascertaining its relation to the velocity. Du Buat attempted it in his experiments, but without success. This must evidently make a part of the resistance in all velocities: and it still remains an undecided question, "What relation it bears to the velocities?" When the solid body is wholly buried in the fluid this accumulation does not take place, or at least not in the same way; it may, however, be observed. Every person may recollect, that in a very swift running stream a large stone at the bottom will produce a small swell above it; unless it lies very deep, a nice eye may still observe it. The water, on arriving at the obstacle, glides past it in every direction, and is deflected on all sides; and therefore what passes over it is also deflected upwards, and causes the water over it to rise above its level. The nearer that the body is to the surface, the greater will be the perpendicular rise of the water, but it will be less diffused; and it is uncertain whether the *whole* elevation will be greater or less. By the whole elevation we mean the area of a perpendicular section of the elevation by a plane perpendicular to the direction of the stream. We are rather disposed to think that this area will be greatest when the body is near the surface. D'Ulloa has attempted to consider this subject theoretically, and is of a very different opinion, which he confirms by the single experiment to be mentioned by and by. Meantime it is evident, that if the water which glides past the body cannot fall in behind it with sufficient velocity to fill up the space behind, there must be a void there; and thus a hydrostatic pressure must be superadded to the resistance arising from the inertia of the water. All must have observed, that if the end of a stick held in the hand be drawn slowly through the water, the water will fill the place left by the stick, and there will be no curled wave; but if the motion be very rapid, a hollow trough or gutter is left behind, and is not filled up till at some distance from the stick, and the wave which forms its sides is very much broken and curled. The writer of this article has often looked into the water from the poop of a second-rate man-of-war when she was sailing eleven miles per hour, which is a velocity of sixteen feet per second nearly; and he not only observed that the back of the rudder was naked for about two feet below the load water-line, but also that the trough or wake made by the ship was filled up with water which was broken and foaming to a considerable depth, and to a considerable distance from the vessel; there must therefore have been a void. He never saw the wake perfectly transparent (and therefore completely filled with water) when the velocity exceeded nine or ten feet per second. While this broken water is observed, there can be no doubt that there is a void and an additional resistance. But even when the space left by the body, or the space behind a still body exposed to a stream, is completely filled, it may not be filled sufficiently fast, and there may be (and certainly is, as we shall afterwards see) a quantity of water behind the body, which is moving more slowly away than the rest, and therefore hangs in some shape by the body, and is dragged by it, increasing the resistance. The quantity of this must depend partly on the velocity of the body or stream, and partly on the rapidity with which the surrounding water comes in behind. This last must depend on the pressure of the surrounding water. It would appear that when this adjoining pressure is very great, as must happen when the depth is great, the augmentation of resistance now spoken of would be less. Accordingly this appears in Newton's experiments, where the balls were less retarded as they were deeper under water.

These experiments are so simple in their nature, and were made with such care, and by a person so able to detect and appreciate every circumstance, that they deserve great credit, and the conclusions *legitimately* drawn from them deserve to be considered as physical laws. We think that the present deduction is unexceptionable; for in the motion of balls which hardly descended, their preponderancy being hardly sensible, the effect of depth must have borne a very great proportion to the whole resistance, and must have greatly influenced their motions; yet they were observed to fall as if the resistance had in no way depended on the depth.

The same thing appears in Borda's experiments, where a sphere which was deeply immersed in the water was less resisted than one that moved with the same velocity near the surface; and this was very constant and regular in a course of experiments. D'Ulloa, however, affirms the contrary; he says that the resistance of a board, which was a foot broad, immersed one foot in a stream moving two feet per second, was $15\frac{1}{2}$ lbs. and the resistance to the same board, when immersed two feet in a stream moving $1\frac{1}{3}$ foot per second (in which case the surface was two feet), was $26\frac{1}{4}$ pounds.[1]

We have been more minute on this subject, because it is the leading proposition in the theory of the action of fluids. Newton's demonstration of it takes no notice of the manner in which the various particles of the fluid are put in motion, or the motion which each in particular acquires. He only shows, that if there be nothing concerned in the communication but pure inertia, the sum total of the motions of the particles, estimated in the direction of the motion of the body, or that of the stream, will be in the duplicate ratio of the velocity. It was therefore of importance to show that this part of the theory was just.

2. It appears from a comparison of all the experiments, that the impulses and resistances are very nearly in the proportion of the surfaces. They appear, however, to increase somewhat faster than the surfaces. Borda found that the resistance, with the same velocity, to a surface of

9 inches	was	9	instead of	9
16		17,535		16
36		42,750		36
81		104,737		81

The deviation in these experiments from the theory increases with the surface, and is probably much greater in the extensive surfaces of the sails of ships and wind-mills, and the hulls of ships.

3. The resistances by no means vary in the duplicate ratio of the sines of the angles of incidence.

As this is a circumstance of great importance, inasmuch as the whole theory of the construction and working of ships, and the action of water on our most important machines, depends upon it, it merits a very particular consideration. We cannot do a greater service than by rendering more generally known the excellent experiments of the French academy.

Experiments of the French academy.

Fifteen boxes or vessels were constructed, which were two feet wide, two feet deep, and four feet long. One of them was a parallelopiped of these dimensions; the others had prows of a wedge form, the angle of the wedge varying by 12° from 12° to 180°; so that the angle of incidence increased by 6° from one box to another. These boxes were dragged across a very large basin of smooth water, in which they were immersed two feet, by means of a line passing over a wheel connected with a cylinder, from which the moving weight was suspended. The motion soon became perfectly uniform; and the time of passing over ninety-six French feet with this uniform motion was very carefully noted. The resistance was measured by the weight employed, after deducting a certain quantity (properly estimated) for friction, and for the accumulation of the water against the anterior surface. The results of the numerous experiments are given in the following table; where column I. contains the angle of the prow, column II. contains the resistance as given by the preceding theory, column III. contains the resistance exhibited in the experiments, and column IV. contains the deviation of the experiment from the theory.

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[1] There is something very unaccountable in these experiments. The resistances are much greater than any other author has observed.

I.	II.	III.	IV.
180°	10000	10000	0
168	9890	9893	+3
156	9568	9578	+10
144	9045	9084	+39
132	8346	8446	+100
120	7500	7710	+210
108	6545	6925	+380
96	5523	6148	+625
84	4478	5433	+955
72	3455	4800	+1345
60	2500	4404	+1904
48	1654	4240	+2586
36	955	4142	+3187
24	432	4063	+3631
12	109	3999	+3890

The resistance to one square foot, French measure, moving with the velocity of 2·56 feet per second, was very nearly 7·625 pounds French.

Reducing these to English measures, we have the surface = 1·1360 feet, the velocity of the motion equal to 2·7284 feet per second, and the resistance equal to 8·234 pounds avoirdupois. The weight of a column of fresh water of this base, and having for its height the fall necessary for communicating this velocity, is 8·264 pounds avoirdupois. The resistances to other velocities were accurately proportional to the squares of the velocities.

Absolute resistance of water.

There is great diversity in the value which different authors have deduced for the absolute resistance of water from their experiments. In the value now given nothing is taken into account but the inertia of the water. The accumulation against the fore-part of the box was carefully noted, and the statical pressure backwards, arising from this cause, was subtracted from the whole resistance to the drag. There had not been a sufficient variety of experiments for discovering the share which tenacity and friction produced; so that the number of pounds set down here may be considered as somewhat superior to the mere effects of the inertia of the water. We think, upon the whole, that it is the most accurate determination yet given of the resistance to a body in motion; but we shall afterwards see reason for believing that the impulse of a running stream having the same velocity is somewhat greater; and this is the form in which most of the experiments have been made.

It is to be observed, also, that the resistance here given is that to a vessel two feet broad and deep, and four feet long. The resistance to a plane two feet broad and deep would probably have exceeded this in the proportion of 15·22 to 14·54, for reasons which we shall see afterwards.

From the experiments of Du Buat, it appears that a body of one foot square, French measure, and two feet long, having its centre fifteen inches under water, moving three French feet per second, sustained a pressure of 14·54 French pounds, or 15·63 English. This, reduced in the proportion of 3^2 to $(2{\cdot}56)^2$, gives 11·43 pounds, considerably exceeding the 8·234 mentioned above.

Bouguer, in his *Manœuvre des Vaisseaux*, says that he found the resistance of sea-water to a velocity of one foot to be twenty-three ounces *poids des marc*.

Borda found the resistance of sea-water to the face of a cubic foot, moving against the water one foot per second, to be twenty-one ounces nearly. But in this experiment the wave was not deducted.

Don George d'Ulloa found the impulse of a stream of sea-water, running two feet per second, on a foot square, to be 15¼ English pounds. This greatly exceeds all the values given by others.

From these experiments we learn, in the first place, that the direct resistance to the motion of a plane surface through water, is very nearly equal to the weight of a column of water having that surface for its base, and for its height the fall producing the velocity of the motion. This is but one half of the resistance determined by the preceding theory. It agrees, however, very well with the best experiments made by other philosophers on bodies totally immersed or surrounded by the fluid; and sufficiently shows that there must be some fallacy in the principles or reasoning by which this result of the theory is supposed to be deduced.

But we see that the effects of the obliquity of incidence deviate enormously from the theory, and that this deviation increases rapidly as the acuteness of the prow increases. In the prow of 60° the deviation is nearly equal to the whole resistance pointed out by the theory, and in the prow of 12° it is nearly forty times greater than the theoretical resistance.

The resistance of the prow of 90° should be one half the resistance of the base. We have not such a prow; but the medium between the resistance of the prow of 96 and 84 is 5790 instead of 5000.

These experiments agree with those of other authors on plane surfaces. Mr Robins found that the resistance of the air to a pyramid of 45°, with its apex foremost, was to that of its base as 1000 to 1411, instead of one to two. Borda found that the resistance of a cube, moving in water in the direction of the side, was to the oblique resistance, when it was moved in the direction of the diagonal, in the proportion of $5\frac{1}{3}$ to 7; whereas it should have been that of $\sqrt{2}$ to 1, or of 10 to 7 nearly. He also found that a wedge whose angle was 90°, moving in air, gave for the proportion of the resistances of the edge and base 7281 : 10,000, instead of 5000 : 10,000. Also, when the angle of the wedge was 60°, the resistances of the edge and base were 52 and 100, instead of 25 and 100.

In short, in all the cases of oblique plane surfaces, the resistances are greater than those which were assigned by the theory. The theoretical law agrees tolerably with observation in large angles of incidence, that is, in incidences not differing very far from the perpendicular; but in more acute prows the resistances are more nearly proportional to the sines of incidence than to their squares.

The French academicians deduced from these experiments an expression of the general value of the resistance, which corresponds tolerably well with observation. Thus let x be the complement of the half angle of the prow, and let P be the direct pressure or resistance, with an incidence of 90°, and p the effective oblique pressure: then $p = \mathrm{P} \times \text{cosine}^2\, x + 3{\cdot}153 \left(\frac{x^\circ}{6^\circ}\right)^{3{\cdot}25}$. This gives for a prow of 12° an error in defect equal to about $\frac{7}{100}$, and in larger angles it is much nearer the truth; and this is exact enough for any practice.

This is an abundantly simple formula; but if we introduce it in our calculations of the resistances of curvilineal prows, it renders them so complicated as to be almost useless; and what is worse, when the calculation is completed for a curvilineal prow, the resistance which results is found to differ widely from experiment. This shows that the motion of the fluid is so modified by the action of the most prominent part of the prow, that its impulse on what succeeds is greatly affected, so that we are not allowed to consider the prow as composed of a number of parts, each of which is affected as if it were detached from all the rest.

As the very nature of naval architecture seems to require curvilinear forms in order to give the necessary strength, it seemed of importance to examine more particularly the deviations of the resistances of such prows from the resistances assigned by the theory. The academicians therefore made vessels with prows of a cylindrical shape; one of these was a half cylinder, and the other was one third of a cylinder, both having the same breadth, viz. two feet, the same depth, also two feet, and the same length, four feet. The resistance of the half cylinder was to the resistance of the perpendicular prow in the proportion of 13 to 25, instead of being as 13 to 19·5. Borda found nearly the same ratio of the resistances of the half cylinder, and the plane of its diameter when moved in air. He also compared the resistances of two prisms or wedges of the same breadth and height. The first had its sides plane, inclined to the base in angles of 60°: the second had its sides portions of cylinders, of which the planes were the chords, that is, their sections were arcs of circles of 60°. Their resistances were as 133 to 100, instead of being as 133 to 220, as required by the theory; and as the resistance of the first was greater in proportion to that of the base than the theory allows, the resistance of the last was less.

Mr Robins found the resistance of a sphere moving in air to be to the resistance of its great circle as 1 to 2·27, whereas theory requires them to be as 1 to 2. He found, at the same time, that the absolute resistance was greater than the weight of a cylinder of air of the same diameter, and having the height necessary for acquiring the velocity. It was greater in the proportion of 49 to 40 nearly.

Borda found the resistance of the sphere moving in water to be to that of its great circle as 1000 to 2508, and it was one ninth greater than the weight of the column of water whose height was that necessary for producing the velocity. He also found that the resistance of air to the sphere was to its resistance to its great circle as 1 to 2·45.

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It appears, therefore, on the whole, that the theory gives the resistance of oblique plane surfaces too small, and that of curved surfaces too great; and that it is quite unfit for ascertaining the modifications of resistance arising from the figure of the body. The most prominent part of the prow changes the action of the fluid on the succeeding parts, rendering it totally different from what it would be were that part detached from the rest, and exposed to the stream with the same obliquity. It is of no consequence, therefore, to deduce any formula from the valuable experiments of the French academy. The experiments themselves are of great importance, because they give us the impulses on plane surfaces with every obliquity. They therefore put it in our power to select the most proper obliquity in a thousand important cases. By appealing to them, we can tell what is the proper angle of the sail for producing the greatest impulse in the direction of the ship's course; or the best inclination of the sail of a windmill, or the best inclination of the float of a water-wheel, &c. &c. We see also, that the deviation from the simple theory is not very considerable till the obliquity is great; and that, in the inclinations which other circumstances would induce us to give to the floats of water-wheels, the sails of windmills, and the like, the results of the theory are sufficiently in accordance with experiment, for rendering this theory of very great use in the construction of machines. Its great defect is in the impulsions on curved surfaces, which puts a stop to our improvement of the science of naval architecture, and the working of ships.

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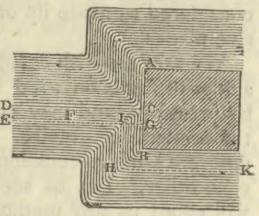
th efects.

Having thus pointed out the defects of the Newtonian theory by a comparison with experiment, we now proceed to consider the circumstances which cause the great discrepancy. It has already been stated that Newton, in order to explain the phenomena of oblique impulse, assumed the distances between the particles of his hypothetical fluid to be infinitely great in comparison of their diameters, so that each particle might have room to escape, after making its stroke, without affecting the motions of the other particles, and consequently, that the actions of the particles might be regarded as so many separate collisions. But this assumption does not represent the real state of the case. The rare fluid introduced by Newton for the purpose now mentioned, either does not exist in nature, or does not act in the manner we have stated, namely, the particles making their impulse, and then escaping through among the rest without affecting their motion. We cannot indeed say what may be the proportion between the diameter and the distance of the particles. The first may be incomparably smaller than the second, even in mercury, the densest fluid which we are familiarly acquainted with; but although they do not touch each other, they act nearly as if they did, in consequence of their mutual attractions and repulsions. We have seen air a thousand times rarer in some experiments than in others, and therefore the distance of the particles at least ten times greater than their diameters; and yet, in this rare state, it propagates all pressures or impulses made on any part of it to a great distance, almost in an instant. It cannot be, therefore, that fluids act on bodies by impulse. It is very possible to conceive a fluid advancing with a flat surface against the flat surface of a solid. The very first and superficial particles may make an impulse; and if they were annihilated, the next might do the same; and if the velocity were double, these impulses would be double, and would be withstood by a double force, and not a quadruple, as is observed; and this very circumstance that a quadruple force is necessary, should have made us conclude that it was not to impulse that this force was opposed. The first particles having made their stroke, and not being annihilated, must escape laterally. In their escaping they effectually prevent every farther impulse, because they come in the way of those filaments which would have struck the body. The whole process seems to be somewhat as follows:

Action of fluids in motion on fixed bodies explained.

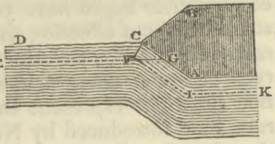
Fig. 6.



When the particles of the fluid come into contact with the plane surface AB (fig. 6), perpendicular to the direction DC of their motion, they must deflect to both sides equally, and in equal portions, because no reason can be assigned why more should go to either side. By this means the filament EF, which would have struck the surface in G, is deflected *before it arrives at* the surface, and describes a curved path EFIHK, continuing its rectilineal motion to I, where it is intercepted by a filament immediately adjoining to EF, on the side of the middle filament DC. The different particles of DC may be supposed to impinge in succession at C, and to be deflected at right angles; and, gliding along CB, to escape at B. Each filament in succession, outwards from DC, is deflected in its turn; and being hindered from even touching the surface CB, it glides off in a direction parallel to it; and thus EF is deflected in I, moves parallel to CB from I to H, and is again deflected at right angles, and describes HK parallel to DC. The same thing may be supposed to happen on the other side of DC. Thus it would appear, that except two filaments immediately adjoining to the line DC, which bisects the surface at right angles, no part of the fluid makes any impulse on the surface AB. All the other filaments are merely pressed against it by the lateral filaments without them, which they turn aside, and prevent from striking the surface.

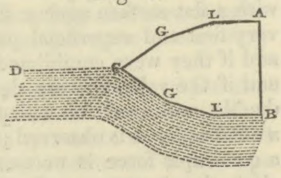
In like manner, when the fluid strikes the edge of a prism or wedge ACB (fig. 7), it cannot be said that any real impulse is made. Nothing hinders us from supposing C to be a mathematical angle or indivisible point, not susceptible of any impulse, and serving merely to divide the stream. Each filament EF is effectually prevented from impinging at G in the line of its direction, and with the obliquity of incidence EGC, by the filaments between EF and DC, which glide along the surface CA; and it may be supposed to be deflected when it comes to the line CF which bisects the angle DCA, and again deflected and rendered parallel to DC at I. The same thing happens on the other side of DC; and we cannot in that case assert that there is any impulse.

Fig. 7.



We now see plainly how the ordinary theory must be totally unfit for furnishing principles of naval architecture, even although a formula could be deduced from such a series of experiments as those of the French academy. Although we should know precisely the impulse, or, to speak now more cautiously, the action, of the fluid on a surface GL (fig. 8) of any obliquity, when it is alone, detached from all others, we cannot in the smallest degree tell what will be the action of *part* of a stream or fluid advancing towards it with the same obliquity, when it is preceded by an adjoining surface CG, having a different inclination; for the fluid will not glide along GL in the same manner as if it made part of a more extensive surface having the same inclination. The previous deflections are extremely different in these two cases; and the previous deflections are the only changes which we can observe in the motions of the fluid, and the only causes of that pressure which we observe the body to sustain, and which we call the impulse on it. This theory must, therefore, be quite unfit for ascertaining the action on a curved surface, which may be considered as made up of an indefinite number of successive planes.

Fig. 8.

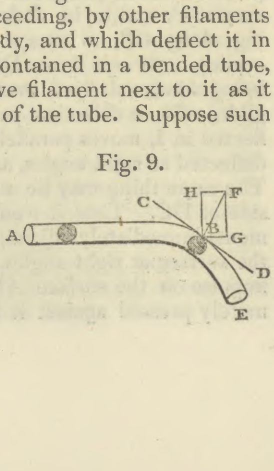


We now see with equal evidence how it happens that the action of fluids on solid bodies may and must be opposed by pressures, and may be compared with and measured by the pressure of gravity. We are not comparing forces of different kinds, percussions with pressures, but pressures with each other. Let us see whether this view of the subject will afford us any method of comparison or absolute measurement.

Absolute measure of the pressure.

When a filament of fluid, that is, a row of corpuscles, are turned out of their course, and forced to take another course, force is required to produce this change of direction. The filament is prevented from proceeding, by other filaments which lie between it and the body, and which deflect it in the same manner as if it were contained in a bended tube, and it will press on the concave filament next to it as it would press on the concave side of the tube. Suppose such a bended tube ABE (fig. 9), and that a ball A is projected along it with any velocity, and moves in it without friction; it is demonstrated, in elementary mechanics, that the ball will move with undiminished velocity, and will press on every point, such as B, of the concave side of the tube, in a direction BF perpendicular to the plane CBD, which touches the tube in the point B. This pressure on the adjoining filament, on the concave side of its path, must be withstood by that filament which deflects it; and it must be propagated across that filament to the next, and thus augment the pressure upon that next filament already pressed by the deflection of the intermediate filament; and thus there is a pressure towards the middle filament, and towards the body, arising from the deflection of all the outer filaments; and their accumulated sum must be conceived as immediately exerted on the middle filaments and on the body, because a perfect fluid transmits every pressure undiminished.

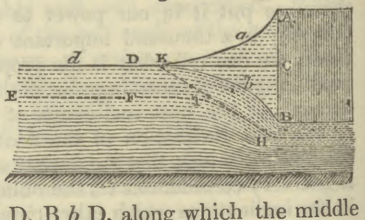
Fig. 9.



The pressure BF is equivalent to the two BH, BG, one of which is perpendicular, and the other parallel, to the direction of the original motion. By the first (taken in any point of the curvilineal motion of any filament), the two halves of the stream are pressed together, and, in the case of fig. 6 and 7, exactly balance each other. But the pressures, such as BG, must be ultimately withstood by the surface ACB; and it is by these accumulated pressures that the solid body is urged down the stream, and it is these accumulated pressures which we observe and measure in our experiments. We shall anticipate a little, and say that it is most easily demonstrated, that when a ball A (fig. 9) moves with undiminished velocity in a tube so incurvated that its axis at E is at right angles to its axis at A, the accumulated action of the pressures, such as BG, taken for every point of the path, is precisely equal to the force which would produce or extinguish the original motion.

This being the case, it follows most obviously, that if the two motions of the filaments are such as we have described and represented by fig. 6, the whole pressure in the direction of the stream, that is, the whole pressure which can be observed on the surface, is equal to the weight of a column of fluid having the surface for its base, and twice the fall productive of the velocity for its height, precisely as Newton deduced it from other considerations; and it seems to make no difference whether the fluid be elastic or unelastic, if the deflections and velocities are the same. Now it is a fact, that no difference in this respect can be observed in the actions of air and water; and this had always appeared a great defect in Newton's theory; but it was only a defect of the theory attributed to him. But it is also true, that the observed action is but one-half of what is just now deduced from this improved view of the subject. Whence arises this difference? The reason is this: We have given a very erroneous account of the motions of the filaments. A filament EF does not move, as represented in fig. 6, with two rectangular inflections at I and at H, and a path IH between them parallel to CB. The process of nature is more like what is represented in fig. 10. *It is observed*, that at the anterior part of the body AB, there remains a quantity of fluid ADB, almost, if not altogether, stagnant, of a singular shape, having two curved concave sides A *a* D, B *b* D, along which the middle filaments glide. This fluid is very slowly changed. The late Sir Charles Knowles, a distinguished officer of the British navy, made many beautiful experiments for ascertaining the paths of the filaments of water. At a distance up the stream, he allowed small jets of a coloured fluid, which did not mix with water, to make part of the stream; and the experiments were made in troughs with sides and bottom of plate-glass. A small taper was placed at a considerable height above, by which the shadows of the colour-

Fig. 10.



Experi ments Sir Ch Knowl

ed filaments were most distinctly projected on a white plane held below the trough, so that they were accurately drawn with a pencil. A few important particulars may be here mentioned.

The still water ADC, fig. 10, lasted for a long while before it was renewed; and it seemed to be gradually wasted by abrasion, by the adhesion of the surrounding water, which gradually licked away the outer parts from D to A and B; and it seemed to renew itself in the direction CD, opposite to the motion of the stream. There was, however, a considerable intricacy and eddy in this motion. Some (seemingly superficial) water was continually, but slowly, flowing outward from the line DC, while other water was seen within and below it, coming inwards and going backwards.

The coloured lateral filaments were most constant in their form, while the body was the same, although the velocity was in some cases quadrupled. Any change which this produced seemed confined to the superficial filaments.

As the filaments were deflected, they were also constipated, that is, the curved parts of the filaments were nearer each other than the parallel straight filaments up the stream; and this constipation was more considerable as the prow was more obtuse and the deflexion greater.

The inner filaments were ultimately more deflected than those without them; that is, if a line be drawn touching the curve EFIH in the point H of contrary flexure, where the concavity begins to be on the side next the body, the angle HKC, contained between the axis and the tangent line, is so much the greater as the filament is nearer the axis.

When the body exposed to the stream was a box of upright sides, flat bottom, and angular prow, like a wedge, having its edge also upright, the filaments were not all deflected laterally, as theory would make us expect; but the filaments near the bottom were also deflected downwards as well as laterally, and glided along at some distance under the bottom, forming lines of double curvature.

The breadth of the stream that was deflected was much greater than that of the body; and the sensible deflection began at a considerable distance up the stream, especially in the outer filaments.

Lastly, the form of the curves was greatly influenced by the proportion between the width of the trough and that of the body. The curvature was always less when the trough was very wide in proportion to the body.

Great varieties were also observed in the motion or velocity of the filaments. In general, the filaments increased in velocity outwards from the body to a certain small distance, which was nearly the same in all cases, and then diminished all the way outward. This was observed by inequalities in the colour of the filaments, by which one could be observed to outstrip another. The retardation of those next the body seemed to proceed from friction; and it was imagined that without this the velocity there would always have been greatest.

These observations give us considerable information respecting the mechanism of these motions, and the action of fluids upon solids. The pressure in the duplicate ratio of the velocities comes here again into view. We found, that although the velocities were very different, the curves were precisely the same. Now the observed pressures arise from the transverse forces by which each particle of a filament is retained in its curvilineal path; and we know that the force by which a body is retained in any curve is directly as the square of the velocity, and inversely as the radius of curvature. The curvature, therefore, remaining the same, the transverse forces, and consequently the pressure on the body, must be as the square of the velocity; and, on the other hand, we can see pretty clearly (indeed it is rigorously demonstrated by D'Alembert), that whatever be the velocities, the curves will be the same. For it is known in hydraulics, that it requires a fourfold or ninefold pressure to produce a double or triple velocity. And as all pressures are propagated through a perfect fluid without diminution, this fourfold pressure, while it produces a double velocity, produces also fourfold transverse pressures, which will retain the particles, moving twice as fast, in the same curvilineal paths. And thus we see that the impulses, as they are called, and resistances of fluids, have a certain relation to the weight of a column of fluid whose height is the height necessary for producing the velocity. How it happens that a plane surface, immersed in an extended fluid, sustains just half the pressure which it would have sustained had the motions been such as are represented in fig. 6, is a matter of more curious and difficult investigation. But we see evidently that the pressure must be less than what is there assigned; for the stagnant water a-head of the body greatly diminishes the ultimate deflections of the filaments; and it may be demonstrated, that when the part BE of the canal, fig. 9, is inclined to the part AB in an angle less than 90°, the pressures BG along the whole canal are as the versed sine of the ultimate angle of deflection, or the versed sine of the angle which the part BE makes with the part AB. Therefore, since the deflections resemble more the sketch given in fig. 10, the accumulated sum of all these forces BG of fig. 9 must be less than the similar sum corresponding to fig. 6, that is, less than the weight of the column of fluid having twice the productive height for its height. How it is just one half, shall be our next inquiry.

Investigations of Newton.

And here we must return to the labours of Sir Isaac Newton. After many beautiful observations on the nature and mechanism of continued fluids, he says, that the resistance which they occasion is but one half of that occasioned by the rare fluid which had been the subject of his former proposition. He then enters into another, as novel and as difficult an investigation, viz. the laws of hydraulics, and endeavours to ascertain the motion of fluids through orifices when urged by pressures of any kind. He endeavours to ascertain the velocity with which a fluid escapes through a horizontal orifice in the bottom of a vessel, by the action of its weight, and the pressure which this vein of fluid will exert on a little circle which occupies part of the orifice. To obtain this, he employs a kind of approximation and trial, of which it would be extremely difficult to give an extract; and then, by increasing the diameter of the vessel and of the hole to infinity, he accommodates his reasoning to the case of a plane surface exposed to an indefinitely extended stream of fluid; and, lastly, giving to the little circular surface the motion which he had before ascribed to the fluid, he says, that the resistance to a plane surface moving through an unelastic continuous fluid, is equal to the weight of a column of the fluid whose height is one half of that necessary for acquiring the velocity; and he says, that the resistance of a globe is, in this case, the same with that of a cylinder of the same diameter. The resistance, therefore, of the cylinder or circle is four times less, and that of the globe is twice less, than their resistances on a rare elastic medium.

But this determination, though founded on principles or assumptions which are much nearer to the real state of things, is liable to great objections. It depends on his method for ascertaining the velocity of the issuing fluid; a method extremely ingenious, but defective. The cataract which he supposes, cannot exist as he supposes, descending by the full action of gravity, and surrounded by a funnel of stagnant fluid. For, in such circumstances, there is nothing to balance the hydrostatical pressure of this surrounding fluid; because the whole pressure of the central cataract is employed in producing its own descent. In the next place, the pressure which he determines is beyond all doubt only half of what is observed on a plane surface in all our experiments. And, in the third place it is repugnant to all our experience, that the resistance of a globe or of a pointed body is as great as that of its circular base. He supposes the two bodies placed in a tube or canal; and since they are supposed of the same diameter, and therefore leave equal spaces at their sides, he concludes, that because the water escapes by their sides with the same velocity, they will have the same resistance. But this is by no means a necessary consequence. Even if the water should be allowed to exert equal pressures on them, the pressures being perpendicular to their surfaces, and these surfaces being inclined to the axis, while in the case of the base of a cylinder it is in the direction of the axis, there must be a difference in the accumulated or compound pressure in the direction of the axis. He indeed says, that in the case of the cylinder or the circle obstructing the canal, a quantity of water remains stagnant on its upper surface, viz. all the water whose motion would not contribute to the most ready passage of the fluid between the cylinder and the sides of the canal or tube; and that this water may be considered as frozen. If this be the case, it is indifferent what is the form of the body that is covered with this mass of frozen or stagnant water. It may be a hemisphere or a cone; the resistance will be the same. But Newton by no means assigns, either with precision or with distinct evidence, the form and magnitude of this stagnant water, so as to give confidence in the results. He contents himself with saying, that it is that water whose motion is not necessary, or cannot contribute to the most easy passage of the water. There remains, therefore, many imperfections in this theory.

Researches of D. Bernoulli.

In the second volume of the *Comment. Petropol.* 1727, Daniel Bernoulli proposes a formula for the resistance of fluids, deduced from considerations quite different from those on which Newton founded his solution. But he delivers it with diffidence, because he found that it gave a resistance four times greater than experiment. In the same dissertation he determines the resistance of a sphere to be one half of that of its great circle. But in his subsequent theory of Hydrodynamics (a work which must ever rank among the first productions of the age, being equally remarkable for refined and elegant mathematics, and ingenious and original thoughts in dynamics), he calls this determination in question. It is indeed founded on the same hypothetical principles which have been unskilfully detached from the rest of Newton's physics, and made the groundwork of all the subsequent theories on this subject.

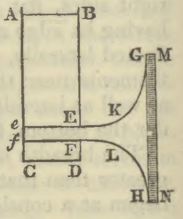
Impulse of a fluid vein on a plane surface.

In 1741, Daniel Bernoulli published another dissertation (in the eighth volume of the *Com. Petropol.*) on the action and resistance of fluids, limited to a very particular case; namely, to the impulse of a vein of fluid falling perpendicularly on an infinitely extended plane surface. This he demonstrates to be equal to the weight of a column of the fluid whose base is the area of the vein, and whose height is twice the fall producing the velocity. This demonstration is drawn from the true principles of mechanics and the acknowledged laws of hydraulics, and may be received as a strict physical demonstration. As it is the only proposition in the whole theory that has as yet received a demonstration accessible to readers not versant in all the refinements of modern analysis, and as the principles on which it proceeds will undoubtedly lead to a solution of every problem which can be proposed, when our mathematical knowledge shall enable us to apply them, we think it our duty to give the demonstration in this place, although we must acknowledge that it will hardly bear an application to any case in which the conditions are even slightly varied. There do occur cases however in practice, where it may be applied to very great advantage.

Bernoulli first determines the whole action exerted in the efflux of the vein of fluid. Suppose the velocity of efflux v is that which would be acquired by falling through the height h. It is well known that a body moving during the time of this fall with the velocity v would describe a space $= 2h$. The effect, therefore, of the hydraulic action is, that in the time t of the fall h, there issues a cylinder or prism of water whose base is the cross section s or area of the vein, and whose length is $2h$. And this quantity of matter is now moving with the velocity v. The quantity of motion, therefore, which is thus produced in the time t, is $2shv$. And this is the accumulated effect of all the expelling forces estimated in the direction of the efflux. Now, to compare this with the exertion of some pressure with which we are familiarly acquainted, let us suppose this pillar $2sh$ to be frozen, and, being held in the hand, to be dropped. It is well known, that in the time t it will fall through the height h, and will acquire the velocity v, and now possesses the quantity of motion $2shv$; and all this is the effect of its weight. The weight, therefore, of the pillar $2sh$ produces the same effect, and in the same time, and (as may easily be seen) in the same gradual manner, with the expelling forces of the fluid in the vessel, which expelling forces arise from the pressure of all the fluid in the vessel. Therefore the accumulated hydraulic pressure by which a vein of a heavy fluid is forced out through an orifice in the bottom or side of a vessel, is equal (when estimated in the direction of the efflux) to the weight of a column of the fluid having for its base the section of the vein, and twice the fall productive of the velocity of efflux for its height.

Now let ABDC be a quadrangular vessel with upright plane sides, in one of which is an orifice EF. From every point of the circumference of this orifice, suppose horizontal lines Ee, Ff, &c. which will mark a similar surface on the opposite side of the vessel. Suppose the orifice EF to be shut. There can be no doubt but that the surfaces EF and ef will be equally pressed in opposite directions. Now open the orifice EF; the water will rush out, and the pressure on EF is now removed. There will therefore be a tendency in the vessel to move back in the direction Ee. And this tendency must be precisely equal and opposite to the whole effort of the expelling forces. This is a conclusion as evident as any proposition in mechanics. It is thus that a gun recoils and a rocket rises in the air; and on this is founded the operation of Barker's mill, described in all treatises of mechanics.

Fig. 11.



Now let this stream of water be received on a circular plane MN, perpendicular to its axis, and let this circular plane be of such extent that the vein escapes from its sides in an infinitely thin sheet, the water flowing off in a direction parallel to the plane. The vein by this means will expand into a trumpet-shaped figure, or conoid, having curved sides, EKG, FLH. We abstract at present the action of gravity which would cause the vein to bend downwards, and occasion a greater velocity at H than at G; and we suppose the velocity equal in every point of the circumference. It is plain that if the action of gravity be neglected after the water has issued through the orifice EF, the velocity in every point of the circumference of the plane MN will be that of the efflux through EF.

Now, because EKG is the figure assumed by the vein, it is plain that if the whole vein were covered by a tube or funnel, fitted to its shape, and perfectly polished, so that the water shall glide along it without any friction (a thing which we may always suppose), the water will exert no pressure whatever on this tube. Lastly, let us suppose that the plane MN is attached to the tube by some bits of wire, so as to allow the water to escape all round by the narrow chink between the tube and the plane. We have now a vessel consisting of the upright part ABDC, the conoid GKEFLH, and the plane MN; and the water is escaping from every point of the circumference of the chink GHNM with the velocity v. If any part of this chink were shut up, there would be a pressure on that part equivalent to the force of efflux from the opposite part. Therefore, when all is open, these efforts of efflux balance each other all round. There is not therefore any tendency in this compound vessel to move to any side. But take away the plane MN, and there would immediately arise a pressure in the direction E*e* equal to the weight of the column $2sh$. This is therefore balanced by the pressure on the circular plane MN, which is therefore equal to this weight, and the proposition is demonstrated.

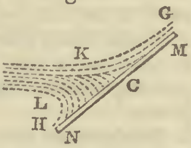
A number of experiments were made by Professor Krafft at St Petersburg, by receiving the vein on a plane which was fastened to the arm of a balance, having a scale hanging on the opposite arm. The resistance or pressure on the plane was measured by weights put into the scale; and the velocity of the jet was measured by means of the distance to which it spouted on a horizontal plane.

The results of these experiments were as conformable to the theory as could be wished. The resistance was always a little less than what the formula required, but greatly exceeded its half; the result of the generally received theories. This defect should be expected; for the demonstration supposes the plane MN to be infinitely extended, so that the film of water which issues through the chink may be accurately parallel to the plane, which never can be completely effected. Also it was supposed that the velocity was justly measured by the amplitude of the parabola described when the plane was removed. But it is well known that the very putting the plane MN in the way of the jet, though at the distance of an inch from the orifice, will diminish the velocity of the efflux through this orifice.

I ulse on a blique s ace.

Bernoulli hoped to render this proposition more extensive and applicable to oblique impulses, when the axis AC of the vein (fig. 12) is inclined to the plane in an angle ACN. But here all the simplicity of the case is gone, and we are now obliged to ascertain the motion of each filament. It might not perhaps be impossible to determine what must happen in the plane of the figure, that is, in a plane passing through the axis of the vein, and perpendicular to the plane MN. But even in this case it would be extremely difficult to determine how much of the fluid will go in the direction EKG, and what will go in the path FLH, and to ascertain the form of each filament, and the velocity in its different points. In the real state of the case, the water will dissipate from the centre C on every side; and we cannot tell in what proportions. Let us, however, consider a little what happens in the plane of the figure, and suppose that all the water goes either in the course EKG or in the course FLH. Let the quantities of water which take these two courses have the proportions of m to n, and let $m + n = 1$. Let $k =$ the velocity at A, $v =$ the velocity at G, and $u =$ the velocity at H; and let $\varphi =$ the supplement of the angle ACM. Now, since $m + n = 1$, and since the quantity of fluid which passes through A in a given time is proportional to the velocity, the momentum or quantity of motion at A in the direction AC is mk^2, and the quantity of motion at G in the same direction is $mv^2 \cos. \varphi$, so that $m\,(k^2 - v^2 \cos. \varphi)$ is the quantity of motion destroyed by the plane CM, which is obviously equal to the resistance of that plane, or equal to the pressure of the sheet of fluid GKEACM. In the same manner it is shown that the quantity of motion destroyed by the plane CN, or the pressure of the sheet of fluid HLFACN, is $n\,(k^2 + u^2 \cos. \varphi)$ (remembering that in this case $\cos. \varphi$ is negative); therefore the sum of these two pressures, or the whole pressure on the plane MN, in the direction AC, is $m\,(k^2 - v^2 \cos. \varphi) + n\,(k^2 + u^2 \cos. \varphi)$, which being multiplied by the sine of ACM, or $\sin. \varphi$, gives the pressure perpendicular to MN equal to $\{m\,(k^2 - v^2 \cos. \varphi) + n\,(k^2 + u^2 \cos. \varphi)\} \sin. \varphi$.[1]

Fig. 12.



But there remains a pressure in the direction perpendicular to the axis of the vein, which is not balanced, as in the former case, by the equality on opposite sides of the axis. The pressure arising from the water which escapes at G has an effect opposite to that produced by the water which escapes at H. When this is taken into account, we shall find that their joint efforts perpendicular to AC are $(m - n)\,k^2 \sin. \varphi$, which, being multiplied by the cosine of ACM, gives the action perpendicular to the plane MN $= (m - n)\,k^2 \cos. \varphi \sin. \varphi$.

The sum or joint effort of all these pressures is $m(k^2 - v^2 \cos. \varphi) \sin. \varphi + n\,(k^2 - u^2 \cos. \varphi) \sin. \varphi + (m - n)\,k^2 \cos. \varphi \sin. \varphi$.

Thus, from this case, which is much simpler than can happen in nature, seeing that there will always be a lateral efflux, the determination of the impulse is as uncertain and vague as it was sure and precise in the former case.

It is therefore without proper authority that the absolute impulse of a vein of fluid on a plane which receives it wholly, is asserted to be proportional to the sine of incidence. If indeed we suppose the velocities in G and H to be equal to that at A, then $k = v = u$, and the whole impulse is $k^2 \sin. \varphi$, as is commonly supposed. But this cannot be. Both the velocity and quantity at H are less than those at G. Nay, frequently there is no efflux on the side H when the obliquity is very great. We made conclude, in general, that the oblique impulse will always bear to the direct impulse a greater proportion than that of the sine of incidence to radius. If the whole water escapes at G, and none goes off laterally, the pressure will be $(k^2 + k^2 \cos. \varphi - v^2 \cos. \varphi) \sin. \varphi$. The experiments of the Abbé Bossut show, in the plainest manner, that the pressure of a vein, striking obliquely on a plane which receives it wholly, diminishes faster than in the ratio of the square of the sine of incidence; whereas, when the oblique plane is wholly immersed in the stream, the impulse is much greater than in this proportion, and in great obliquities is nearly as the sine.

Nor will this proposition determine the impulse of a fluid on a plane wholly immersed in it, even when the impulse is perpendicular to the plane. The circumstance is now wanting on which we can establish a calculation, namely, the angle of final deflection. Could this be ascertained for each filament, and the velocity of the filament, the principles are completely adequate to an accurate solution of the problem. In the experiments which we mentioned to have been made under the inspection of Sir Charles Knowles, a cylinder of six inches diameter was exposed to the action of a stream moving precisely one foot per second; and when certain deductions were made for the water which was held adhering to the posterior base (as will be noticed afterwards), the impulse was found equal to $3\frac{1}{8}$ ounces avoirdupois. There were thirty-six coloured filaments distributed on the stream, in such situations as to give the most useful indications of their curvature. It was found necessary to have some which passed under the body and some above it; for the form of these filaments, at the same distance from the axis of the cylinder, was considerably different; and those filaments which were situated in planes neither horizontal nor vertical took a double curvature. In short, the curves were all traced with great care, and the deflecting forces were computed for each, and reduced to the direction of the axis; and they were summed up in such a manner as to give the impulse of the whole stream. The deflections were marked as far a-head of the cylinder as they could be observed with certainty. By this method the impulse was computed to be 2$\frac{15}{16}$ ounces, differing from observation $\frac{3}{16}$ of an ounce, or about $\frac{1}{16}$ of the whole; a difference which may most reasonably be ascribed to the adhesion of the water, which must be most sensible in such small velocities. These experiments may therefore be considered as giving all the confirmation that can be desired of the justness of the principles. This indeed hardly admits of a doubt; but the method gives us but small assistance, in as far as it leaves us in every case the task of observing the form of the curves and the velocities in their different points. To derive advantage from this method of Daniel Bernoulli, we must discover some means of determining, *a priori*, what will be the motion of the fluid whose course is obstructed by a body of any form. And here we cannot omit taking notice of the casual observations of Sir Isaac Newton when attempting to determine the resistance of the plane surface, or cylinder, or sphere exposed to a stream moving in a canal. He says, that the form of the resisting surface is of less consequence, because there is always a quantity of water stagnant upon it, and which may therefore be considered as frozen; and he therefore considers that water only whose motion is necessary for the most expeditious discharge of the water in the vessel. We are disposed to think, that in this casual observation Sir Isaac Newton has pointed out the only method of arriving at a solution of the problem; and that, if we could discover *what motions are not necessary for the most expeditious passage of the water*, and could thus determine the form and magnitude of the stagnant water which adheres to the body, we should much more easily ascertain the real motions which occasion the observed resistance.

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[1] For a general solution of this problem, see the *Traité de Mécanique* of Poisson, tome ii. p. 778.

In the mean time, we may admit this as a physical truth, that the perpendicular impulse or resistance of a plane surface, wholly immersed in the fluid, is equal to the weight of the column having the surface for its base, and the fall producing the velocity for its height.

This is the medium result of all experiments made in these precise circumstances. And it is confirmed by a set of experiments of a kind wholly different, and which seem to point it out more certainly as an immediate consequence of hydraulic principles.

If a tube, open at both ends, and bent into a right angle near one of its extremities, be held in an upright position, and the open mouth of the bent end be exposed directly to a stream of fluid issuing from a reservoir or vessel, the fluid is observed to stand in the upright tube precisely on a level with the fluid in the reservoir. Here is a most unexceptionable experiment, in which the impulse of the stream is actually opposed to the hydrostatical pressure of the fluid in the tube. Pressure is in this case opposed to pressure, because the issuing fluid is deflected by what remains in the mouth of the tube, in the same way in which it would be deflected by a firm surface. We shall have occasion by and by to mention some most valuable and instructive experiments made with this instrument, which is known by the name of Pitot's tube.

Euler's theory.

It was this which suggested to Euler another theory of the impulse and resistance of fluids, which must not be omitted, as it is applied in his elaborate performance on the Theory of the Construction and Working of Ships. He supposes a stream of fluid, moving with any velocity, to strike the plane BD perpendicularly, and that part of it goes through a hole, forming a jet. Euler says, that the velocity of this jet will be the same with the velocity of the stream. Now compare this with an equal stream issuing from a hole in the side of a vessel with the same velocity. The one stream is urged out by the pressure occasioned by the impulse of the fluid; the other is urged out by the pressure of gravity. The effects are equal, and the modifying circumstances are the same. The causes are therefore equal, and the pressure occasioned by the impulse of a stream of fluid, moving with any velocity, is equal to the weight of a column of fluid whose height is productive of this velocity, &c. He then determines the oblique impulse by the resolution of motion, and deduces the common rules of resistance, &c.

But all this is without just grounds. Not a shadow of argument is given for the leading principle in this theory, viz. that the velocity of the jet is the same with the velocity of the stream. None can be given, but saying that the pressure is equivalent to its production; and this is assuming the very thing he labours to prove. The matter of fact is, that the velocity of the jet is greater than that of the stream, and may be greater almost in any proportion; which curious circumstance was discovered and ingeniously explained long ago by Daniel Bernoulli in his *Hydrodynamica*. It is evident that the velocity must be greater. Were a stream of sand to come against the plane, what goes through would indeed preserve its velocity unchanged; but when a real fluid strikes the plane, all that does not pass through is deflected on all sides; and by these deflections forces are excited, by which the filaments which surround the cylinder immediately fronting the hole are made to press this cylinder on all sides, and as it were squeeze it between them; and thus the particles at the hole must of necessity be accelerated, and the velocity of the jet must be greater than that of the stream. We are disposed to think that, in a fluid perfectly incompressible, the velocity will be double, or at least increased in the proportion of 1 to $\sqrt{2}$. If the fluid is in the smallest degree compressible even in the very small degree that water is, the velocity at the first impulse may be much greater. Daniel Bernoulli found that a column of water moving five feet per second, in a tube some hundred feet long, produced a velocity of 136 feet per second in the first moment.

There being this radical defect in the theory of Euler, it is needless to take notice of its total insufficiency for explaining oblique impulses and the resistance of curvilineal prows.

Solut D'Al bert.

D'Alembert has attempted a solution of the problem in a method entirely new and extremely ingenious. Bernoulli had only considered the pressures which were excited in consequence of the curvilineal motions of the particles. D'Alembert thought that these pressures were not the consequences, but the causes, of these curvilineal motions. No internal motion can happen in a fluid but in consequence of an unbalanced pressure; and every such motion will produce an inequality of pressure, which will determine the succeeding motions. He therefore endeavoured to reduce all to the discovery of those disturbing pressures, and thus to the laws of hydrostatics. Assisted by that general principle of dynamics which he had previously established, and which had enabled him to solve many of the most difficult problems concerning the motions of bodies, such as the centre of oscillation, of spontaneous conversion, the precession of the equinoxes, &c. &c. with great facility and elegance, he demonstrates, in a manner equally new and simple, those propositions which Newton had so cautiously deduced from his hypothetical fluid, showing that they were not limited to this hypothesis, viz. that the motions produced by similar bodies, similarly projected in them, would be similar; that whatever were the pressures, the curves described by the particles would be the same; and that the resistances would be proportional to the squares of the velocities. He then comes to consider the fluid as having its motions constrained by the form of the canal or by solid obstacles interposed.

He supposes, in the first place, a solid body or obstacle to be kept fixed by some exterior cause, in a fluid which strikes against it. The filaments, on encountering the obstacle, bend themselves in different directions, and the portion of fluid which covers the anterior part of the body remains stagnant to a certain distance. Now the pressure sustained by the obstacle, or the resistance which it opposes to the fluid, is produced by the loss of velocity which the particles undergo; for one body acts on another only by communicating, or tending to communicate, to it a part of its own motion. He then shows that the question reduces itself to find the velocity of the particles which glide past the surface of the body (which he determines in two different ways); and this velocity being found, we have the rigorous formulæ for the pressure. It then only remains, theoretically speaking, to compute the formulæ in order to obtain results applicable in practice. But this is what we can scarcely hope to accomplish without restricting their generality, and neglecting some of the conditions which essentially belong to the question. So inadequate are our mathematical theories to cope with the difficulty, that even D'Alembert has not been able to exemplify the application of the equation to the simplest case which can be proposed, namely, the direct impulse on a plane surface wholly immersed in the fluid. All that he is enabled to do, is to apply it (by some modifications and substitutions which take it out of its state of extreme generality) to the direct impulse of a vein of fluid on a plane which deflects it wholly, and thus to show its conformity to the solution given by Daniel Bernoulli, and to observation and experience. He shows, that this impulse (independent of the deficiency arising from the plane not being of infinite extent) is somewhat less than the weight of a column whose base is the section of the vein, and whose height is twice the fall necessary for communicating the velocity. This great philosopher and geometer concludes by saying, that he does not believe that any method can be found for solving this problem that is more direct and simple; and imagines, that if the deductions from it shall be found not to agree with experiment, we must give up all hopes of determining the resistance of fluids by theory.[1]

F ther ex ri- m ts ne- ce ry.

In the present state of the theory of hydrodynamics, it would be of great importance to multiply experiments on the resistance of bodies. Those of the French academy are undoubtedly of much value, and will always be appealed to; but there are circumstances in those experiments which render them more complicated than is proper for a general theory, and which therefore limit the conclusions which we wish to draw from them. The bodies were floating on the surface. This greatly modifies the deflections of the filaments of water, causing some to deflect laterally which would otherwise have remained in one vertical plane; and this circumstance also necessarily produced what the academicians called the *remou*, or accumulation on the anterior part of the body, and depression behind it. This produced an additional resistance, which was measured with great difficulty and uncertainty. The effect of adhesion must also have been very considerable, and very different in the different cases; and it is of difficult calculation. It cannot perhaps be totally removed in any experiment, and it is necessary to consider it as making part of the resistance in the most important practical cases, viz. the motion of ships. Here we see that its effect is very great. Every seaman knows that the speed even of a copper-sheathed ship is *greatly* increased by greasing her bottom. The difference is too remarkable to admit of a doubt: nor should we be surprised at this, when we attend to the diminution of the motion of water in long pipes. A smooth pipe four and a half inches diameter and 500 yards long yields but one fifth of the quantity which it ought to do independently of friction. But adhesion produces a great effect, which cannot be compared with friction. We see that water flowing through a hole in a thin plate will be increased in quantity fully one third by adding a little tube whose length is about twice the diameter of the hole. The adhesion therefore will greatly modify the action of the filaments both on the solid body and on each other, and will change both the forms of the curves and the velocities in different points.

The form of these experiments of the academy is ill suited to the examination of the resistance of bodies wholly immersed in the fluid. The form of experiment adopted by Robins for the resistance of air, and afterwards by the Chevalier Borda for water, is free from these inconveniences, and is susceptible of equal accuracy. The great advantage of both is the exact knowledge which they give us of the velocity of the motion; a circumstance essentially necessary, and but imperfectly known in the experiments of Mariotte and others, who examined quiescent bodies exposed to the action of a stream. It is extremely difficult to measure the velocity of a stream, which is also very different in its different parts. It is swiftest of all in the middle superficial filament, and diminishes as we recede from this towards the sides or bottom, and the rate of diminution is not precisely known.

It were greatly to be wished that some more palpable argument could be found for the existence of a quantity of stagnant fluid at the anterior and posterior parts of the body. The one already given, derived from the consideration that no motion changes either its velocity or direction by finite quantities in an instant, is unexceptionable, but gives us little information. But surely there are circumstances which rigorously determine the extent of this stagnant fluid. And it appears, without doubt, that if there were no cohesion or friction, this space will have a determined ratio to the size of the body (the figures of the bodies being supposed similar). Suppose a plane surface AB, as in fig. 10, there can be no doubt but that the figure A*a*D*b*B will in every case be similar. But if we suppose an adhesion or tenacity which is constant, this may make a change both in its extent and its form: for its constancy of form depends on the disturbing forces being always as the squares of the velocity; and this ratio of the disturbing forces is preserved, while the inertia of the fluid is the only agent and patient in the process. But when we add to this the constant (that is, invariable) disturbing force of tenacity, a change of form and dimensions must happen. In like manner, the friction, or something analogous to friction, which produces an effect proportional to the velocity, must alter this necessary ratio of the whole disturbing forces. We may conclude, that the effect of both these circumstances will be to diminish the quantity of this stagnant fluid, by licking it away externally; and to this we must ascribe the fact, that the part ADB is never perfectly stagnant, but is generally disturbed with a whirling motion. We may also conclude, that this stagnant fluid will be more incurvated between F and H than it would have been, independent of tenacity and friction. And, lastly, we may conclude, that there will be something opposite to pressure, or something which we may call *abstraction*, exerted on the posterior part of the body which moves in a tenacious fluid, or is exposed to the stream of such a fluid; for the stagnant fluid adheres to the posterior surface, and the passing fluid tends to draw it away both by its tenacity and by its friction. This must augment the apparent impulse of the stream on such a body; and it must greatly augment the resistance, that is, the motion lost by this body in its progress through the tenacious fluid; for the body must drag along with it this stagnant fluid, and drag it in opposition to the tenacity and friction of the surrounding fluid. The effect of this is most remarkably seen in the resistances to the motion of pendulums; and the Chevalier du Buat, in his examination of Newton's experiments, clearly shows that this constitutes the greatest part of the resistance.

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[1] The rigorous equations of the motions of fluids, whether incompressible or elastic, were first given by D'Alembert in his *Essai d'une Nouvelle Théorie sur la Résistance des Fluides*, 1752; but the analytical theory was greatly simplified, and the formulæ, which are expressed by equations of partial differences, rendered completely general, by Euler (Berlin Memoirs, 1755). The general equations of motion have been still further simplified by Lagrange, and if it were possible to integrate them, we should be enabled to determine completely, in every case, all the circumstances of the action of a fluid put in motion by any forces whatever. But the difficulty of effecting the integrations has hitherto proved insuperable, and mathematicians have hitherto been obliged, even in the solution of the simplest problems, to have recourse to particular methods, grounded on restricted hypotheses. See Fourth Preliminary Dissertation, sect. 2.

Du Buat's experiments.

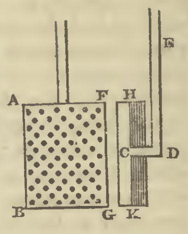
We cannot conclude this dissertation better, than by giving an account of some experiments of the Chevalier du Buat, which seem of immense consequence, and tend to give us entirely new views of the subject. Du Buat observed the motion of water issuing from a glass cylinder through a narrow ring formed by a bottom of smaller diameter; that is, the cylinder was open at both ends, and there was placed at its lower end a circle of smaller diameter, by way of bottom, which left a ring all around. He threw some powdered sealing-wax into the water, and observed with great attention the motion of its small particles. He saw those which happened to be in the very axis of the cylinder descend along the axis with a motion pretty uniform, till they came very near the bottom; from this they continued to descend very slowly, till they were almost in contact with the bottom; they then deviated from the centre, and approached the orifice in straight lines and with an accelerated motion, and at last darted into the orifice with great rapidity. He had observed a thing similar to this in a horizontal canal, in which he had set up a small board like a dam or bar, over which the water flowed. He had thrown a gooseberry into the water, in order to measure the velocity at the bottom, the gooseberry being a small matter heavier than water. It approached the dam uniformly till about three inches from it. Here it almost stood still, but it continued to advance till almost in contact. It then rose from the bottom along the inside of the dam with an accelerated motion, and quickly escaped over the top.

Hence he concluded that the water which covers the anterior part of the body exposed to the stream is not perfectly stagnant, and that the filaments recede from the axis in curves, which converge to the surface of the body as different hyperbolas converge to the same assymptote, and that they move with a velocity continually increasing till they escape round the sides of the body.

He had established a proposition concerning the pressure which water in motion exerts on the surface along which it glides, viz. *that the pressure is equal to that which it would exert if at rest*, minus *the weight of the column whose height would produce the velocity of the passing stream.* Consequently the pressure which the stream exerts on the surface perpendicularly exposed to it will depend on the velocity with which it glides along it, and will diminish from the centre to the circumference. This, says he, may be the reason why the impulse on a plane wholly immersed is but one half of that on a plane which deflects the whole stream.

He contrived a very ingenious instrument for examining this theory. A square brass plate ABGF (fig. 13) was pierced with a great number of holes, and fixed in the front of a shallow box HK, represented edgewise. The back of this box was pierced with a hole C, in which was inserted the tube of glass CDE, bent square at D. This instrument was exposed to a stream of water, which beat on the brass plate. The water having filled the box through the holes, stood at an equal height in the glass tube when the surrounding water was stagnant; but when it was in motion it always stood in the tube above the level of the smooth water without, and thus indicated the pressure occasioned by the action of the stream.

Fig. 13.



When the instrument was not wholly immersed, there was always a considerable accumulation against the front of the box, and a depression behind it. The water before it was by no means stagnant; indeed it should not be, as Du Buat observes; for it consists of the water which was escaping on all sides, and therefore upwards from the axis of the stream, which meets the plate perpendicularly in C considerably under the surface. It escapes upwards; and if the body were sufficiently immersed, it would escape in this direction almost as easily as laterally. But in the present circumstances it heaps up, till the elevation occasions it to fall off sidewise as fast as it is renewed. When the instrument was immersed more than its semi-diameter under the surface, the water still rose above the level, and there was a great depression immediately behind this elevation. In consequence of this difficulty of escaping upwards, the water flows off laterally; and if the horizontal dimensions of the surface are great, this lateral efflux becomes more difficult, and requires a greater accumulation. From this it happens, that the resistance of broad surfaces equally immersed is greater than in the proportion of the breadth. A plane of two feet wide and one foot deep, when it is not completely immersed, will be more resisted than a plane two feet deep and one foot wide; for there will be an accumulation against both; and even if these were equal in height, the additional surface will be greatest in the widest body; and the elevation will be greater, because the lateral escape is more difficult.

The circumstances chiefly to be attended to are these. The pressure on the centre was much greater than towards the border, and, in general, the height of the water in the tube DE was more than $\frac{4}{3}$ of the height necessary for producing the velocity when only the centre hole was open. When various holes were opened at different distances from the centre, the height of the water in DE continually diminished as the hole was nearer the border. At a certain distance from the border the water at E was level with the surrounding water, so that no pressure was exerted on that hole. But the most unexpected and remarkable circumstance was, that in great velocities, the holes at the very border, and even to a small distance from it, not only sustained no pressure, but even gave out water; for the water in the tube was lower than the surrounding water. Du Buat calls this a *non-pressure.* In a case in which the velocity of the stream was three feet, and the pressure on the central hole caused the water in the vertical tube to stand 33 lines or $\frac{33}{12}$ of an inch above the level of the surrounding smooth water, the action on a hole at the lower corner of the square caused it to stand 12 lines lower than the surrounding water. Now the velocity of the stream in this experiment was 36 inches per second. This requires $21\frac{1}{2}$ lines for its productive fall, whereas the pressure on the central hole was 33. This approaches to the pressure on a surface which deflects it wholly. The intermediate holes gave every variation of pressure, and the diminution was more rapid as the holes were nearer the edge; but the law of diminution could not be observed.

This is quite a new and most unexpected circumstance in the action of fluids on solid bodies, and renders the subject more intricate than ever; yet it is by no means inconsistent with the genuine principles of hydrostatics or hydraulics. In as far as Du Buat's proposition concerning the pressure of moving fluids is true, it is very reasonable to say, that when the lateral velocity with which the fluid tends to escape exceeds the velocity of percussion, the height necessary for producing this velocity must exceed that which would produce the other, and a non-pressure must be observed. And if we consider the forms of the lateral filaments near the edge of the body, we see that the concavity of the curve is turned towards the body, and that the centrifugal forces tend to diminish their pressure on the body. If the middle alone were struck with a considerable velocity, the water might even rebound, as is frequently observed. This *actual* rebounding is here prevented by the surrounding water, which is moving with the same velocity; but the pressure may be almost annihilated by the *tendency* to rebound of the inner filaments.

Part (and perhaps a considerable part) of this apparent non-pressure is undoubtedly produced by the tenacity of the water, which licks off with it the water lying in the hole. But at any rate this is an important fact, and gives great value to these experiments. It furnishes a key to many curious phenomena in the resistance of fluids; and the theory of Du Buat deserves a very serious consideration. It is all contained in the two following propositions.

S stance Du t's ry.

1. "*If, by any cause whatever, a column of fluid, whether making part of an indefinite fluid, or contained in solid canals, come to move with a given velocity, the pressure which it exerted laterally before its motion, either on the adjoining fluid or on the sides of the canal, is diminished by the weight of a column having the height necessary for communicating the velocity of the motion.*

2. "*The pressure on the centre of a plane surface perpendicular to the stream, and wholly immersed in it, is $\frac{3}{2}$ of the weight of a column having the height necessary for communicating the velocity. For* 33 *is* $\frac{3}{2}$ *of* $21\frac{1}{2}$."

He attempted to ascertain the medium pressure on the whole surface, by opening 625 holes dispersed all over it. With the same velocity of current, he found the height in the tube to be 29 lines, or $7\frac{1}{2}$ more than the height necessary for producing the velocity. But he justly concluded this to be too great a measure, because the holes were $\frac{1}{4}$ of an inch from the edge; had there been holes at the very edge, they would have sustained a non-pressure, which would have diminished the height in the tube very considerably. He exposed to the same stream a conical funnel, which raised the water to 34 lines. But this could not be considered as a measure of the pressure on a plane solid surface; for the central water was undoubtedly scooped out, as it were, and the filaments much more deflected than they would have been by a plane surface. Perhaps something of this happened even in every small hole in the former experiments. And this suggests some doubt as to the accuracy of the measurement of the pressure and of the velocity of a current by Pitot's tube. It surely renders some corrections absolutely necessary. It is a fact, that when exposed to a vein of fluid coming through a short passage, the water in the tube stands on a level with that in the reservoir. Now we know that the velocity of this stream *does not* exceed what would be produced by a fall equal to $\frac{82}{100}$ of the head of water in the reservoir.

Du Buat, by a scrupulous attention to all the circumstances, concludes that the medium of pressure on the whole surface is equal to $\frac{25\cdot5}{21\cdot5}$ of the weight of a column having the surface for its base and the productive fall for its height. But we think that there is an uncertainty in this conclusion; because the height of the water in the vertical tube was undoubtedly augmented by an hydrostatical pressure arising from the accumulation of water above the body which was exposed to the stream.

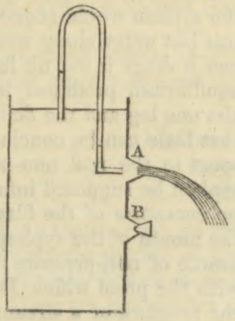
Since the pressures are as the squares of the velocities, or as the heights h which produce the velocities, we may express this pressure by $\frac{25\cdot5}{21\cdot5}h$, or $1\cdot186\ h$, or mh, the value of m being 1·186. This exceeds considerably the result of the experiments of the French academy. In these it does not appear that m sensibly exceeds unity. It is to be observed, that in these experiments the body was moved through still water; here it is exposed to a stream. These are generally supposed to be equivalent, on the authority of the third law of motion, which makes every action depend on the relative motions. We shall by and by see some causes of difference.

Action on the hinder part of the body.

The writers on this subject seem to think their task completed when they have considered the action of the fluid on the anterior part of the body, or that part of it which is before the broadest section, and have paid little or no attention to the hinder part. Yet those who are most interested in the subject, the naval architects, seem convinced that it is of no less importance to attend to the form of the hinder part of a ship. And the universal practice of all nations has been to make the hinder part more acute than the fore part. This has undoubtedly been deduced from experience; for it is in direct opposition to any notions which a person would naturally form on this subject. Du Buat therefore thought it very necessary to examine the action of the water on the hinder part of the body by the same method. And, previous to this examination, in order to acquire some scientific notions of the subject, he made the following very curious and instructive experiment.

Two little conical pipes A and B (fig. 14) were inserted into the upright side of a prismatic vessel. They were an inch long, and their diameters at the inner and outer ends were five and four lines. A was fifty-seven lines under the surface, and B was seventy-three. A glass syphon was made of the shape represented in the figure, and its internal diameter was $1\frac{1}{4}$ line. It was placed with its mouth in the axis, and even with the base of the conical pipe. The pipes being shut, the vessel was filled with water, and it was made to stand on a level in the two legs of the syphon, the upper part being full of air. When this syphon was applied to the pipe A, and the water running freely, it rose thirty-two lines in the short leg, and sunk as much in the other. When it was applied to the pipe B, the water rose forty-one lines in the one leg of the syphon, and sunk as much in the other.

Fig. 14.



He reasons in this manner from the experiment. The ring comprehended between the end of the syphon and the sides of the conical tube being the narrowest part of the orifice, the water issued with the velocity corresponding to the height of the water in the vessel above the orifice, diminished for the contraction. If therefore the cylinder of water immediately before the mouth of the syphon issued with the same velocity, the tube would be emptied through a height equal to this HEAD OF WATER (*charge*). If, on the contrary, this cylinder of water, immediately before the mouth of the syphon, were stagnant, the water in it would exert its full pressure on the mouth of the syphon, and the water in the syphon would be level with the water in the vessel. Between these extremes we must find the real state of the case, and we must measure the force of non-pressure by the rise of the water in the syphon.

We see that in both experiments it bears an accurate proportion to the depth under the surface. For 57 : 73 $= 32 : 41$ very nearly. He therefore estimates the non-pressure to be $\frac{56}{100}$ of the height of the water above the orifice.

We are disposed to think that the ingenious author has not reasoned accurately from the experiment. In the first place, the force indicated by the experiment, whatever be its origin, is certainly double of what he supposes; for it must be measured by the sum of the rise of the water in one leg, and its depression in the other, the weight of the air in the bend of the syphon being neglected. It is precisely analogous to the force acting on the water oscillating in a syphon, which is acknowledged to be the sum of the elevation and depression. The force indicated by the experiment therefore is $\frac{112}{100}$ of the height of the water above the orifice. The force exhibited in this experiment bears a still greater proportion to the productive height; for it is certain that the water *did not* issue with the velocity acquired by the fall from the surface, and probably did not exceed two thirds of it. The effect of contraction must have been considerable and uncertain. The velocity should have been measured both by the amplitude of the jet and by the quantity of water discharged. In the next place, we apprehend that much of the effect is produced by the tenacity of the water, which drags along with it the water which would have slowly issued from the syphon had the other end not dipped into the water of the vessel. We know that if the horizontal part of the syphon had been continued far enough, and if no retardation were occasioned by friction, the column of water in the upright leg would have accelerated like any heavy body; and when the last of it had arrived at the bottom of that leg, the whole in the horizontal part would be moving with the velocity acquired by falling from the surface. The water of the vessel which issues through the surrounding ring very quickly acquires a much greater velocity than what the water descending in the syphon would acquire in the same time, and it drags this last water along with it both by tenacity and friction, and it drags it out till its action is opposed by the want of equilibrium produced in the syphon by the elevation in the one leg and the depression in the other. We imagine that little can be concluded from the experiment with respect to the real non-pressure. Nay, if the sides of the syphon be supposed infinitely thin, so that there would be no curvature of the filaments of the surrounding water at the mouth of the syphon, we do not very distinctly see any source of non-pressure: for we are not altogether satisfied with the proof which Du Buat offers for this measure of the pressure of a stream of fluid gliding along a surface, *and obstructed by friction or any other cause.* We imagine that passing water in the present experiment would be a little retarded by accelerating continually the water descending in the syphon, and renewed a-top, supposing the upper end open; because this water would not of itself acquire more than half this velocity. It however drags it out, till it not only resists with a force equal to the weight of the whole vertical column, but even exceeds it by $\frac{12}{100}$. This it is able to do, because the whole pressure by which the water issues from an orifice has been shown by Daniel Bernoulli to be equal to twice this weight. We therefore consider this beautiful experiment as chiefly valuable, by giving us a measure of the tenacity of the water; and we wish that it were repeated in a variety of depths, in order to discover what relation the force exerted bears to the depth. It would seem that the tenacity, being a certain determinate thing, the proportion of 100 to 112 would not be constant; and that the observed ratio would be made up of two parts, one of them constant, and the other proportional to the depth under the surface.

But still this experiment is intimately connected with the matter in hand; and this apparent non-pressure on the hinder part of a body exposed to a stream, from whatever causes it proceeds, does operate in the action of water on this hinder part, and must be taken into the account.

Furth experi ments Du B

We must therefore follow Du Buat in his discussions on this subject. A prismatic body, having its prow and poop equal and parallel surfaces, and plunged horizontally into a fluid, will require a force to keep it firm in the direction of its axis precisely equal to the difference between the real pressures exerted on its prow and poop. If the fluid is at rest, this difference will be nothing, because the opposite dead pressures of the fluid will be equal; but in a stream, there is superadded to the dead pressure on the prow the active pressure arising from the deflections of the filaments of this fluid.

If the dead pressure on the poop remained in its full intensity by the perfect stagnation of the water behind it, the whole sensible pressure on the body would be the active pressure only on the prow, represented by $m\,h$. If, on the other hand, we could suppose that the water behind the body moved continually away from it (being renewed laterally) with the velocity of the stream, the dead pressure would be entirely removed from its poop, and the whole sensible pressure, or what must be opposed by some external force, would be $m\,h + h$. Neither of these can happen; and the real state of the case must be between these extremes.

The following experiments were tried. The perforated box with its vertical tube was exposed to the stream, the brass plate being turned down the stream. The velocity was again 36 inches per second.

The central hole A alone being opened, gave a non-
pressure of....................................13 lines;
a hole B, $\frac{5}{6}$ of an inch from the edge, gave...15
a hole C, near the surface........................15·7
a hole D, at the lower angle......................15·3

Here it appears that there is a very considerable non-pressure, increasing from the centre to the border. This increase undoubtedly proceeds from the greater lateral velocity with which the water is gliding in from the sides. The water behind was by no means stagnant, although moving off with a much smaller velocity than that of the passing stream, and it was visibly removed from the sides, and gradually licked away at its further extremity.

Another box, having a great number of holes, all open, indicated a medium of non-pressure equal to $13\frac{1}{8}$ lines.

Another of larger dimensions, but having fewer holes, indicated a non-pressure of $12\frac{1}{6}$.

But the most remarkable and the most important phenomena were the following.

The first box was fixed to the side of another box, so that when all was made smooth it made a perfect cube, of which the perforated brass plate made the poop.

The apparatus being now exposed on the stream, with the perforated plate looking down the stream,

The hole A indicated a non-pressure.................=7·2
B...8
C...6

Here was a great diminution of the non-pressures, produced by the distance between the prow and the poop.

This box was then fitted in the same manner, so as to make the poop of a box three feet long. In this situation the non-pressures were as follows.

Hole A...1·5
B...3·2

The non-pressures were still farther diminished by this increase of length.

The box was then exposed with all the holes open in three different situations.

1st, Single, giving a non-pressure........................13·1
2d, Making the poop of a cube...............................5·3
3d, Making the poop of a box three feet long..........3·0

Another large box.

1st, Single	12·2
2d, Poop of a cube	5
3d, Poop of the long box	3·2

These are most valuable experiments. They plainly show how important it is to consider the action on the hinder part of the body. For the whole impulse or resistance, which must be withstood or overcome by the external force, is the sum of the active pressure on the fore part, and of the non-pressure on the hinder part; and they show that this does not depend solely on the form of the prow and poop, but also, and perhaps chiefly, on the length of the body. We see that the non-pressure on the hinder part was prodigiously diminished (reduced to one fourth) by making the length of the body triple of the breadth. And hence it appears, that merely lengthening a ship, without making any change in the form either of her prow or her poop, will greatly diminish the resistance to her motion through the water; and this increase of length may be made by continuing the form of the midship frame in several timbers along the keel, by which the capacity of the ship, and her power of carrying sail, will be greatly increased, and her other qualities improved, while her speed is augmented.

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It is of importance to consider a little the physical cause of this change. The motions are extremely complicated, and we must be contented if we can but perceive a few leading circumstances.

The water is turned aside by the anterior part of the body, and the velocity of the filaments is increased, and they acquire a divergent motion, by which they also push aside the surrounding water. On each side of the body, therefore, they are moving in a divergent direction, and with an increased velocity. But as they are on all sides pressed by the fluid without them, their motions gradually approach parallelism, and their velocities to an equality with that of the stream. The progressive velocity, or that in the direction of the stream, is checked, at least at first. But since we observe the filaments condensed round the body, and that they are not deflected at right angles to their former direction, it is plain that the real velocity of a filament in its oblique path is augmented. We always observe, that a stone lying in the sand, and exposed to the wash of the sea, is laid bare at the bottom, and the sand is generally washed away to some distance all round. This is owing to the increased velocity of the water which comes into contact with the stone. It takes up more sand than it can keep floating, and it deposits it at a little distance all around, forming a little bank, which surrounds the stone at a small distance. When the filaments of water have passed the body, they are pressed by the ambient fluid into the place which it has quitted, and they glide round its stern, and fill up the space behind. The more divergent and the more rapid they are, when about to fall in behind, the more of the circumambient pressure must be employed to turn them into the trough behind the body, and less of it will remain to press them to the body itself. The extreme of this must obtain when the stream is obstructed by a thin plane only. But when there is some distance between the prow and the poop, the divergency of the filaments which had been turned aside by the prow is diminished by the time that they have come abreast of the stern, and should turn in behind it. They are therefore more readily made to converge behind the body, and a more considerable part of the surrounding pressure remains unexpended, and therefore presses the water against the stern; and it is evident that this advantage must be so much the greater as the body is longer. But the advantage will soon be susceptible of no very considerable increase; for the lateral, and divergent, and accelerated filaments, will soon become so nearly parallel and equally rapid with the rest of the stream, that a great increase of length will not make any considerable change in these particulars; and it must be accompanied with an increase of friction.

These are very obvious reflections. And if we attend minutely to the way in which the almost stagnant fluid behind the body is expended and renewed, we shall see all these effects confirmed and augmented. But as we cannot say anything on this subject that is precise, or that can be made the subject of computation, it is needless to enter into a more minute discussion. The diminution of the non-pressure towards the centre most probably arises from the smaller force which is necessary to be expended in the inflection of the lateral filaments, already inflected in some degree, and having their velocity diminished. But it is a subject highly deserving the attention of mathematicians; and we presume to invite them to the study of the motions of these lateral filaments passing the body, and pressed into its wake by forces which are susceptible of no difficult investigation. It seems highly probable, that if a prismatic box, with a square stern, were fitted with an addition precisely shaped like the water which would (abstracting tenacity and friction) have been stagnant behind it, the quantity of non-pressure would be the smallest possible. The mathematician would surely discover circumstances which would furnish some maxims of construction for the hinder part as well as for the prow. And as his speculations on this last have not been wholly fruitless, we may expect advantages from his attention to this part, so much neglected.

In the mean time, let us attend to the deductions which Du Buat has made from his few experiments.

Deductions from the experiments.

When the velocity is three feet per second, requiring the productive height 21·5 lines, the height corresponding to the non-pressure on the poop of a thin plane is 14·41 lines (taking in several circumstances of correction, which we have not mentioned), that of a foot cube is 5·83, and that of a prism of triple length is 3·31.

Let q express the variable ratio of these heights to the height producing the velocity, so that qh may express the non-pressure in every case; we have,

For a thin plane	$q = 0{\cdot}67$
a cube	0·271
a prism = 3 cubes	0·153

It is evident that the value of q has a dependence on the proportion of the length, and the transverse section of the body. A series of experiments on prismatic bodies showed Du Buat that the deviation of the filaments was similar in similar bodies, and that this obtained even in dissimilar prisms, when the lengths were as the square roots of the transverse sections. Although therefore the experiments were not sufficiently numerous for deducing the precise law, it seemed not impossible to derive from them a very useful approximation. By a dexterous comparison he found, that if l expresses the length of the prism, and s the area of the transverse section, the non-pressure will be expressed pretty accurately by the formula $\frac{1}{q} = \log.\left(1{\cdot}42 + \frac{l}{\sqrt{s}}\right)$. But this formula is applicable only to prismatic bodies.

Hence arises an important remark, that when the height corresponding to the non-pressure is greater than $\sqrt{s}$, and the body is little immersed in the fluid, there will be a void behind it. Thus a surface of a square inch, just immersed in a current of three feet per second, will have a void behind it. A foot square will be in a similar condition when the velocity is twelve feet.

We must be careful to distinguish this non-pressure from the other causes of resistance, which are always necessarily combined with it. It is superadditive to the active impression on the prow, to the statical pressure of the accumulation a-head of the body, the statical pressure arising from the depression behind it, the effects of friction, and the effects of tenacity. It is indeed next to impossible to estimate them separately, and many of them are actually combined in the measures now given. Nothing can determine the pure non-pressures till we can ascertain the motions of the filaments.

Comparison of the pressure on a body in a stream, and on a body moving in a quiescent fluid.

Du Buat here takes occasion to controvert the universally adopted maxim, that the pressure occasioned by a stream of fluid on a fixed body is the same with that on a body moving with equal velocity in a quiescent fluid. He repeated all these experiments with the perforated box in still water. The general distinction was, that both the pressures and the non-pressure in this case were less, and that the differences were chiefly observed near the edges of the surface. The general factor of the pressure of a stream on the anterior surface was $m = 1{\cdot}186$; but that on a moving body through a still fluid is only $m = 1$. He observed no non-pressure even at the very edge of the prow, but even a sensible pressure. The pressure, therefore, or resistance, is more equally diffused over the surface of the prow than the impulse is. He also found that the resistances diminished in a less ratio than the squares of the velocities, especially in small velocities.

The non-pressures increased in a greater ratio than the squares of the velocities. The ratio of the velocities to a small velocity of $2\frac{1}{5}$ inches per second increased geometrically, the value of q increased arithmetically; and we may determine q for any velocity v by this formula, $q = \frac{1}{2{\cdot}8} \log. \frac{v}{2{\cdot}2}$; that is, let the common logarithm of the velocity in inches, divided by $2\frac{1}{5}$, be considered as a common number; divide this common number by $2\frac{8}{10}$, the quotient is q, which must be multiplied by the productive height. The product is the pressure.

When Pitot's tube was exposed to the stream, we had $m = 1$; but when it is carried through still water, m is $= 1{\cdot}22$. When it was turned from the stream, we had $q = 0{\cdot}157$; but when carried through still water, q is $= 0{\cdot}138$. A remarkable experiment.

When the tube was moved laterally through the water, so that the motion was in the direction of the plane of its mouth, the non-pressure was $= 1$. This is one of his chief arguments for his theory of non-pressure. He does not give the detail of the experiment, and only inserts the result in his table.

As a body exposed to a stream deflects the fluid, heaps it up, and increases its velocity; so a body moved through a still fluid turns it aside, causes it to swell up before it, and gives it a real motion alongside of it in the opposite direction. And as the body exposed to a stream has a quantity of fluid almost stagnant both before and behind; so a body moved through a still fluid carries before it and drags after it a quantity of fluid, which accompanies it with nearly an equal velocity. This addition to the quantity of matter in motion must make a diminution of its velocity; and this forms a very considerable part of the observed resistance.

We cannot, however, help remarking, that it would require very distinct and strong proof indeed to overturn the common opinion, which is founded on our most certain and simple conceptions of motion, and on a law of nature to which we have never observed an exception. Du Buat's experiments, though most judiciously contrived, and executed with scrupulous care, are by no means of this kind. They were, of absolute necessity, very complicated; and many circumstances, impossible to avoid or to appreciate, rendered the observation, or at least the comparison, of the velocities, very uncertain.

We can see but two circumstances which do not admit of an easy or immediate comparison in the two states of the problem. When a body is exposed to a stream *in our experiments*, in order to have an impulse made on it, there is a force tending to move the body backwards, independent of the real impulse or pressure occasioned by the deflection of the stream. We cannot have a stream except in consequence of a sloping surface. Suppose a body floating on this stream. It will not only sail down *along with the stream*, but it will sail *down the stream*, and will therefore go faster along the canal than the stream does; for it is floating on an inclined plane; and if we examine it by the laws of hydrostatics, we shall find, that besides its own tendency to *slide* down this inclined plane, there is an odds of hydrostatical pressure, which *pushes* it down this plane. It will therefore go along the canal faster than the stream. For this acceleration depends on the difference of pressure at the two ends, and will be more remarkable as the body is larger, and especially as it is longer. This may be distinctly observed. All floating bodies go into the stream of the river, because there they find the smallest obstruction to the acquisition of this motion along the inclined plane; and when a number of bodies are thus floating down the stream, the largest and longest outstrip the rest. A log of wood floating down in this manner may be observed to make its way very fast among the chips and saw-dust which float alongside of it.

Now when, in the course of our experiments, a body is supported against the action of the stream, and the impulse is measured by the force employed to support it, it is plain that part of this force is employed to act against that tendency which the body has to outstrip the stream. This does not appear in our experiment, when we move a body with the velocity of this stream through still water having a horizontal surface.

The other distinguishing circumstance is, that the retardations of a stream arising from friction are found to be nearly as the velocities. When, therefore, a stream moving in a limited canal is checked by a body put in its way, the diminution of velocity occasioned by the friction of the stream having already produced its effect, the impulse is not affected by it; but when the body puts the still water in motion, the friction of the bottom produces some effect, by retarding the recess of the water. This, however, must be next to nothing.

The chief difference will arise from its being almost impossible to make an exact comparison of the velocities; for when a body is moved against the stream, the relative velocity is the same in all the filaments. But when we expose a body to a stream, the velocity of the different filaments is not the same, because it decreases from the middle of the stream to the sides.

Du Buat found the total sensible resistance of a plate twelve inches square, and measured, not by the height of water in the tube of the perforated box, but by weights acting on the arm of a balance, having its centre fifteen inches under the surface of a stream moving three feet per second, to be 19·46 lbs.; that of a cube of the same dimensions was 15·22 lbs.; that of a prism three feet long was 13·87 lbs.; and that of a prism six feet long was 14·27 lbs. The first three agree extremely well with the determination of m and q, by the experiments with the perforated box. The total resistance of the last was undoubtedly much increased by friction, and by the retrograde force of so long a prism floating in an inclined stream. This last by computation is 0·223 lbs.; this added to $h\,(m + q)$, which is 13·39 lbs., gives 13·81 lbs., leaving 0·46 lb. for the effect of friction.

If the same resistances be computed on the supposition that the body moves in still water, in which case we have $m = 1$, and for a thin plate $q = \frac{1}{2{\cdot}8} \log. \frac{v}{2{\cdot}2}$, whence, supposing the velocity to be thirty-six inches per second,

$q = 0{\cdot}433$; and if from this we find values of q for the cube and three-feet prism (assuming q to vary inversely as $\log.\left(1{\cdot}42 + \frac{l}{\sqrt{s}}\right)$, according to what was above shown), we shall have for the cube, $q = 0{\cdot}172$, and for the prism, $q = 0{\cdot}102$. Hence, if R denote the resistance due both to the pressure and non-pressure of the body when moving in quiescent water, the three values of R will be 1·433, 1·172, and 1·102, which correspond to the weights 14·94 lbs., 12·22 lbs., and 11·49 lbs.

Hence Du Buat concludes, that the resistances in these two states are nearly in the ratio of 13 to 10. This, he thinks, will account for the difference observed in the experiments of different authors.

uantity fluid hich adeeres to e moving dy.

Du Buat next endeavours to ascertain the quantity of water which is made to adhere in some degree to a body which is carried along through still water, or which remains nearly stagnant in the midst of a stream. He takes the sum of the motions in the direction of the stream, viz. the sum of the actual motions of all those particles which have lost part of their motion, and he divides this sum by the general velocity of the stream. The quotient is equivalent to a certain quantity of water perfectly stagnant round the body. Without being able to determine this with precision, he observes, that it augments as the resistance diminishes; for in the case of a longer body, the filaments are observed to converge to a greater distance behind the body. The stagnant mass a-head of the body is more constant; for the deflection and resistance at the prow are observed not to be affected at the length of the body. By a very nice analysis of many circumstances, he comes to this conclusion, that the whole quantity of fluid, which in this manner accompanies the solid body, remains the same, whatever is the velocity. He might have deduced it at once, from the consideration that the curves described by the filaments are the same in all velocities.

He then relates a number of experiments made to ascertain the absolute quantity thus made to accompany the body. These were made by causing pendulums to oscillate in fluids. Newton had determined the resistances to such oscillation by the diminution of the arches of vibration. Du Buat determines the quantity of dragged fluid by the increase of their duration; for the stagnation or dragging is in fact adding a quantity of matter to be moved, without any addition to the moving force. It was ingeniously observed by Newton, that the time of oscillation was not sensibly affected by the resistance of the fluid, a compensation almost complete being made by the diminution of the arches of vibration; and experiment confirmed this. If, therefore, a great augmentation of the time of vibration be observed, it must be ascribed to the additional quantity of matter which is thus dragged into motion, and it may be employed for its measurement. Thus, let a be the length of a pendulum swinging seconds in vacuo, and l the length of a seconds pendulum swinging in a fluid. Let p be the weight of the body in the fluid, and P the weight of the body displaced by it; $P + p$ will express its weight in vacuo, and $\frac{P+p}{p}$ will be the ratio of these weights. We shall therefore have $\frac{P+p}{p} = \frac{a}{l}$ and $l = \frac{ap}{P+p}$.

Let n express the sum of the fluid displaced, and the fluid dragged along, n being a greater number than unity, to be determined by experiment. The mass in motion is no longer $P + p$, but $P + np$, while its weight in the fluid is still p. Hence $l = \frac{ap}{nP + p}$, and $n = \frac{p}{P}\left(\frac{a}{l} - 1\right)$.

A prodigious number of experiments made by Du Buat on spheres vibrating in water gave values of n which were nearly constant, namely, from 1·5 to 1·7; and by considering the circumstances which accompanied the variations of n (which he found to arise chiefly from the curvature of the path described by the ball), he states the mean value of the number n at 1·585. So that a sphere in motion drags along with it about $\frac{6}{10}$ths of its own bulk of fluid with a velocity equal to its own.

Similar experiments with prisms, pyramids, and other bodies, afforded a complete confirmation of his assertion, that prisms of equal lengths and sections, though dissimilar, dragged equal quantities of fluid; that similar prisms, and prisms not similar, but whose lengths were as the square root of their sections, dragged quantities proportional to their bulks.

He found a general value of n for prismatic bodies, which alone may be considered as a valuable result, namely,

$$n = 0{\cdot}705 \frac{\sqrt{s}}{l} + 1{\cdot}13.$$

From all these circumstances, we see an intimate connection between the pressures, non-pressures, and the fluid dragged along with the body. Indeed this is immediately deducible from first principles; for what Du Buat calls the *dragged fluid* is in fact a certain portion of the whole change of motion produced in the direction of the body's motion.

It was found, that with respect to thin planes, spheres, and pyramidal bodies of equal bases, the resistances were inversely as the quantities of fluid dragged along.[1]

The reader will readily observe, that these views of the Chevalier du Buat are not so much discoveries of new principles as they are classifications of consequences which may all be deduced from the general principles employed by D'Alembert and other mathematicians. But they greatly assist us in forming notions of different parts of the procedure of nature in the mutual action of fluids and solids on each other. This must be very acceptable in a subject which it is by no means probable that we shall be able to investigate with mathematical precision.

Change of resistance produced by the void behind a body.

The only circumstance which we have not noticed in detail, is the change of resistance produced by the void, or tendency to a void, which obtains behind the body; and we omitted a particular discussion, merely because we could say nothing sufficiently precise on the subject. Persons not accustomed to the discussions in the physico-mathematical sciences are apt to entertain doubts or false notions connected with this circumstance, which we shall attempt to remove.

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[1] It is a remarkable circumstance, that these very important conclusions of the Chevalier du Buat, which were first published in the second edition of his well-known work in 1786, and which twice formed the subject of the prize proposed by the Academy of Sciences of Paris, should have been so little attended to by succeeding experimenters, that in the numerous attempts to determine the length of the seconds pendulum, no one thought of applying the additional correction for the reduction to a vacuum, which they so clearly make necessary, until the subject was again brought into notice by Bessel, in a memoir on the length of the seconds pendulum, published in 1828 (Memoirs of the Berlin Academy for 1826), in which the effect of the adhesive air was shown by decisive experiments, and given as an original discovery. Bessel determined the quantity denoted in the text by n in two different ways;—by swinging in air two spheres of equal diameter, but of different specific gravity (brass and ivory), and by swinging the same sphere alternately in air and water. The first mode gave $n = 1{\cdot}946$, a value which he afterwards increased to 1·956 (Schumacher's *Astronomische Nachrichten*, No. 223); and the second gave $n = 1{\cdot}625$, which is within the limits assigned by Du Buat. Mr Baily, who investigated this subject with great care by means of a vacuum apparatus, gives, as the mean result of his experiments, $n = 1{\cdot}846$; and he observes that the experiments seem to show that in pendulums of equal length and of similar construction, the factor n depends on the *form* and *magnitude* of the moving body, and is not affected by its weight or specific gravity. (Baily *on the Correction of a Pendulum for the Reduction to a Vacuum*, Phil. Trans. for 1832.)

If a fluid were perfectly incompressible, and were contained in a vessel incapable of extension, it is impossible that any void could be formed behind the body; and in this case it is not very easy to see how motion could be performed in it. A sphere moved in such a medium could not advance the smallest distance, unless *some* particles of the fluid, in filling up the space left by it, moved with a velocity next to infinite. Some degree of compressibility, however small, seems necessary. If this be insensible, it may be rigidly demonstrated, that an external force of compression will make no *sensible* change in the internal motions, or in the resistances. This indeed is not obvious, but is an immediate consequence of the *quaquaversum* pressure of fluids. As much as the pressure is augmented by the external compressions in one side of a body, so much is it augmented on the other side; and the same must be said of every particle. Nothing more is necessary for securing the same motions by the same partial and internal forces; and this is fully verified by experiment. Water remains equally fluid under any compressions. In some of Sir Isaac Newton's experiments, balls of four inches diameter were made so light as to preponderate in water only three grains. These balls descended in the same manner as they would have descended in a fluid where the resistance was equal in every part; yet, when they were near the bottom of a vessel nine feet deep, the compression round them was at least 2400 times the moving force; whereas, when near the top of the vessel, it was not above 50 or 60 times.

But in a fluid sensibly compressible, or which is not confined, a void may be left behind the body. Its motion may be so swift that the surrounding pressure may not suffice for filling up the deserted space; and, in this case, a statical pressure will be added to the resistance. This may be the case in a vessel or pond of water having an open surface exposed to the finite or limited pressure of the atmosphere. The question now is, whether the resistance will be increased by an increase of external pressure? Supposing a sphere moving near the surface of water, and another moving equally fast at four times the depth. If the motion be so swift that a void is formed in both cases, there is no doubt but that the sphere which moves at the greatest depth is most resisted by the pressure of the water. If there is no void in either case, then, because the quadruple depth would cause the water to flow in with only a double velocity, it would seem that the resistance would be greater; and indeed the water flowing in laterally with a double velocity produces a quadruple non-pressure. But, on the other hand, the pressure at a small depth may be insufficient for preventing a void, while that below effectually prevents it; and this was observed in some experiments of Borda. The effect, therefore, of greater immersion, or of greater compression, in an elastic fluid, does not follow a precise ratio of the pressure, but depends partly on absolute quantities. It cannot therefore be stated by any very simple formula what increase or diminution of resistance will result from a greater depth; and it is chiefly on this account that experiments made with models of ships and mills are not conclusive with respect to the performance of a large machine of the same proportions, without corrections sometimes pretty intricate. We assert, however, with great confidence, that this is of all methods the most exact, and infinitely more certain than anything that can be deduced from the most elaborate calculation from theory. If the resistances at all depths be equal, the proportionality of the total resistance to the body is exact, and perfectly conformable to observation. It is only in great velocities where the depth has any material influence, and the influence is not near so considerable as we should, at first sight, suppose; for, in estimating the effect of immersion, which has a relation to the difference of pressure, we must always take in the pressure of the atmosphere; and thus the pressure at thirty-three feet deep is not thirty-three times the pressure at one foot deep, but only double, or twice as great. The atmospheric pressure is omitted only when the resisted plane is at the very surface. (B. B. B.)

Colone Beaufo experiments.

For an account of the experiments of Coulomb, Hutton, and Vince, the reader is referred to HYDRODYNAMICS, chapter iii. (vol. xii. p. 76). We may also refer to a very extensive and valuable series of experiments made in the years 1796–1798, by the late Colonel Beaufoy, in the Greenland Docks at Deptford, the details of which have been recently published in a large and sumptuous quarto volume,[1] by his son, Henry Beaufoy, Esq., and munificently distributed among scientific institutions and individuals. The following are the principal results:—

1. The power of the velocity to which the resistance is proportional is a little above the duplicate ratio or square of the velocity when the velocity is two miles per hour; but the ratio gradually decreases as the velocity increases, and becomes a little less than the duplicate ratio at the velocity of eight miles per hour.

2. The power of the velocity of the *plus* pressure, or pressure on the head end of the body, is a little above the duplicate ratio.

3. The power of the velocity of the *minus* pressure, or pressure on the stern end, is in general less than the duplicate ratio, and diminishes as the velocity increases.

4. A cube is less resisted than a square iron plate equal in dimensions with the side of the cube; and a cylinder less than a round plane of which the area is equal to the end of the cylinder.

5. The resistance of a cylinder one foot in length, and the area of the section = 1 square foot, with a semi-globe at each end, when moving with a velocity of eight miles per hour, was 46·29 lbs. avoirdupois; and the resistance of a globe of the same radius, moving at the same velocity, was 64·87; whence the resistance on the globe was diminished by the interposition of the cylinder, nearly in the ratio of 7 to 5.

6. As a general result, it was found that bodies whose head ends are formed of curve surfaces were less resisted than bodies of the same dimensions formed of plane surfaces.

7. The resistance is a minimum when the greatest breadth of the body is at the distance of about two fifths of the length from the head end.

8. Similar bodies appear to be more resisted immediately under the surface than at the depth of six feet.

In the Transactions of the Royal Society of Edinburgh (vol. xiv. part i.), there is a paper by Mr Russel, containing an account of a series of experiments on the resistances of canal boats, made by him in the years 1834 and 1835, which bring to light some phenomena not previously observed, relative to the resistances on bodies partly immersed and moving in narrow channels, and are important on account of their practical bearing on canal navigation. The principal phenomena developed by the experiments were the following:—1*st*, That the resistance does not follow the ratio of the squares of the velocities, excepting when the velocity is small, and the depth of the fluid considerable; 2*d*, that the increments of the resistance are greater than those due to the squares of the velocities as the velocity approaches a certain limit, which depends upon the depth of the fluid; 3*d*, that immediately after passing this limit, the resistance suffers a sudden diminution, and becomes much less than that due to the square of the velocity, after which it continues to receive increments, of which the ratio is less than that due to the increment of the square of the velocity. As these phenomena appeared inconsistent with the received theories of hydrodynamics, it was important to investigate their causes. The deviation from the law of the squares, at the greater velocities, might be ascribed in part to a partial emersion of the floating body; for the resistance being taken in the ratio of the square of the velocity upon that part only of the body which remains immersed, the aggregate resistance will increase less rapidly at the higher velocities, and may even diminish as the velocity is increased. But the principal and most remarkable part of the phenomena, namely, the rapid increase of resistance as the velocity approaches a certain limit, and its sudden diminution when the velocity passed that limit, was found to depend on the generation of waves, which alter the form of the surface of the fluid, and consequently the position of the floating body.

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[1] *Nautical and Hydraulic Experiments, with numerous Scientific Miscellanies*; by Colonel Mark Beaufoy, F. R. S. &c. In three volumes, with plates. Vol. i. London; printed at the private press of Henry Beaufoy, F. R. S., South Lambeth, Surrey, 1834. The second and third volumes have not yet appeared.

When a solid body is dragged along the surface of a fluid, a wave is generated which moves in the direction of the motion of the body, with a velocity nearly uniform. The velocity of the wave is independent of the form or velocity of the moving body, and depends only on the depth of the fluid, being in fact equal to the velocity acquired by a body falling in vacuo through a space equal to half the depth of the fluid, as was demonstrated by Lagrange. The existence and mode of propagation of the wave being established, it is easy to see that the resistance will be greatly modified by the position of the moving body relatively to the wave. A vessel coming behind or following the wave is very differently circumstanced from one drawn in a horizontal position along the level surface of a quiescent fluid. The prow is pressed into the anterior wave, and consequently the bow more deeply immersed; the keel also assumes an inclined position, whence the vertical section of the immersed part of the body is increased, and on both these accounts a greater body of fluid is displaced. In addition to this, the increased immersion of the bow augments the anterior wave, and the augmented height gives rise to more rapid currents along the sides. Thus all the elements of resistance are increased; and it is obvious, that the more closely the vessel follows on the wave, the more powerful will be the effect of the retarding forces. Hence there is a very rapid increase of resistance in approximating gradually to the velocity of the wave. But if we suppose the vessel to be lifted up on the top of the wave, all the retarding forces are at once annihilated, the vessel recovers its horizontal position, and, by reason of the curvature of the wave, the immersion of the ends becomes a minimum. When the velocity of the vessel exceeds that of the wave, the displaced fluid is pushed aside by the prow of the vessel, and is accumulated on both sides of it in the form of a continuous wave, which remains to fill up the void when the vessel has passed through, so that the equilibrium of the hydrostatic pressure is very little disturbed, and immediately restored. Hence it is always found, that the commotion of the fluid is much greater when the velocity of the body is less than that of the wave, than in the contrary case.

The following experiments will give an idea of the manner in which the resistance is affected by the velocity. The depth of the canal was about five feet and a half, and the velocity of the wave from eleven to twelve feet per second, or about eight miles per hour. The weight of the vessel and load was 10,239 lbs.

Velocity in Miles per hour.	Moving Force, in lbs.
4·72	112
5·92	261
6·19	275
9·04	250
10·48	268·5.

Thus it appears, that at six miles per hour *behind* the wave, the resistance was greater than at nine miles per hour *upon* the wave; and at ten miles and a half per hour it was very little greater than at 5·9. The breadth of the canal materially affects the resistance. A narrow canal, by preventing the diffusion of the wave, increases its height, whence the resistance is increased when the velocity of the vessel is less than that of the wave; but when the velocity is greater than that of the wave, the contrary effect takes place. In both cases the narrowness of the canal augments the effect of the wave. The practical importance of these results is obvious.

Some experiments have also been recently made for the purpose of determining the amount and law of atmospheric resistance on railway-carriages. The experiments were made by starting a train of carriages with a given velocity down an inclined plane, and determining the velocity when the train ceased to be accelerated. The inclination of the plane and the weight of the carriages and load being known, the accelerating force of gravity is easily computed; and as this is equal, when the velocity becomes uniform, to the aggregate resistance, if we subtract the part due to friction, the part attributable to the resistance of the atmosphere becomes known. The results seemed to show that the atmospheric resistance increases in a considerably more rapid ratio than the squares of the velocity, but, on account of the great uncertainty which at present exists respecting the amount of the friction of carriage-wheels constrained to move on rails, they are not deserving of much confidence.

RESOLUTION, in *Music*. To resolve a discord or dissonance, says Rousseau, is to carry it according to rule into a consonance in the subsequent chord. There is for that purpose a procedure prescribed, both for the fundamental bass of the dissonant chord, and for the part by which the dissonance is formed.

Resolution *Bay*, a bay on the west coast of Christina, one of the Marquesas Islands, in the South Pacific Ocean. It is so called from Captain Cook's ship the Resolution having anchored in it in the year 1774. Long. 130. 8. W. Lat. 9. 55. S.

Resolution *Island*, one of the Society Islands, in the South Pacific Ocean, about four miles long. It is very flat, and is covered with wood. Long. 141. 39. W. Lat. 17. 24. S.

RESORT, a French word, sometimes used by English authors to signify the jurisdiction of a court, and particularly one from which there is no appeal. Thus it is said, that the House of Lords judge *en dernier ressort*, or in the last resort.

RESOULABAD, a town of Hindustan, in the province of Agra, district of Etaweh, seventy-two miles west by south from Lucknow. Resoul signifies messenger, a title which belongs to Mahommed; and a number of small places in the East are called after him.

RESPONDENT, in the schools, one who maintains a thesis in any art or science; who is thus called from his being required to answer all the objections proposed by the opponent.

REST, the continuance of a body in the same place, or its continual application or contiguity to the same parts of the ambient or contiguous bodies. It is therefore opposed to motion.

Rest, in *Poetry*, is a short pause of the voice in reading, being the same with the *cæsura*, which, in Alexandrine verses, falls on the sixth syllable, but in verses of ten or eleven syllables, on the fourth.

REST-HARROW, or Cammock, the *Ononis Arvensis.* A decoction of this plant has been much recommended for horses labouring under a stoppage of urine. It is the pest of some corn-fields; but in its younger state, before the plant has acquired thorns, it is a most acceptable food for sheep.

RESTAURATION, the act of re-establishing or setting a thing or person in its former state.

RESTITUTION, in a moral and legal sense, is restoring a person to his right, or returning something unjustly taken or detained from him.

Restitution of Medals, or *Restored Medals*, is a term used by antiquaries for such medals as were struck by the emperors, to retrieve the memory of their predecessors. Hence, in several medals, we find the letters rest. This practice was first begun by Claudius, who struck afresh several medals of Augustus. Nero did the same; and Titus, imitating his father's example, struck restitutions of most of his predecessors. Gallienus struck a general restitution of all the preceding emperors on two medals; the one bearing an altar, the other an eagle without the letters rest.

RESTIVE, in the manège, a stubborn, unruly, ill-broken horse, that stops, or runs back, instead of advancing forward.

RESTORATION, a small island in the South Pacific Ocean, on the east coast of New Holland, discovered by Captain Bligh in 1789. Oysters are plentiful on the shore, and there is also abundance of water.

RESURRECTION, in *Theology*, is a rising again from the state of the dead; in other words, is that event, the belief of which constitutes one of the principal articles in the Christian creed. See Theology.

RESUSCITATION, the same with resurrection and revivification. The term *resuscitation*, however, is more particularly used by chemists for the reproducing a mixed body from its ashes; an art to which many have pretended, as to reproduce plants, &c. from their ashes.

RETFORD, East, a market-town of the county of Nottingham, in the hundred of Bassetlaw, 145 miles from London. It is situated on the river Idle, which runs into the Trent, is well built, has a town-hall, and good market-place well attended every Saturday. It is a corporate town, governed by two bailiffs and twelve aldermen. It returns two members to the House of Commons; but, on account of prevalent bribery, the right of voting for the borough has been extended to all the freeholders of the county in which it stands. In the neighbourhood are many hop plantations. The chief trade is what arises from the great road. The population amounted in 1801 to 1948, in 1811 to 2030, in 1821 to 2461, and in 1831 to 2491.

RETHEL, an arrondissement of the department of the Ardennes, in France, extending over 481 square miles. It comprehends six cantons, composed of 124 communes, and contains 59,840 inhabitants. The capital is a city of the same name, situated on the right bank of the Aisne. It contains 900 houses, and 4960 inhabitants, chiefly employed in making coarse woollen goods. Long. 3. 20. E. Lat. 40. 35. N.

RETICULA, or Reticule, in *Astronomy*, a contrivance for measuring very nicely the quantity of eclipses. This instrument, which was introduced by the Academy of Sciences at Paris, is a little frame composed of thirteen fine silken threads, parallel to and at equal distances from each other, placed in the focus of object-glasses of telescopes; that is, in the place where the image of the luminary is painted in its full extent. The diameter of the sun or moon is consequently thus seen divided into twelve equal parts or digits; so that, in order to ascertain the quantity of the eclipse, there is nothing more to do than to number the parts that are dark, or that are luminous. As a square reticule is only proper for the diameter of the luminary, not for the circumference of it, it is sometimes made circular, by drawing six concentric, equidistant circles, which perfectly represent the phases of the eclipse. But it is obvious, that whether the reticule be square or circular, it should be perfectly equal to the diameter or circumference of the sun or star, such as it appears in the focus of the glass, otherwise the division cannot be just. Another imperfection in the reticule is, that its magnitude is determined by that of the image in the focus, and of course it will only fit one particular magnitude. But a remedy for these inconveniences was discovered by M. de la Hire, who contrived that the same reticule might serve for all telescopes, and all magnitudes of the luminary in the same eclipse. If two object-glasses be applied against each other, having a common focus, and forming an image of a certain magnitude, this image will increase in proportion as the distance between the two glasses is increased, at least to a certain limit. If therefore a reticule be taken of such a magnitude as just to comprehend the greatest diameter the sun or moon can ever have in the common focus of two object-glasses applied to each other, it is only necessary to remove them from each other, as the star becomes less, in order to have the image still exactly comprehended in the same reticule. As the silken threads are apt to deviate from the parallelism, by the different temperature of the air, another improvement is, to make the reticule of a thin looking-glass, by drawing lines or circles upon it with the fine point of a diamond.

RETICULATION. Of all the devices which man has invented wherewithal to secure to himself the "dominion over the fish of the sea and over the fowl of the air, and over the cattle," few can plead greater antiquity than reticulation; none has retained its place as an essential item in the catalogue of useful engines so permanently, through all ages and changes, as the net. Other weapons and instruments have either fallen into total disuse before the gigantic strides of improvement, or now only minister to our recreation; but the net, to this hour, forms an indispensable part of the apparatus used by many of the industrious classes of society. As a means of supplying us with a variety of wholesome food, and of enabling us to carry on an extensive commerce with other nations, net-making becomes an art of some importance; and, as an agreeable occupation to the amateur, it may be reckoned among the chief in point of domestic utility; and therefore is not in either case to be placed "next to mere idleness in the scale of insignificance." Fishing-net making is decidedly now the most extensive branch of reticulation, how serviceable soever it may be for other purposes. To say nothing of the shapes of the various engines of this kind used in our fisheries, their texture is the best that human ingenuity has been able to conceive; for, when wet, they are easily dried, when torn, easily mended; they offer little resistance when drawn out of the water, whereby the labour of hauling them is greatly diminished; the risk of their being overthrown or carried away by tides, currents, or storms, is lessened; and the more shy fish are not so easily scared away as they otherwise would be by toils more densely wrought; the sand, the mud, the young fry and spawn, the small insects and other animals inhabiting the waters, find a free passage through the meshes, and thus much wanton destruction of animal life is prevented, whilst a larger abundance and a more regular supply of fish is obtained than by any other mode. Such are some of the advantages which principally result from the delicacy of texture and rarity which, comparatively speaking, all nets exhibit, when fairly used, and no contrivances adopted for abusively increasing the *take.* The forms of nets vary according to the manner in which they are intended to act, and this is either by entangling the fish in their complicated folds, as in the *trammel*, receiving them into pockets, as in the *trawl*, suspending them by the body in the meshes, as in the *mackerel-net*, imprisoning them within their labyrinth-like *chambers*, as in the *stake-net*, or drawing them to shore, as in the *seine.* It is somewhat extraordinary that it was not until the year 1685 that nets were introduced into Norway, by one Claus Niels Stiningen. The fishermen set up a general outcry against so *pernicious an innovation*, and, after much disputing, the question was decided by an appeal to the law, and experience has confirmed the verdict, that nets are not only not prejudicial, but highly conducive to the prosperity of the fishing trade. Of the antiquity of the art of net-making it will not be necessary to enter into any detail; that nets were invented at a very early period, and have been universally adopted all over the world, and were, and have been ever since, put to an infinite variety of uses, requires no farther proof than can be afforded by a reference to the works of the most ancient authors, both sacred and profane, by whom constant allusion is made to network; and modern travellers have found it to be in vogue amongst the most rude as well as the most polished nations. For much curious information on this head we must refer the reader to *Beckmann.*[1] One use of the net, however, though known to the ancients, and long since adopted in Italy and other hot climates, has only quite recently, and hitherto but partially, been recognised in this country. It deserves notice, not solely on account of its exhibiting a curious phenomenon in the habits of certain insects highly interesting to the naturalist, but, for the sake of humanity, it is worthy also of the attention of the philanthropist. It has been found by careful experiments that a net made of the finest thread, of any colour, and with meshes of one inch and a quarter square, effectually keeps out the house-fly from the apartments across the open windows of which it is spread.[2] We must leave it to others to speculate upon the causes which operate on the imagination of the gnat and house-fly, so as to prevent them venturing through the " capacious breadth of these divisions." It has been suggested with much probability, that an optical delusion in the eyes of these insects produces this wonderful effect. The fact having been so well ascertained, what is there, except prejudice, to prevent our taking advantage of it, as affording, at a very trifling expense, and with very little trouble, a material comfort, not only to " the whole," but to " the sick ?" How refreshing will it prove to many a poor helpless sufferer to feel that he can enjoy in hot weather the luxury of fresh air, free from the irksome attacks of these persevering, buzzing, biting disturbers of his peace, at a time when he most needs repose, and every palliative that art can suggest! But our limits warn us to commence our practical directions relating to our subject. 1. *Tools and terms used by net-makers :—* *Accrues, false meshes*, or *quarterings*, are loops inserted in any given row, by which the number of meshes is increased. To *bread* or *breathe* a net, is to make a net. *Dead* netting is a piece without either *accrues*, or *stole* (stolen) meshes, which last means that a mesh is taken away by netting into two meshes of the preceding row at once, thereby diminishing the net at any part. The *head* of a net is the upper margin, along which the corks are strung upon a rope called the *head-rope.* The *foot* of a net is the opposite or lower margin, which carries the *foot-rope*, on which, in many cases, leaden plummets are made fast. *Over* means wide, as a *day-net* is three fathoms long, and one *over* or wide. The *lever* is the first row of a net. *Meshes* are the squares composing the net. A *needle* is the instrument used for holding and netting the material to be netted; it is made with an *eye* E, a *tongue* T, and a *fork* F, fig. 1, Plate CCCCXXXV. The twine is wound on it by being passed alternately between the *fork* and round the *tongue*, so that the turns of the string lie parallel to the length of the *needle*, and are kept on by the *tongue* and *fork.* A short *needle*, about four inches long, should be set apart for *mending.* A *spool* or *mesh-pin* is a round (fig. 2) or a flat (fig. 3) piece of wood, on which the *loops* are formed; the circumference of the *spool* determining the size of the *loops.* Each *loop* contains two sides of the square mesh; therefore, supposing that it be required to make a mesh one inch square, that is, measuring one inch from knot to knot, a *spool* two inches circumference must be used. Large meshes may be formed by giving the twine two or more turns round the *spool*, as occasion may require, or the *spool* may be made flat, and of a sufficient width, having a portion cut away to admit the finger and thumb to grasp it conveniently (fig. 3). A pair of *round-pointed scissors*, so as to be carried conveniently in the pocket, and a *knife*, are likewise indispensable. To *return on your work* is, when, in *breading* a cylindrical net, you stop at any given point, turn your work and net back again, instead of going on round and round, as in forming the *regard* of the *hoop* net; which is a slit made in that engine, through which the fisherman introduces his hand to extract the fish caught therein, when he goes to *look* (*regarder*, French) what success he has had. *Taught*, tight; the twine is pulled *taught* when a knot is made. 2. *How to make the loop or stitch in netting.* Being so generally understood that any neighbour can in a few minutes teach the uninitiated, we shall not describe the process; a little careful observation will show more than any written description can, however minute. 3. The same may be said *of making accrues.* It will be easily understood how a very simple manœuvre, when put in practice, becomes apparently complicated when described in words. It would be idle were we, under the plea of rendering this article complete, to encumber it with laboured explanations, if they can be called such, which leave the reader more in the dark than he was before. 4. The *bend-knot* is constantly required for uniting two ends of twine together, &c., and is thus performed. See fig. 4, in which A and B are to be joined. 5. *The art of mending* is of great importance; for, if the fisherman cannot mend an occasional rent, he will soon be obliged to have a new net. Two or three damaged meshes will, if neglected, speedily become a yawning hole; whereas the engine will last a long time by taking care to replace injured parts properly, and without delay. By amateur netters and gamekeepers this part of the art of reticulation is generally unheeded, and a bungling confusion of threads, drawn together any how, serving rather to increase the mischief, is substituted for a neat and efficient repair. In order to explain, as clearly as may be, the method to be pursued, we must request the reader to suppose that a net (fig. 5) has an injury in the middle of the space indicated by the dotted lines. We must begin by *cutting* the net, that is, the hole must be enlarged, not only by removing that portion which is actually torn, but by cutting into the sound parts. This operation is represented in fig. 5. The parts to be cut away are marked by the transverse lines *b a a a*, *c b a a a d*, below the knots of the original net. It will be observed that, whereas at *a a a c*, *a a a d*, two sides of the meshes are cut,

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[1] Beckmann's History of Inventions, art. *Netting.* See also Adams's Roman Antiquities, " Retiarius."

[2] See the Transactions of the Entomological Society of London, vol. ii.

one only is removed at *b b*. In performing this manœuvre the workman must be careful to have his net hung before him in its proper position, viz. in the order in which the rows were netted, as in fig. 5. This requires attention, because, if either of the sides *c* or *d* were uppermost, the mischief would be increased when he came to cut away according to the above instructions. The next thing to be done is to unpick the knots of the old meshes, *a, a, a, a, a, a*; but the lateral knots *e, d*, must *not* be unpicked, for that would destroy the adjoining sound meshes; for the same reason, only *one* side of the meshes *b, b* is cut. We must suppose, then, that the meshes represented by the dotted lines are entirely removed; the next thing to be done is to replace them. It is evident that this cannot be properly accomplished unless the inserted meshes resemble as accurately as possible those that have been removed. A practised hand will effect this without a spool, but some skilful workmen think that it is infinitely less troublesome, and that the required regularity of the meshes is better insured, if a spool be used suitable to the meshes of the old net. Having filled a *small* needle with twine, make fast the end above the knot at K (fig. 5), hold the spool and needle in the usual way, and take up the loops L, M, N, as in common netting; when at N, lay aside the spool, and make the side NO. This is done by means of the *bend-knot*, the angle P being the *bend* or loop of the knot. The second row is now to be netted in the same way as the first, and so on with the rest, the single side at the end of each row being managed as at NO, and leading down to the row beneath. We have supposed the workman to have begun and ended this first row, netting from left to right; to work back the second row, he has simply to get on the other side of his net, or to turn the latter over, as may be most convenient, and thus to net on as usual from left to right, changing at the end of each row either the position of his net or of his own person. We shall next suppose that the required number of rows, save one, is completed; we must insert a *junction* row between the row QRST, and that of the old net VWXY. This is done without a spool, by making the side TV fast at V with a *bend-knot* round the loop of the *old* net at V; then the side VS with a *bend-knot* at S, round the loop of the *new* piece at S; then the sides SW, WR, RX, XQ, QY, in the same manner. Care must be taken that these sides be of the same length as the sides of the other meshes. At the beginning K and the end Y of your work, leave ends *e e*, to prevent the knot slipping. In fig. 5 three rows have been removed, and it will be seen that those loops which have only *one* side removed, are diagonally opposite to each other, and thus it is when an *uneven* number of rows is to be cut away; but when an *even* number is removed, those loops of which only one side is cut are at opposite angles of the orifice, but on the same side of the square. 6. *Oblong and square netting.* If it be required to have the net with meshes setting in squares with their sides, accurately at right angles with each other, like the squares in a sash-window-frame, the following method is to be pursued. Net one loop for the first row, draw the spool out and net two loops for the second row, the additional loop being obtained by taking up that one loop which formed your first row twice, or, as it is technically termed, *by setting in a false mesh.* Your second row will thus consist of two loops. Remove the spool, begin the third row, which is to consist of three loops, the additional one being gained as before. Continue thus adding a loop at the *end* of each row until you have made your half square as large as you require; the two *selvages* on each side of your netting forming two sides of your square; then, before you begin to form the other two sides of your square, net one row of *dead* netting, *i. e.* do not increase or diminish anywhere; but at the *end* of the following rows set in a *stole* mesh, *i. e.* take up the two last loops of the row together. Your net will at last be reduced to one loop again, and will, when stretched out, form a complete square, and all the meshes will stand square with each other. But, supposing you want your net to be longer than it is wide, and yet the meshes composing it to be square, as in the other, you are to proceed as follows: Form half a square as before, the length of one side of which will determine the width of the oblong to be made. When this is done, you must set in a *false mesh* at the *end* of one row, and a *stole* mesh at the *end* of the other row. Continue thus adding and diminishing *alternately*, until your oblong is of the required length, and this is ascertained by measuring the long side of the netting from *a* to *b* (fig. 6), from the corner at *a* to the last knot at *b*. Finish off so as to net the part expressed by dotted lines in fig. 6, as you did in the case of the square net, viz. by taking two loops up at once at the *end of each* row. In the *oblong* you need not net a row of plain loops before you begin to finish off, as was done in the *square net.* Oblong and square nets, when worked as now directed, will, when finished, appear in the shape of a lozenge, and so will all the meshes of which they are composed; but when stretched out with the sides at right angles, each to the other, the whole net will assume its proper shape. It adds to the finished appearance of the net, if, in making the last single loop of the net, the spool be withdrawn before the knot is *taught*, and *then* draw the twine up; the last loop is thus, as it were, *absorbed*, instead of remaining there to spoil the neatness of the work. The single loop, too, with which the net was begun, may have its knot sufficiently loosened to enable the workman to tighten up the loop and make it *vanish*, as he did at the other end. A little practice will demonstrate this clearly.

Many net-makers consider it a great saving both of time and twine to make their *hay*-nets, and the like, after this manner; besides which, the *selvage* thus formed along each side of the net affords sufficient strength without any additional cord to border it. 7. *How to net a round or cylindrical net without having to join.* Net any given number of loops, and, when you come to the end of the row, instead of turning the net over to net a second, keep the spool in the last loop, and with the needle pick up the *first* loop of the row just finished, and net into it in the usual manner; thus the row will be united. Continue to take up each loop on your right hand in succession, as in ordinary netting, and thus go on netting round and round until you have obtained the required length. The rows will resemble the turns of a spiral spring descending from the top to the bottom. 8. *How to make a bag-net from a square.* Net a piece of *dead netting* containing any given number of loops in the row, observing always an *odd* number, as 3, 5, 7, 9, 11, according to the proposed size of the bag; net double the number of rows that there are loops in the row save one, as 5, 9, 13, 17, 21. This done, draw the foundation string, viz. the string on which you netted the *lever*, and fix it in the middle of your square, then net round and round it. The corner loops must be carefully worked for the first few rounds, to make them set even. It is always in the workman's power to increase the circumference of his bag as he proceeds from the bottom to the mouth, by setting in *false meshes*. In doing this, however, he must observe regularity, and take care to insert his *quarterings* at equal distances, else the net will be lop-sided, and distorted. 9. *Of joining two nets together.* Apply one net on the other, supposing each to contain the same number of meshes in the rows to be united, and that the meshes are of the same size; then, with a spool a full quarter less in size than that on which the nets were *breaded*, net one row along the margins to be joined, taking up two loops on the needle, *i. e.* one mesh of each net together; or, if the object be to join the first with the last row of the same net, the two rows must be accurately placed one upon the other, by folding the net over on itself; then proceed as before. Sea-nets, such as those for herrings and mackerel, which are made in *rands* or breadths, are joined rand to rand lengthways, or along the *selvages*. The former are composed of three breadths. each thirty-two yards long by fifty loops deep, on a spool three inches in circumference. At the close of each year the lowest rand, which goes deepest into the sea, is removed, and a new one joined on at the top of the net; so that the rand which was uppermost now becomes second, and that which was second is now the lowest. This latter is removed at the end of the next season, when the same rule is observed in replacing it, and so on every year; thus the whole of the original net is renewed every three years. This operation is called by net-makers, giving the net a *new jacket*. Another mode of joining, and when performed carefully it is the neatest, is by uniting the two nets, or the two margins of one net, in the same way as the last row of the new piece is joined to the meshes of the old net in *mending*. The first-made side of the *inserted* or *joining work* must be twice as long as the rest, as also the last side of the suture; for they, in fact, are equivalent to *two* sides of a mesh. The following description of specific nets will serve to furnish examples of the foregoing rules, and of the mode of *mounting* nets, which yet remains to be noticed.

The casting-net (fig. 7) is netted round and round (see No. 7 in this article); the number of the loops for the *lever* vary, as well as their size, according as it is intended for *gudgeons*, &c. or *minnows;* in either case, it would be a great loss of labour if the whole net were made on one spool so small as it is necessary the lower part of this engine should be. Spools therefore of different circumferences are used, diminishing gradually from the largest for the top, to the smallest for the *tuck*. The following will form a good sized net for *gudgeons* and larger fish. Fill the needle with double twine, net four rounds with a spool two inches and a half circumference, on a *lever* of thirty-six loops; then use single twine, and in the fifth row set in twelve *false meshes;* net two rounds dead netting, and then set in *false meshes* in the same line with the others, having taken care to set in the *quarterings* of the fifth row so as to divide the circle into equal parts. Net two feet down on the first spool, then one foot down on each of seven other spools, each spool being an eighth of an inch less than the preceding one. Continue to set in *quarterings* in their proper places, and at the commencement of the *eighth foot* set in four additional *false meshes* equidistantly between the *original quarterings*, and continue putting in the *accrues* until you have netted a foot and a half more, having taken to your *eighth spool* at the beginning of the *ninth foot;* then net four rows *dead* netting in *double* twine; take your *ninth spool*, and net two feet six inches of *dead* netting for the *tuck*, the last two rounds in *double* twine. Have a stout line with leaden bullets threaded on it, and sew this line, with running stitches, through each mesh, along the lowest row of the net, the interval between each *lead* being two inches. This weighted margin is then turned upwards and inwards, and made fast to the *double twine-work above the tuck*, at about every foot of the circumference, by means of ratlines three inches long. The *lead-line* should be about a foot less in length than the row of the *tuck* to which it is sewn. The leads are made fast to the line by being tied at each end to prevent slipping, and the holes should be bored as near the size of the line as possible. In fig. 7, the lines *a, a, a*, show the seams formed by the *accrues* running down the net; *d, d, d, d*, are the *ratlines* by which the tuck is suspended from the rows of *double* meshes, marked by dots; *bc, bc*, indicate the *tuck* which forms a series of pockets, or rather one continuous pocket, inside the net, into which the fish fall. Fig. 7* shows a portion of the *lead line l, l*, sewn on to the last row of the *tuck;* L is the bullet; *s, s, s, s, s, s, s*, the course of the twine, simply run through the meshes and round the lead-line; *t, t*, the *tie* which holds the mesh on each side the bullet L fast; *v, v, v*, the twine which sews the line to the meshes, passing over the bullet, being threaded through the loops which extend along the length of the bullet. The *trammel* consists of three separate layers of nettings, and derives its name from its conformation (*trois mailles*, French), because it ensnares by *threefold meshes*. The three parts consist of two *out-wallings* and the *lint;* this latter is suspended loosely between the two former, it being made twice their length and twice their depth. The two *out-wallings* are to be of the same size.

The length and depth of this engine varies according to the service it is intended to perform, either in fishing or fowling; the same may be said of the size of the meshes; those of the *out-wallings*, however, are generally five times larger from knot to knot than those of the *lint*. All the parts should be netted *four square* (as *oblong* and *square* netting is sometimes called, see No. 6 in this article), the *lint* in twine as fine as may be consistent with the required strength, and the *out-wallings* with much stouter material in proportion. These, when finished, are to be *mounted.* Fix each of the four corners of one *out-walling* to four pegs driven into the ground, which should be cleared of rubbish, &c. The *out-walling* is to be stretched tight. Pass all round the *lint*, through each mesh, a stout line of twine, as thick as that of which the *out-wallings* are made. This line, and likewise the *lint* at its four corners, is made fast to the four pegs; the former is drawn tight from peg to peg, but the latter, being longer and wider, hangs loosely. The meshes of the *lint* should be as equally distributed along the line as is possible. Over the *lint* is applied the other *out walling*, the four corners of which are to be fastened to the four pegs. If the engine is intended for fishing, a stout cord must be threaded with round flat corks two inches diameter, and half an inch thick, more or less. This cord is to be fixed along the *head* of the net by means of pieces of twine whipped two or three times round, and embracing the line of the *lint*, the margins of each *out-walling*, and the *cord* itself. The twine is tied into a firm knot at those points where the cord meets the angles of the *out-walling's* meshes. The floats are placed about six inches apart, and are pierced, so as to embrace the *head-rope* firmly. This last is made fast down *each side* of the net, at the angles of the meshes of the *out-wallings;* but it has here no floats; it is extended along the bottom of the net, where it is called the *foot-rope*, and is weighted with small plates of lead rolled and beaten round it with a hammer, as a tag is fixed round a boot-lace, at about every three inches. The cord that thus surrounds the net must be bent into a loop at each end of the top of the net, for to these is to be made fast a *draw-rope* when the net is *shot*. Some net-makers also tie the three layers of net together at each angle of the meshes of the *out-wallings* throughout the area of the net, to give additional strength, and to prevent the *lint* getting *huddled* together at the bottom when suspended in the water or drawn along the ground. This engine acts thus: The fish or fowl passes through the large mesh of the out-walling, strikes against the *lint*, which, hanging loosely, yields, and protrudes through the corresponding mesh of the other *out-walling*, and thus forms a *cæcum*, into which the animal falls, and is entangled. The *hoop-net* consists of two parts; the *body*, and the *valve, funnel*, or *gullet*, which are united in the manner hereafter to be described. Begin with the *body* at its lower or pointed end (see fig. 8), and work up to its entrance, thus: Net thirty-seven loops round on a spool four inches circumference, one row. Take a spool two inches circumference and net twenty rows of *dead* netting. In the next row set in five *false meshes* equidistantly, then twenty rows of *dead* netting, then a row with five *false meshes;* repeat this manœuvre; then net thirty-six rows of *dead* netting, and the next row in *double* twine; thus you have an upper and a lower row, as shown in fig. 5, the dotted lines representing the lower row. Cut off the thread which has worked the *upper* row, leaving an end; empty your needle, and wind on it the thread that proceeds from the *lower* row, and work on with the single twine as follows, taking care, however, to pick up only the loops of the *lower* row as you go round. Net on the same spool fourteen rows of *dead* netting, then at equal distances in the circumference of the fifteenth row set in eight *stole* meshes, then net two rows of *dead* netting, in the next row eight stole meshes in a line with the others; repeat this action three times more. After you have for the fifth time set in your *stole* meshes, net a row of plain netting; lay aside the two-inch spool, and take a twelve-inch and net one row. The *valve* is now finished, and must be reflected inwards to gain its right position. You now take your needle, charged with single twine, and join on to that end which was left at the upper row where the valve issued from the *body* of the engine; with the two-inch spool net eleven rows of dead netting. In the next row set in five *false meshes* at equal distances each from the other, and continue to set in these at every third row eleven times in the same line. This done, make seven rows of *dead* netting, then one row on a four-inch spool in *double* twine. Through this last row a pliant stick is passed, about six feet long, and bent into a *bow* (BBB, fig. 8); a piece of cord keeps the extremities in place, answering to the string of the archer's bow; the lower meshes of the net's mouth are strung on this cord, see fig. 8. A weight is generally attached to the *bow* at its extremities, somewhere towards BB. Four hoops are lashed round the net at HHHH, to prevent its collapsing; these are larger as they proceed from the point to the mouth, and are made of slighter wood than the bow, the smallest being about one foot three inches diameter, and the largest two feet.

Some *hoop-nets* have more than one *valve.* In that case the hoops must always be placed at the entrance of the *valves,* and many netters make a row of *double* twine at those parts, to give additional strength where there is most strain on the netting. The large loops at the bottom of the *funnel* are tied together, in *fasces* of equal number of loops, to four lines, and these are made fast to another line which is threaded through the last row of meshes belonging to the point of the *body,* and which, being drawn tight, closes up the entrance at that part. All the lines are then tied to a support at P, and thus the net is kept extended. The principle of this engine is analogous to that of the common mouse-trap. When there is only one valve (as in fig. 8, V), the fisherman withdraws the fish by loosing the line that closes the body of the engine at P; but when there are more than one valve, he makes a *regard* in the *body* between each hoop. A *regard* is thus made: Net round and round, and when arrived at the part wherein you wish to put a *regard, return on your work;* and when you again come to the place where you altered your mode of netting, return again; and thus continue until you have made the *regard* of sufficient length, then work round and round as before.

A *tunnel* for partridges is made like the hoop-net, but without valves.

The *trawl* is a very large and rapacious net, and much discussion has been held as to whether it should be permitted. It would seem, however, upon a careful examination of evidence, that, under proper restrictions, it is not detrimental to the fisheries. This engine is composed of two separate pieces, called the *upper* and the *lower leaf;* the meshes are about two inches square. For the *under leaf* or *blade,* net 160 loops in *double* twine, two rows, then with single twine net a plain row; in the next, set in a *stole* mesh at about the sixth mesh from the beginning, and another at about the sixth mesh from the end of the row; net three rows of *dead* netting, then set in *stole* meshes as before; repeat this once again, afterwards go on setting in *stole meshes* less frequently, *i. e.* leave five rows of dead netting between, until the width of the *blade* is reduced to thirty-six meshes, then net about five feet for the *hose* or *tail* H, fig. 9. The *wings* are now to be set on to this *leaf.* For this purpose you must begin working at the other extremity, or top of the *leaf,* as at T or *t;* net fifty-six loops and stop; return on your work; net again to the end of your row (the third), and here, quite at the extremity, set in a *false* mesh; but when, in the course of netting row after row, you come to the *false* meshes, do *not* take them up, but let them *hang,* as is shown in fig. 9 at B and B of the *wings* W and W. At the *commencement* of every row which alternates with those to which you add a *false* mesh, at about three loops from the beginning, set in a *stole* mesh; thus the *false* meshes will always be on one side, and the *stole* meshes on the other side of the *wing,* which will thus be diminished at last to eighteen meshes. When this is effected, net two rows in *double* twine, not adding or diminishing. Thus one *wing* is done; net the other in the same way, and take care that the one is exactly the same as the other. The *under* leaf being now finished, we pass on to the structure of the *upper blade,* fig. 10. Net 180 *loops* in *double* twine, two rows; then with single twine forty rows of *dead* netting; diminish evenly and gradually from 180 to 160 meshes, taking notice that this reduction must be made before you come to a level with the *double* rows whence the *wings* rose in the other *blade.* Diminish from 160 to thirty-six, as you did when working down the *lower leaf,* making the *hose* as before. The *blades* being now finished, must be joined together down their sides, as the sides of a sack are; and a rope, acting as a binding along the seams, is sewn on, in the same way as the *head-rope* of the *trammel.* Round the top of the *upper blade* a rope is strung through the meshes, and carried round the *bosom* BBB, fig. 9, being sewn to, and not threaded through, the *hanging false loops* of the *wings* W, W. The two blades are then sewn together at certain parts to form *pockets,* in the direction of A, A, A, A, A, A; *oooooo,* being the orifice of the pockets. At L, L, loops of rope are bent, to which lines are hitched for hauling the net out of the sea into the boat. The two *blades* or *leaves* must be *exactly* of the same length; for, when joined, the top row of the *wings* must be even with the top row of the back of the net or *upper blade,* and the *hose* should meet no less accurately at the bottom. When the *trawl* is in the sea, a long beam of about thirty feet in length and seven inches in circumference is lashed to the top of the net, keeping the *wings* and back extended from point to point. This beam is let into irons, called *trawl-heads,* at each extremity, which serve to sink it. A heavy rope, usually made of old netting, tightly twisted and bound round with strong twine, is lashed along the bosom of the net. Thus *mounted,* the engine is lowered into the sea, being *trailed* or *trawled* along the bottom by means of a rope attached to the boat's mast, and communicating with each end of the *beam* by a *bridle.* The *bosom* touches the ground, and the *upper blade* and *beam* floats over it; the *bosom's* rope disturbs the fish at the bottom; they are, however, stopped from escaping, by striking against the *upper blade,* which extends over the *bosom,* so they swim down the *trawl* to the *hose;* but this is tied up, so they next attempt to return towards the mouth of the net; but in their way they fall into the pockets, which only open inwards towards the *hose,* and thus are secured. *A day-net* is used for catching larks from 14th September to 14th November; after that, until 25th February, the *trammel.* The reason of this is, that during the latter division of the season the weather usually is cloudy, and the *doring-glass* of the *day*-net cannot act. The structure of this net is very simple, and is represented in fig. 11. The thread should be very fine, as also that used for the *trammels;* the meshes three quarters of an inch from knot to knot; two pieces of *oblong* netting, measuring three fathoms by one, are extended to their full width, by being lashed to light staves of the required length, one at each end (see fig. 11, A, A). These two leaves are to be laid on the ground exactly opposite each other, so accurately, that when they are drawn over, the two margins *m, m* shall touch each other. Each leaf is to be staked down with pegs at the lower corners, at G, G, G, G. A line B*g* and B*g* is to be stretched from the top of the stakes B, B, and fastened firmly to the ground by the pegs *g, g*. Another line is to be stretched from the head of the stakes *b* and *b*, in the direction of *b*C, *b*C, and fixed to the ground by a peg C and C. Another line F and F is to proceed from the head of each stake *b, b*, and is to be joined at H to the *main line*, which draws the leaves over; F, F should each be at least a fathom long. In the centre D is to be placed the doring-glass, whence proceeds a line E. The fowler retires to his ambuscade, and with his left hand he plays the doring-glass with the line E, and holds the *main line* H in his right; when the birds are seen playing around the glass, and within reach of the net, he pulls the leaves over with a quick jerk, and thus secures them. The *doring-glass* is thus made: Take a piece of wood (AC, fig. 12) nine inches long and one and a half thick, cut out in the shape of an arch, and the edges at the top bevelled off so as to make it a six-sided figure. This bow is to be painted red, and covered with pieces of looking-glass along the sides and at each end; a wooden peg B, six inches long and three fourths of an inch in circumference, a little pointed at the end, with a hole at I, through which the line E (fig. 11) is threaded, must be fixed to the under surface of the arch, at the centre. Take another piece of wood six inches thick and one foot long (fig. 13), sharpened at the end in order to fix it in the ground; cut out a mortise in it two inches high, and one inch and three fourths deep; bore a hole at N and O, large enough to receive the peg B (fig. 12). This device is made to act by winding up the string round the peg several turns, and then pulling it; then letting it wind itself up again, and then jerking it again; thus making the glass revolve briskly, as children do their toy windmills.

The object we have had in view is that of embodying, in plain and simple language, a few practical hints on the subject of net-making, so that they may be conveniently consulted by all classes requiring that kind of information. The various engines described may be modified, altered, and combined, as occasion requires. It would be endless to enter into these minutiæ, or to give a catalogue of the different nets used, with the technical name for each in different parts of the kingdom. We shall therefore conclude with a few *general observations.* 1. In all cases use twine as fine as circumstances will permit, and make your meshes as large as is consistent with the object in view; for the nets will be thereby more easily dried, lighter, and more efficient. 2. In filling your needle *double*, draw the twine from separate balls. 3. Take great care to dry your nets thoroughly, and hang them up away from walls, where rats and mice cannot get at them. 4. Mend them immediately. 5. Keep them well tanned, or immersed in Kyan's Patent as often as may be necessary; but never use tar and oil. This mixture has been proved to be inefficient as a preservative, and to be so offensive to the fish as to drive many away from the nets thus prepared, and to impart an unpleasant flavour to those that are caught in them. 6. If you wish to *dye* your nets green, russet, yellow, &c. for fowling or other purposes, send them to the nearest dyer or tanner, as the cheapest and best mode of treatment. (B. K.)

RETICULUM is a Latin word, signifying a *little net* or *casting net.* It was applied by the Romans to a particular mode of constructing their buildings. In the city of Salino may still be seen remains of some walls, evidently of Roman origin, from the *reticulum.* This structure consists of small pieces of baked earth, cut lozenge-wise, and disposed with great regularity on the angles, so as to exhibit to the eye the appearance of cut diamonds; and it was called *reticular*, from its resemblance to fishing-nets. The Romans always concealed it under a regular coating of other matter; and Mr Houel informs us, that this was the only specimen of it which he saw in his travels through Sicily, Malta, and the Lapari Islands. It appears to be the remains of some baths, which had been built for the convenience of sea-bathing.

RETIRADE, in *Fortification*, a kind of retrenchment made in the body of a bastion or other work, which is to be disputed, inch by inch, after the defences are dismantled. It usually consists of two faces, which form a re-entering angle. When a breach is made in a bastion, the enemy may also make retirade or new fortification behind it.

RETIREMENT means a private way of life, or a secret habitation. "Few," says an elegant writer, "are able to bear solitude; and though retirement is the ostensible object of the greater part, yet, when they are enabled by success to retire, they feel themselves unhappy. Peculiar powers and elegance of mind are necessary to enable us to draw all our resources from ourselves. In a remote and solitary village the mind must be internally active in a great degree, or it will be miserable for want of employment. But in great and populous cities, even while it is passive, it will be constantly amused. It is impossible to walk the streets without finding the attention powerfully solicited on every side. No exertion is necessary. Objects pour themselves into the senses, and it would be difficult to prevent their admittance. But, in retirement, there must be a spirit of philosophy and a store of learning, or else the fancied scenes of bliss will vanish like the colours of the rainbow. Poor Cowley might be said to be melancholy mad. He languished for solitude, and wished to hide himself in the wilds of America. But he was not able to support the solitude of a country village within a few miles of the metropolis. With a virtuous and cheerful family, with a few faithful and good-humoured friends, with a well-selected collection of elegant books, and with a competency, one may enjoy comforts even in the deserted village, which the city, with all its diversions, cannot supply."

RETORT, in *Chemistry*, an oblong or globular vessel of glass or porcelain, with its neck bent, proper for distillation.

RETPOORAH, a town of Hindustan, in the nizam's territories, province of Berar. It is seventeen miles south-east from Ellichpoor. Long. 78. 21. E. Lat. 21. 19. N.

RETRACTS, amongst horsemen, pricks in a horse's feet, arising from the fault of the farrier in driving nails that are weak, or in driving them ill pointed or otherwise amiss.

RETROMINGENTS, in *Natural History*, a class or division of animals, whose characteristic is, that they stale or make water backwards, both male and female.

RETZ, Cardinal de. See Gondi.

REUS-PLAUEN, two sovereign principalities in Germany, one belonging to the elder and one to the younger branch of that family. The dominions of the elder branch are divided into two portions, of which the northernmost, called the Lordship of Gera, is surrounded by the Prussian province of Saxony, by the duchies of Saxe-Gotha and of Weimar; and the southernmost by Prussia, Weimar, the kingdom of Saxony, Bavaria, and Saxe-Cobourg. It extends over 612 square miles, and contains the capital, Gera, and ten other cities and towns, with 79,370 inhabitants, all of

Reutlingen || Reversion.

whom are Protestants, except about 200 Jews. It is an agricultural district, and the character of its soil and productions resembles that of the other parts of Saxony. The dominions of the younger branch consist of several detached lordships, extending over 472 square miles, and contain 52,205 inhabitants, all adhering to the Lutheran profession. The income of these states amounts together to L.54,000. The soil and productions of both are similar. The military contingent required by the German confederation for both the states is 742 men.

REUTLINGEN, a city of the kingdom of Wirtemberg, in the province of the Black Forest, the capital of the bailiwick of the same name. It is situated on the river Echaz, and is surrounded with walls and ditches. It contains four Lutheran churches, one of which, that of Maria, is remarkable for its tower, 340 feet in height. It contains 1250 houses, mostly built in the style of the middle ages, and the inhabitants amount to 9200. It is celebrated for its leather manufactories; and paper, cutlery, hardware, and many smaller articles, are produced. In the vicinity good wine is made. Long. 9. 3. 15. E. Lat. 48. 29. 15. N.

REVE, Reeve, or *Greve*, the bailiff of a franchise or manor, and so called, especially in the west of England. Hence shire-reeve, sheriff, port-greve, and the like.

REVEILLE, a beat of drum about break of day, to give notice that it is time for the soldiers to rise, and that the sentries are to forbear challenging.

REVELATION, the act of revealing, or making a thing public that was before unknown; it is also used to signify the discoveries made by God to his prophets, and by them to the world; and more particularly includes the books of the Old and New Testament. See Theology.

REVELS, entertainments of dancing, masking, acting comedies, farces, and the like, anciently very frequent in the inns of court and in noblemen's houses, but now much disused. The officer who had the direction of the revels at court was called the *Master of the Revels.*

REVENGE means the return of injury for injury, and differs materially from that sudden resentment which rises in the mind immediately on being injured; which, so far from being culpable when restrained within due bounds, is absolutely necessary for self-preservation. Revenge, on the contrary, is a cool and deliberate wickedness, and is often executed years after the offence had been given; and the desire of it is generally the effect of littleness, weakness, and vice, whilst to do right, and to suffer wrong, is a mark of a great soul, that scorns to stoop to suggested revenge.

REVENUE. See the articles England, Funding System, Political Economy, and Taxation.

REVERBERATION, in *Physics*, the act of a body repelling or reflecting another after its impinging thereon.

Reverberation, in *Chemistry*, denotes a kind of circulation of the flame by means of a reverberatory furnace.

REVEREND, a title of respect given to ecclesiastics. The religious abroad are called reverend fathers, and abbesses, prioresses, and others reverend mothers. In England, bishops are right reverend, and archbishops most reverend. In France, before the Revolution, the bishops, archbishops, and abbots, were all alike most reverend. In Scotland, the clergy individually are reverend, a synod is very reverend, and the general assembly is venerable.

REVERIE, the same with delirium, raving, or distraction. It is used also for any ridiculous, extravagant imagination, action, or proposition; a chimera, or vision. But the most ordinary use of the word amongst English writers is for a deep disorderly musing or meditation.

REVERSION, in the law of England, has two significations; the one of which is, an estate left, which continues during a particular state in being; and the other is the returning of the land, after the particular estate is ended; and it is further said to be an interest in lands, when the possession of it fails, or where the estate, which was for a time parted with, returns to the granters or their heirs. But, according to the usual definition of a reversion, it is the residue of an estate left in the granter, after a particular estate granted away ceases, continuing in the granter of such an estate.

Revivification || Revolution.

The difference between a remainder and a reversion consists in this, that the remainder may belong to any man except the granter; whereas the reversion returns to him who conveyed the lands.

Reversion, in annuities. See Annuities.

REVIVIFICATION, in *Chemistry*, a term generally applied to the distillation of quicksilver from cinnabar.

Revivification, in *Physiology*, the recalling to life of animals apparently dead. There are many kinds of insects which may be revivified, after all the powers of animation have been suspended for a considerable time. Common flies, small beetles, spiders, moths, bugs, &c. after being drowned in spirit of wine, and continuing apparently dead for upwards of fifteen minutes, have been restored to life merely by being thrown amongst wood-ashes slightly warm.

Whilst Dr Franklin was in France, he received a quantity of Madeira wine from America, which had been bottled in Virginia. He found a few dead flies in some of the bottles, which he exposed to the sun in the month of July; and in less than three hours these seemingly dead animals recovered life which had been so long suspended. At first they appeared as if convulsed; they then raised themselves on their legs, washed their eyes with their fore feet, dressed their wings with those behind, and in a short time began to fly about.

But the most remarkable instance of revivification we have heard of is the following. In the warmer parts of France there is an insect very pernicious to the rye, apparently beginning its operations at the foot of the plant, and gradually proceeding towards the ear. If the plant be thoroughly dried whilst the insect is in the root or stem, the animal is irrecoverably killed; but after it has reached the grain, the case is very different. There have been instances of these insects being brought to life in fifteen minutes, by a little warm water, after the grains in which they were lodged had been kept dry for thirty years.

What is the metaphysician to think of these phenomena, or what conclusion is he to draw from them respecting the mind? If he be a sober man he will draw no conclusion, and for this reason, that he knows nothing of the sentient principle of insects, or of any animal but man. He is conscious that it is the same individual being that, in himself, thinks, and wills, and feels; he knows that part of his thought is not in one place, and part of it in another; and therefore he concludes that this thinking being is not matter, whilst experience teaches him that it quits the material system when that becomes unfit to discharge its functions, and cannot be recalled. Experience teaches him, on the other hand, that the sentient principle of these insects does not quit the system when unfit for its functions; and hence he ought to infer, that the minds of men and of insects are very different, and that the bond which unites the material and immaterial parts of an insect is certainly different from that which unites the mind and body of man. This is the only inference which can be fairly drawn from these phenomena.

REVIEW, a term applied to literary journals, which give a periodical view of the state of literature.

REVOLUTION, in politics, signifies a change in the constitution of a state, and is a word of different import from revolt, with which it is sometimes confounded. When a people withdraw their obedience from their governors for any particular reason, without overturning the government, or waging an offensive war against it, they are in a state of revolt; when they overturn the government, and form a new one for themselves, they effect a revolution. That which is termed the revolution in Britain is the change which, in 1688, took place in consequence of the forced abdication of James II. when the Protestant succession was established, and the constitution restored to its primitive purity.

Revolution, in *Geometry*, the motion of rotation of a line about a fixed point or centre, or of any figure about a fixed axis, or upon any line or surface. Thus, the revolution of a given line about a fixed centre generates a circle; and that of a right-angled triangle about one side, as an axis, generates a cone; and that of a semicircle about its diameter generates a sphere or globe.

Revolution, in *Astronomy*, is the period of a star, planet, or comet, or its course from any point of its orbit, till it return to the same again.

REWAH, a town of Hindustan, in the province of Gundwana, district of Boghela. The suburbs are large. Under the fort runs the Bichanaddy, which has its source twenty miles to the east. It contains a good citadel, built of stone, and the country in the vicinity is well cultivated. Long. 81. 25. E. Lat. 24. 27. N.

REWARY, a town of Hindustan, province of Delhi, forty miles south-west from the city of Delhi. It is possessed by a native chief, one of the numerous British tributaries. Long. 76. 42. E. Lat. 28. 13. N.

REYNEAU, Charles Rene, commonly known by the name of Father Reyneau, a celebrated mathematician of France, was born in the year 1656, at Brissac, in the province of Anjou. When twenty years of age, he connected himself with the Oratorians, a sort of religious order, the members of which lived in community without binding themselves to the observance of any vows, and turned their chief attention to the instruction of youth. He afterwards taught philosophy at Pezenos, and next at Toulon, which requiring some degree of geometrical knowledge, he became extremely fond of that science, and cultivated and improved it to a great extent. He was, in consequence of his knowledge, invited to fill the mathematical chair at Angers in 1683, and he was also elected a member of the academy in 1694.

He undertook to reduce into a body, for the benefit of his pupils, the chief theories which were scattered throughout the works of Newton, Descartes, Leibnitz, Bernoulli, the Leipsic Acts, the Memoirs of the Academy of Paris, and several other works, to which he gave the name of *Analyse Demontrée*, or Analysis Demonstrated, and which was published in 1708, in two vols. quarto.

He gave to this work the name of Analysis Demonstrated, because he therein demonstrates various methods which had not been demonstrated by their authors, or, at least, not with sufficient accuracy and perspicuity. This work of Reyneau was very much applauded, and it became a general maxim in France, that to follow him was the best, if not the only way, to make any extraordinary progress in the study of mathematics.

Such was his ambition to be useful, that in 1714 he published his *Science du Calcul des Grandeurs*, intended for the benefit of such as were wholly unacquainted with the science of geometry. Of this work a very able judge was pleased to observe, that "though several books had already appeared upon the same subject, such a treatise as that before him was still wanting, as in it everything was handled in a manner sufficiently extensive, and at the same time with all possible exactness and perspicuity." Although many branches of the mathematics had been well discussed prior to his time, no good elements were to be met with, even of practical geometry.

When the Royal Academy of Sciences at Paris gave admission to other learned and eminent men, Father Reyneau was received into the number. The works already mentioned are all he ever published, or perhaps ever composed, with the exception of a little piece upon logic; and materials for a second volume of his *Science du Calcul* were left behind him in manuscript. Towards the close of life he was too much afflicted with sickness to give much application to study; and he died in 1728, at seventy-two years of age. His many virtues and extensive erudition made this event much regretted by all who had the pleasure of being acquainted with him. It was regarded as an honour and a happiness by the first men in France to number him amongst their friends, such as the chancellor of the kingdom, and Malebranche, of the latter of whom Reyneau was a faithful and zealous disciple.

REYNOLDS, Sir Joshua, the celebrated painter, was born at Plympton, a small town in Devonshire, on the 16th July 1723. His father was minister of the parish, and also master of the grammar school; and being a man of learning and philanthropy, he was beloved and respected by all to whom he was known. Such a man, it will naturally be supposed, was assiduous in the cultivation of the minds of his children, amongst whom his son Joshua shone conspicuous, by displaying at a very early period a superiority of genius and the rudiments of a correct taste. Unlike other boys, who generally content themselves with giving a literal explanation of their author, regardless of his beauties or his faults, young Reynolds attended to both these, displaying a happy knowledge of what he read, and entering with ardour into the spirit of his author. He discovered likewise talents for composition, and a natural propensity for drawing, in which his friends and intimates thought him qualified to excel. Emulation was a distinguishing feature in his mind, which his father perceived with the delight natural to a parent; and designing him for the church, in which he hoped that his talents might raise him to eminence, he sent him to one of the universities.

Soon after this period he grew passionately fond of painting; and, by the perusal of Richardson's theory of that art, was determined to make it his profession through life. At his own earnest request, therefore, he was removed to London; and about the year 1742 became a pupil to Mr Hudson, who, though not himself an eminent painter, was preceptor to several who afterwards excelled in the art. One of the first advices which he gave to Mr Reynolds was to copy carefully Guercino's drawings. This was done with such skill, that many of the copies are said to be now preserved in the cabinets of the curious as the originals of that very great master.

About the year 1749, Mr Reynolds went to Italy under the auspices and in the company of Lord, then Commodore, Keppel, who was appointed to the command of the British squadron in the Mediterranean. In this garden of the world. this magical seat of the arts, he failed not to visit the schools of the great masters, to study the productions of different ages, and to contemplate with unwearied attention the various beauties which are characteristic of each. His labour here, as has been observed of another painter, was "the labour of love, not the task of the hireling;" and how much he profited by it is known to all Europe.

Having remained about two years in Italy, and studied the language as well as the arts of the country with great success, he returned to England, improved by travel and refined by education. On the road to London from the port where he landed, he accidentally found in the inn where he lodged Johnson's life of Savage; and was so taken with the charms of composition and the masterly delineation of character displayed in that performance, that, having begun to read it whilst leaning with his arm on the chimney-piece, he continued in that attitude insensible of pain till he was hardly able to raise his hand to his head. The admiration

Reynolds. of the work naturally led him to seek the acquaintance of its author, who continued one of his most sincere admirers and warmest friends till 1784, when they were separated by the stroke of death.

The first thing that distinguished him after his return to his native country, was a full-length portrait of Commodore Keppel; which in the polite circles was spoken of in terms of the highest encomium, and testified to what a degree of eminence he had arrived in his profession. This was followed by a portrait of Lord Edgecumbe, and a few others, which at once introduced him to the first business in portrait-painting; and that branch of the art he cultivated with such success as will for ever establish his fame with all descriptions of refined society. Having painted some of the first-rate beauties of the age, the polite world flocked to see the graces and the charms of his pencil; and he soon became the most fashionable painter, not only in England, but in all Europe. He has indeed preserved the resemblance of so many illustrious characters, that we feel the less regret for his having left behind him so few historical paintings; though what he has done in that way shows him to have been qualified to excel in both departments.[1] The only landscape, perhaps, which he ever painted, except those beautiful and chaste ones which compose the back grounds of many of his portraits, is a View on the Thames from Richmond, which in 1784 was exhibited by the Society for Promoting Painting and Design in Liverpool.

In 1764 Mr Reynolds had the merit of being the first promoter of that club which, having long existed without a name, became at last distinguished by the appellation of the *Literary Club*. Upon the foundation of the Royal Academy of Painting, Sculpture, and Architecture, he was appointed president; and his acknowledged excellence in his profession made the appointment acceptable to all the lovers of art. To add to the dignity of this new institution, his majesty conferred on the president the honour of knighthood; and Sir Joshua delivered his first discourse at the opening of the academy on the 2d of January 1769. The merit of that discourse has been universally admitted among painters; but it contains some directions respecting the proper mode of prosecuting their studies, to which every student of every art would do well to pay attention. "I would chiefly recommend," says he, "that an implicit obedience to the rules of art, as established by the practice of the great masters, should be exacted from the young students. That those models which have passed through the approbation of ages should be considered by them as perfect and infallible guides; as subjects for their imitation, not their criticism. I am confident, that this is the only efficacious method of making a progress in the arts; and that he who sets out with doubting, will find life finished before he becomes master of the rudiments. For it may be laid down as a maxim, that he who begins by presuming on his own sense, has ended his studies as soon as he has commenced them. Every opportunity, therefore, should be taken to discountenance that false and vulgar opinion, that rules are the fetters of genius. They are fetters only to men of no genius; as that armour which, upon the strong, becomes an ornament and a defence, upon the weak and mishapen turns into a load, and cripples the body which it was made to protect."

Each succeeding year, on the distribution of the prizes, Sir Joshua delivered to the students a discourse of equal merit with this: and perhaps we do not hazard too much when we say, that, from the whole collected, the lover of belles lettres and the fine arts will acquire juster notions of what is meant by taste in general, and better rules for acquiring a correct taste, than from multitudes of those volumes which have been professedly written on the subject.

In the autumn of 1785 he went to Brussels, where he expended about L.1000 on the purchase of paintings, which, having been taken from the different monasteries and religious houses in Flanders and Germany, were then exposed to sale by the command of the Emperor Joseph. Gainsborough and he had engaged to paint each other's portrait; and the canvass for both being actually stretched, Sir Joshua gave one sitting to his distinguished rival; but, to the regret of every admirer of the art, the unexpected death of the latter prevented all further progress.

In 1790 he was anxiously desirous to procure the vacant professorship of perspective in the academy for Mr Bononi, an Italian architect; but that artist not having been yet elected an associate, was of course no academician, and it became necessary to raise him to these situations, in order to qualify him for being a professor. Mr Gilpin being his competitor for the associateship, the numbers on the ballot proved equal, when the president by his casting vote decided the election in favour of his friend, who was thereby advanced so far towards the professorship. Soon after this, an academic seat being vacant, Sir Joshua exerted all his influence to obtain it for Mr Bononi; but finding himself outvoted by a majority of two to one, he quitted the chair with great dissatisfaction, and next day sent to the secretary of the academy a formal resignation of the office, which for twenty-one years he had filled with honour to himself and his country. His indignation, however, subsiding, he suffered himself to be prevailed upon to return to the chair, which within a year and a half he was again desirous to quit for a better reason.

Finding a disease of languor, occasioned by an enlargement of the liver, to which he had for some time been subject, increase upon him, and daily expecting the total loss of sight, he wrote a letter to the academy, intimating his intention to resign the office of president on account of bodily infirmities, which disabled him from executing the duties of it to his own satisfaction. The academicians received this intelligence with the respectful concern due to the talents and virtues of their president; and either then did enter, or designed to enter, into a resolution, honourable to all parties, namely, that a deputation from the whole body of the academy should wait upon him, and inform him of their wish, that the authority and privileges of the office of president might be his during his life; declaring their willingness to permit the performance of any of its duties which might be irksome to him by a deputy.

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[1] As the lovers of painting may wish to have a catalogue of this great master's historical pieces, we subjoin the following:—Hope nursing Love; Venus chastising Cupid for having learned to cast accounts; Count Ugolino in the Dungeon; the Calling of Samuel; Ariadne; a Captain of Banditti; Beggar Boy; a Lady in the character of St Agnes; Thais; Dionysius the Areopagite; an infant Jupiter; Master Crewe in the character of Henry VIII.; the Death of Dido; a Child asleep; Cupid sleeping; Covent Garden Cupid; Cupid in the Clouds; Cupids painting; Boy laughing; Master Herbert in the character of Bacchus; Hebe; Miss Meyer in the character of Hebe; Madona, a head; the Blackguard Mercury; a little Boy (Samuel) praying; an old Man reading; Love loosing the zone of Beauty; the Children in the Wood; Cleopatra dissolving the Pearl; Garrick in the character of Kitely; Garrick between Tragedy and Comedy; Mrs Abingdon in the character of Comedy; a Child surrounded by Guardian Angels; Miss Beauclerc in the character of Spenser's Una; Resignation; the Duchess of Manchester in the character of Diana; Lady Blake in the character of Juno; Mrs Sheridan in the character of St Cecilia; Edwin, from Beattie's Minstrel; the Nativity, Four Cardinal Virtues, and Faith, Hope, and Charity, for the window of New College Chapel, Oxford; the Studious Boy; a Bacchante; a daughter of Lord W. Gordon as an Angel; the Holy Family; the Cottagers, from Thomson; the Vestal; the Careful Shepherdess; a Gipsy telling Fortunes; the infant Hercules strangling the Serpent; the Mouse-trap Girl; Venus; Cornelia and her Children; the Bird; Melancholy; Mrs Siddons in Tragedy; Head of Lear; Mrs Talmash in the character of Miranda, with Prospero and Caliban; Robin Goodfellow; Death of Cardinal Beaufort; Macbeth, with the Caldron of the Witches.

From this period Sir Joshua never painted more. The last effort of his pencil was the portrait of Charles James Fox, which was executed in his best style, and shows that his fancy, his imagination, and his other great powers in the art which he professed, remained unabated to the end of his life. When the last touches were given to this picture,

The hand of Reynolds fell, to rise no more.

On Thursday the 23d of February 1792, the world was deprived of this amiable man and excellent artist, at the age of sixty-eight years; a man than whom no one, according to Johnson, had passed through life with more observation of men and manners. The following character of him is said to be the production of Mr Burke.

"His illness was long, but borne with a mild and cheerful fortitude, without the least mixture of anything irritable or querulous, agreeably to the placid and even tenor of his whole life. He had from the beginning of his malady a distinct view of his dissolution, which he contemplated with that entire composure which nothing but the innocence, integrity, and usefulness of his life, and an unaffected submission to the will of Providence, could bestow. In this situation he had every consolation from family tenderness, which his tenderness to his family had always merited.

"Sir Joshua Reynolds was, on very many accounts, one of the most memorable men of his time; he was the first Englishman who added the praise of the elegant arts to the other glories of his country. In taste, in grace, in facility, in happy invention, and in the richness and harmony of colouring, he was equal to the great masters of the renowned ages. In portrait he went beyond them; for he communicated to that description of the art in which English artists are the most engaged, a variety, a fancy, and a dignity, derived from the higher branches, which even those who professed them in a superior manner did not always preserve when they delineated individual nature. His portraits remind the spectator of the invention of history and the amenity of landscape. In painting portraits he appears not to be raised upon that platform, but to descend to it from a higher sphere. His paintings illustrate his lessons, and his lessons seem to be derived from his paintings.

"He possessed the theory as perfectly as the practice of his art. To be such a painter, he was a profound and penetrating philosopher.

"In full happiness of foreign and domestic fame, admired by the expert in art, and by the learned in science, courted by the great, caressed by sovereign powers, and celebrated by distinguished poets, his native humility, modesty, and candour never forsook him, even on surprise or provocation; nor was the least degree of arrogance or assumption visible to the scrutinizing eye in any part of his conduct or discourse.

"His talents of every kind, powerful from nature, and not meanly cultivated in letters, his social virtues in all the relations and all the habitudes of life, rendered him the centre of a very great and unparalleled variety of agreeable societies, which will be dissipated by his death. He had too much merit not to excite some jealousy, too much innocence to provoke any enmity. The loss of no man of his time can be felt with more sincere, general, and unmixed sorrow." See Painting.

REZAT, a circle of the kingdom of Bavaria, formed out of the ancient Southern Franconia, in the principality of Anspach, out of Bavarian Unterland, and the territories of the former free states of Nuremberg, Rottenburg, Windsheim, and Weissenbourg. It extends over 3052 square miles, and is bounded on the north-west by the circle of the Lower Maine, and on the north-east by that of the Upper Maine, on the east by that of the Regen, on the south by that of the Upper Maine, and on the west by the territory of the kingdom of Wirtemberg. The circle is divided into forty-one bailiwicks, which comprehend forty-two cities or towns once walled, fifty-five market-towns, and 2004 villages, with 530,726 inhabitants, of whom the far greater part are Lutherans, and most of the rest still adhere to the Catholic church. It is generally a level or undulating district, whose waters are partly conveyed by the smaller rivers to the Danube, but the greater portion by the Maine to the Rhine. It is the best cultivated, the most populous, and the most productive division of the kingdom. It yields abundance of corn and cattle, some wine, and all the various kinds of common fruits. Its manufactures also are extensive, especially near Nuremberg, but having little water communication, the chief commodities are conveyed by land-carriage.

RHABDOLOGY, or Rabdology, in arithmetic, a name given by Napier of Merchiston, the inventor of logarithms, to a method of performing some of the more difficult operations of numbers by means of square little rods. Upon these are inscribed the simple numbers; then, by shifting them according to certain rules, those operations are performed by simply adding or subtracting the numbers as they stand upon the rods.

RHADAMANTHUS, a severe judge, and king of Lydia. The poets make him one of the three judges of hell.

RHADEN, a town of the Prussian province of Westphalia, in the government of Minden, and the capital of the circle of the same name, which extends over 180 square miles, inhabited by 30,000 persons. The town is on the new canal, and contains 390 houses, with 2680 inhabitants, who make large quantities of linen and of woollen yarn.

RHAMA, or Rama, an incarnate deity of the first rank, in Indian mythology. Sir William Jones believes he was the Dionysos of the Greeks, whom they named *Bromius*, without knowing why; and *Bugenes* when they represented him *horned*, as well as *Lyaois* and *Eleutherios* the deliverer, and *Tryambos* or *Dithyrambos* the triumphant. "Most of those titles," says Sir William, "were adopted by the Romans, by whom he was called *Bruma*, *Tauriformis*, *Liber*, and *Triumphus*; and both nations had records or traditionary accounts of his giving laws to men and deciding their contests, of his improving navigation and commerce, and, what may appear yet more observable, of his conquering India and other countries with an army of satyrs, commanded by no less a personage than Pan; whom Lillius Gyraldus, on what authority I know not, asserts to have resided in Iberia, 'when he had returned,' says the learned mythologist, 'from the Indian war, in which he accompanied Bacchus.' It were superfluous in a mere essay to run any length in the parallel between this European god and the sovereign of Ayodhya, whom the Hindus believe to have been an appearance on earth of the preserving power; to have been a conqueror of the highest renown, and the deliverer of nations from tyrants, as well as of his consort Sita from the giant Ravan king of Lanca; and to have commanded in chief a numerous and intrepid race of those large monkeys, which our naturalists, or some of them, have denominated Indian satyrs. This general, the prince of satyrs, was named *Hanumat*, or 'with high cheek-bones;' and with workmen of such agility, he soon raised a bridge of rocks over the sea, part of which, say the Hindus, yet remains; and it is probably the series of rocks to which the Mussulmans or Portuguese have given the foolish name of *Adam's*, or, as it should be called, *Rama's* Bridge. Might not this army of satyrs have been only a race of mountaineers, whom Rama, if such a monarch ever existed, had civilized? However that may be, the large breed of Indian apes is at this moment held in high veneration by the Hindus, and fed with devotion by the Brahmins, who seem in two or three places on the banks of the Ganges to have a regular endowment for the support of them: they live in tribes of three or four hundred, are wonderfully gentle (I speak as an eye-witness), and appear to have some kind of order and subordination in their little sylvan polity." The festival of Rhama is held on the 9th day of the new moon of Chaitra, on which the war of Lanca is dramatically represented, concluding with an exhibition of the fire-ordeal, by which the victor's wife Sita gave proof of her connubial fidelity. Amongst the Hindus there is a variety of very fine dramas of great antiquity on the story of Rhama.

There are three Rhamas mentioned in the Indian mythology, who, together with Krishna, the darling god of the Indian women, are described as youths of perfect beauty. The third Rhama is Krishna's elder brother, and is considered as the eighth Avatar, invested with an emanation of his divine radiance. Like all the Avatars, Rhama is painted with gemmed Ethiopian or Parthian coronets; with rays encircling his head, jewels in his ears, two necklaces, one straight and one pendant on his bosom, with dropping gems; garlands of well-disposed many-coloured flowers, or collars of pearls, hanging down below his waist; loose mantles of golden tissue or dyed silk, embroidered on the hems with flowers, elegantly thrown over one shoulder, and folded like ribbands across the breast; with bracelets, two on one arm and on each wrist. All the Avatars are naked to the waist, and uniformly with dark azure flesh, in allusion probably to the tint of that primordial fluid on which Narayan moved in the beginning of time; but their skirts are bright yellow, the colour of the curious pericarpium in the centre of the water-lily.

RHAPSODI, RHAPSODISTS, in *Antiquity*, persons who made a business of singing pieces of Homer's poems. It has been said that the rhapsodi were clothed in red when they sung the Iliad, and in blue when they sung the Odyssey. They performed on the theatres, and sometimes strove for prizes in contests of poetry and singing. After the two antagonists had finished their parts, the two pieces or papers they were written in were soon joined together again, and hence the name, from ϱαπτω, *suo*, and ωδη, *canticum*. But there seem to have been other rhapsodi of more antiquity than these people, who composed heroic poems or songs in praise of heroes and great men, and sung their own compositions from town to town for a livelihood; of which profession Homer himself is said to have been a member. See HOMER.

RHAPSODOMANCY, an ancient kind of divination performed by pitching on a passage of a poet at hazard, and reckoning on it as a prediction of what was to come to pass. There were various ways of practising this rhapsodomancy. Sometimes they wrote several papers or sentences of a poet on so many pieces of wood, paper, or the like, shook them together in an urn, and drew out one, which was accounted the lot. Sometimes they cast dice on a table whereon verses were written, and that upon which the die lodged contained the prediction. A third manner was by opening a book, and pitching on some verse at first sight. This method they particularly called the *sortes Prænestinæ*; and afterwards, according to the poet, made use of *sortes Homericæ, sortes Virgilianæ*, &c.

RHAPSODY, in *Antiquity*, a discourse in verse, sung or rehearsed by a rhapsodist. Others conceive rhapsody to signify a collection of verses, especially those of Homer, which having been a long time dispersed in pieces and fragments, were at length by Pisistratus's order digested into books called *rhapsodies*, from ϱαπτω, *suo*, and ωδη, *canticum*. Hence, amongst moderns, *rhapsody* is also used for an assemblage of passages, thoughts, and authorities, raked together from divers authors, to compose some new piece.

RHEIMS, an arrondissement of the department of the Marne, in France, 623 square miles in extent. It comprehends ten cantons, divided into 181 communes, and in 1836 contained 123,919 inhabitants. The capital is the city of the same name. It stands in a pleasing district on the river Bisle. It is surrounded with walls, not for defence, but converted into agreeable promenades. It is a city of well-built and large houses, some open places, but in general of narrow streets, well paved. The chief object of attention is the fine Gothic cathedral, in which the kings of France during many generations were crowned. It is 450 feet in length, ninety-five in breadth, and 110 in height. The portico is beautiful, and the interior presents a magnificence in its architecture, which is so combined with simplicity as to produce a wonderful impression on the spectator. It suffered injury during the revolution, but the damages have in some degree been repaired. The palace of the archbishop and some other ecclesiastical buildings are very fine. This city has a lyceum, three hospitals, and 38,359 inhabitants, who carry on considerable manufactures of woollen goods of various kinds, and in shawls of mixed substances. It is also a place of commerce, and is the principal mart for champagne wine. Long. 3. 56. 3. E. Lat. 49. 15. 16. N.

RHEINBACH, a town of the Prussian government of Cologne, the capital of a circle of the same name, which extends over seventy square miles, and contains 23,500 inhabitants. The town is situated on the river Erft, is ill built, with 250 houses, and 1500 inhabitants.

RHEINBERG, a town of the Prussian government of Cleves, the capital of a circle of the same name, which extends over 210 square miles, comprehending nine cities and towns, and thirty-six villages, with 38,200 inhabitants. The town is situated on a brook about one mile from the Rhine, was once fortified, but its defences have been neglected. It contains 430 houses, with 2250 inhabitants, partly employed in making cloths, and partly in the fishery on the Rhine. Long. 6. 29. 26. E. Lat. 51. 33. 17. N.

RHETORES, amongst the Athenians, were ten in number, elected by lot to plead public causes in the senate-house or assembly. For every cause in which they were retained they received a drachm out of the public money. They were sometimes called Συνηγοροι, and their fee το Συνηγορικον. No man was admitted to this office until he was forty years of age, though others say thirty. Valour in war, filial piety to parents, prudence in their affairs, frugality and temperance, were necessary qualifications for this office, and every candidate underwent an examination concerning these virtues previous to the election. The orators at Rome were not unlike the Athenian *rhetores*.

RHETORIANS, a sect of heretics in Egypt, so denominated from Rhetorius, their leader. The distinguishing tenet of this heresiarch, as represented by Philastrius, was, that he approved of all the heresies before him, and taught that they were all in the right.

RHETORIC.

The founder of modern philosophy describes the subject of our present inquiry as being "that science which we call Rhetoric or Art of Eloquence; a science excellent, and excellently well laboured." But Bacon's praise of the science itself, and of its ancient cultivators, has been far from commanding universal assent. The prejudice with which rhetorical studies are regarded by so many, has, it must be confessed, been fostered, if not generated, by the fault of some of its students and expositors. Rhetoricians, like teachers of the kindred science logic, have too often claimed for their art the possession of powers which do not belong to it: their systems of precepts have become most ponderous, and their pretensions most extravagant, in times when eloquence was sunk in the deepest decay; and in the rhetorical writings of the lower empire and the dark ages, it seems to be implicitly assumed that every man who submits to learn and practise certain prescribed rules, will attain skill in speech and writing, as certainly as he would, by an industrious apprenticeship, acquire the mastery of a mechanical trade. Accordingly, in more than one period, and in none perhaps more decidedly than in our own, the very name of Rhetoric has been put under the ban of the empire of literature; and the sentence has been justified by misrepresentations both of the purposes of the art, and of the works which result from it. Its rules have been described as a scheme of petty sophistical artifices, designed to aid in smuggling falsehood into the mind under the disguise of logical quibbles or oratorical ornaments; and, the worst declamations of the worst declaimers being exhibited as adequate specimens, rhetorical composition has been defined to be, that which possesses the forms of eloquence without its spirit. We hear truth, good taste, and eloquence, severally spoken of as the antitheses of rhetoric. Words, to use Mirabeau's paradox, are things; and the subject which we are now to consider is not the only one, nor by any means the most important, in which infinite mischief has been done by the attaching of contemptible associations to terms of neutral meaning, and by the affixing of odious names to objects in themselves innocent or useful.

The truth is, that the uses of rhetoric, as well as of all the other arts or sciences which, in different departments, aim at the training of the human mind for exertions in which it is itself its own instrument, are principally negative. Neither in reasoning nor in oratory can any scheme of rules, logical or rhetorical, nor any study of models however profound, nor any practice however long and intelligent, enable the intellect to perform, even moderately well, a task for which it has an inherent incapacity; and if excellence be the end in view, it will assuredly never be reached, either with the observance of rules or independently of them, unless genius be present to give the primary impulse, and to sustain the mind in its course. Logic, strictly speaking, does not teach us how to reason, but only how to avoid violations of those essential principles on which all reasoning is founded. In like manner, a legitimate system of rhetoric would teach, not what eloquence *is*, but what it is *not*; it would disclaim all purpose of qualifying its students to compound an eloquent discourse by rule, as a medicine is compounded after a prescription; and it would occupy itself mainly in discovering, by the immediate study of the mind itself, and by critical examination of the works of genius, those guiding and universal laws of human intellect which the student of eloquence *must not* disobey, if he wishes to attain, in any shape, the end which he pursues. It must be that such principles exist: if we apprehend rightly what eloquence is, we may reasonably hope to discover at least some of them; and even if we could discover them all,—which no sound thinker has ever yet pretended to do,—the speaker or writer would still retain ample space for the exertion of his natural powers, which indeed would act with redoubled ease and vigour from his distinct knowledge of the limits of their domain. A chart does not teach the mariner how to navigate his vessel; but it may fare hardly with him if he wants one in a narrow sea, with whose soundings he is imperfectly acquainted.

The design of this treatise.

It is designed, in this paper, not to present a dissertation having any claim to be considered as a complete exposition of the subject in any of its sections, but simply to sketch in outline a plan of rhetorical studies, which the student may not find altogether useless as a clue when he attempts to master the details under the guidance of more ambitious works; and it may be well to state at the outset the view which, in common with those who have thought most deeply on the matter, we entertain as to the means by which rhetoric is qualified to execute the very important task which it undertakes.

Systematic rhetoric an essential part of rhetorical studies.

In the first place, then, we hold that the systematic view of the principles and rules of eloquence which rhetorical treatises usually offer, must peremptorily be embraced, as an essential part, in the studies of every one who would become really eloquent in speech or in writing. But this proposition must be understood with two cautions. First, in regard to many particulars indispensable towards the attainment of eloquence, every sound scheme of rhetorical precepts, abandoning all claim to primary discovery, contents itself with informing or reminding the student, that he must seek for knowledge elsewhere, from reflection on the phenomena of his own mind, from the best works in philosophy, and from an observation of the world and of human nature. This is true, not merely as to the matter on which eloquence may employ itself, as to which, however, it is true universally; but also as to most of the instruments which the art uses. Secondly, and more particularly, the real usefulness of rhetoric rests, not on its special rules, but on its general principles. As soon as a rule diverts the student's attention from the principle, it for him ceases to be an aid, and becomes a positive hindrance. As soon as a treatise on rhetoric has impressed on the student's mind distinctly and indelibly the great principles on which eloquence is founded, it has given him a talisman to guard him against all seductions into error, and even against the very mistakes which may be inculcated in the book itself. Systems of rhetoric aid effectually in the attainment of eloquence, only so far as they teach the student to reflect on its principles.

The study of models also essential.

But, further, we have called systematic rhetoric a part only of the studies leading towards eloquence. It is in truth a part which, by itself, is insufficient for the attainment of the end; for we must add to it a critical acquaintance with the best models of literature, extending over as many of its departments as possible, but especially minute in that which the student chiefly designs to cultivate. What is here meant is a study of literary works, not for the knowledge which they contain, but as models; a study directed towards an analysis of the mode in which they communicate knowledge, and of the conformity or disagreement of that mode with the laws of eloquence. Such a study may be said to bear towards the systematic portion of rhetoric a relation similar to that which, in physical science, an examination of the experiments made by the best philosophers bears towards the series of fundamental propositions in which the result of the experiments is embodied; but the study of the experiments is incalculably more imperative in rhetoric than in natural science, from the incompleteness of the systematic result in the one case compared with that which is reached in the other. Treatises on eloquence which aim at expounding its principles, can seldom, in regard to the critical branch, do more than recommend its prosecution, or practically countenance it by incidental illustrations; but it possesses such importance as to merit a more prominent place than it occupies in most systematic works on the subject.

Practice essential.

Lastly, long practice must be added to all these studies before the end can even be approached. This requisite, however, a treatise on rhetoric can do little more than acknowledge and urge.

The three divisions of this treatise.

In pursuance of the opinions now expressed, these pages will endeavour to illustrate the subject in Three Divisions. The First will embrace general observations, intended to elicit the true principles of Eloquence, and to exhibit them in various points of view. From our strong impression as to the predominant importance of the general principles over the special rules, we shall be tempted to linger on this branch longer than may be approved by those who are attached to the minutiæ of the study; and for the same reason we will not allow ourselves to be deterred by the fear of being charged with truisms, from stating considerations which seem calculated to lead us nearer to the goal. The Second Division will contain a brief summary of the most important principles which have been expounded in the best systems of rhetoric; our principal guides, however, being the treatises of Aristotle, Dr Campbell, and Archbishop Whately. The Third Division will attempt to furnish the student with some aids towards his critical acquaintance with models.

I.

Analysis of the ends of eloquence.

"The word Eloquence," says Campbell, adopting the ancient definitions, "in its greatest latitude, denotes 'that art or talent by which a discourse is adapted to its end.' All the ends of speaking are reducible to four; every speech being intended to enlighten the understanding, to please the imagination, to move the passions, or to influence the will." The observations by which the same most acute writer immediately afterwards illustrates this his leading proposition, have much truth and great value. It is said, first, that "any one discourse admits only one of these ends as the principal," to which the others, so far as they are admissible at all, must be rendered conducive; secondly, that "each preceding species, in the order above exhibited, is preparatory to the subsequent;" thirdly, that, in addressing the understanding, the speaker proposes either to explain to his hearers something unknown or not distinctly comprehended, or to prove something disbelieved or doubted; so that, "in the one case, his aim is their information, in the other their conviction;" fourthly, that the address to the imagination is common to oratory with poetry, to which indeed it may be added, that the address to the passions must also be considered common to these two arts; and, lastly, that the height of success in persuasion, the fourth end of the orator, is attained by effecting all these ends in the same discourse.

The widest applications of the term.

The analysis, to the extent to which it goes, is strictly accurate; and there is no just reason for refusing to predicate eloquence of every composition written or spoken, which fulfils its conditions. A simple and perspicuous narrative of facts,—an unimpassioned but convincing argument in proof of a controverted proposition in any department of moral knowledge,—and a harangue which, convincing our understanding of what is, or seems to be, an important truth, summoning before our fancy vivid images of its consequences, and, kindling into flame the most powerful emotions of our nature, hurries us irresistibly to resolution and to action,—each of these exertions of intellect may, in its own sphere, be fully deserving of the appellation of eloquent, because each may possess all the qualities which fit it for producing its end. But we shall still be in danger of misapprehending the real essence of eloquence, unless we state to ourselves substantively, and bring prominently to light, certain principles which the analysis involves, but which it passes over slightly.

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It is rightly said, that each of the purposes of eloquence rises out of, and is necessarily founded on, those which precede it. In other words, the information or conviction of the understanding does, in the first place, lie at the root of all eloquence; no composition is eloquent which does not effect this end. The state of mind which eloquence in all circumstances necessarily produces, is that of Belief. This is the fundamental proposition of the Rhetorical Art, and on it depends every well-founded rule which Rhetoric can deduce from its principles. We cannot have the proposition too strongly impressed on our minds; and we may be assured that, the farther we diverge from its central point, the more we shall find ourselves removed from the ability to apprehend or reduce to practice the principles of Eloquent Composition.

Observa-
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The most common definition of Rhetoric describes it as the Art of Persuasion, a view derived from some of the ancient writers, whose instructions were almost wholly addressed to the case of public speaking in courts of law and popular assemblies. The definition, although it involves the true principle, is slightly faulty, both by excess and by defect. It says more than is true, in stating influence on the will as essential to eloquence; and, on the other hand, it is apt to lead us away from the principle, by tempting us to forget that, as is well said by Whately, the latest and one of the very ablest of the rhetorical writers, "the conviction of the understanding is an essential part of persuasion." If we must describe Rhetoric by a reference to its purpose, we shall perhaps incur the least risk of mistake by stating simply, that it aims, through the instrumentality of language, at the Production of Belief; and we may perhaps venture to suggest, that this seems to be the true meaning, both of the introductory definition, and of the numerous incidental illustrations, which we find in a treatise at once the oldest and the best upon the subject, namely, the Rhetoric of Aristotle.

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But since rhetoric, so far as it can be treated as a science (which to a certain extent it may), is called on to investigate principles which a writer or speaker must obey, in order to command belief, and since, too, its inquiries must embrace, not only the laws which regulate the conviction of the understanding, but also those which rule in the excitement of the imagination and the feelings,—it may be asked whether its province does not in several quarters extend over ground belonging properly to other departments of the mental philosophy. The answer to this question is twofold. There are certain principles which rhetoric does not establish for itself, but assumes as proved by common observation, and by the researches instituted in other branches of mental science; but it also possesses principles which are peculiar to itself, and bring it into no collision even with those other walks of philosophy with which it may be suspected of being identical. By endeavouring at this stage to illustrate both of these propositions, we shall be enabled to bring into a strong light some considerations which might be overlooked if introduced incidentally as bearing on specific rules.

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First, then, Rhetoric is not a primary science. Its first principles are the phenomena and laws of the human mind, which it assumes as known to us from consciousness and observation, and as taught in rational systems of psychology, logic, and ethics. Aristotle, among the many instances in which he protested against errors that had arisen before his time, and have survived in spite of his remonstrances, was especially careful in determining the point at which rhetoric should commence its investigations. He lays it down as a fundamental principle, that the student of eloquence must prepare himself by an adequate acquaintance with three primary branches of knowledge which rhetoric cannot teach him; the science of dialectics, the philosophy of human character and morals, and the philosophy of the passions. The Stagyrite's requirement of skill in logic for one who desires to acquire skill in oratory, will seem unreasonable, not only to those who disdain the assistance of rules in every department of mental exertion, but to some who are disposed in certain matters to avail themselves of the aids which philosophy offers. If, however, we merely advise them to make themselves familiar, so far as they are not so already, with the principles and practice of reasoning, they cannot fairly consider the counsel as useless; and if they admit the necessity of this study, we can only remind them further, that they must either be content to receive the syllogistic logic of Aristotle, as expounding justly the principles on which all reasoning is founded, or engage in that attempt at discovering a new system, which has baffled the human intellect for two thousand years. "I cannot but consider him," says Whately, "as undertaking a task of unnecessary difficulty, who endeavours, without studying logic, to become a thoroughly good argumentative writer." That Aristotle's other demands on the student are well founded, will be more readily admitted, how far soever men may disagree as to the mode in which these branches of knowledge may be best acquired. For those who aim principally at applying their acquaintance with human nature to the purpose here in view, the world is doubtless a better school than the closet of the metaphysician; especially as metaphysical writers have, almost without exception, devoted themselves chiefly to those sections of their science which are least closely allied to active life. But the philosopher's attention is nevertheless directed to many important points which the unsystematic observer is in danger of overlooking; and no one will find cause to regret the time bestowed on a course of metaphysical study, when he proceeds to the task of convincing and persuading his fellow-men. Unfortunately, however, the falsity and extravagance of several very famous systems of ethics, make caution indispensable in regard to such studies. A disciple of Hobbes, who, in addressing himself to any body of men by speech or writing, should frame all his appeals to their feelings, on the assumption that a degrading selfishness was the ruling passion in every breast, would, if he should be within the reach of conviction, discover the best practical refutation of his master's dogmas in his own utter failure; and one whose mind is thoroughly attuned to the low key of Paley's philosophy, would probably, although his heresy in morals is less dangerous, find the application of his creed to the purposes of eloquence scarcely less ineffectual.

II. rinciples which distinguish rhe ric from logic and he philosophy of p try.

But, secondly, there are certain other principles of rhetoric, constituting indeed its essence, which, though they touch the frontier of other mental sciences, are yet substantially distinct and peculiar. The two subjects of inquiry with which the Philosophy of Eloquence comes most nearly into contact are, on the one hand, Logic, and, on the other, the Philosophy of Poetry. We shall be easily able to distinguish the points at which it branches off from both, if we keep firmly in view the main proposition, that the purpose of eloquence is the production of belief.

I. (1.) Extra-logical principles of rhetoric founded on the discursive faculties.

And, first, as to logic. In the first place, this science is conversant about the three discursive operations of the mind, apprehension, judgment, and reasoning, and takes no cognizance of any others. Secondly, logic is strictly "a formal science." In regard to reasoning, which is its principal object, it guarantees, to use the words of a very distinguished living metaphysician, "neither the premises nor the conclusion, but merely the consequence of the latter from the former." Of the truth or falsehood of the propositions which form the logician's premises, his science teaches him absolutely nothing. Here, then, are two barriers, by both of which logic, omnipotent within its own domain, has that domain limited; and beyond each of them lies a wide class of principles essentially affecting human belief. Let us even suppose that the human mind were biassed, in arriving at its conclusions, by no extra-logical operations of its own. Even on this supposition, logical rules would not teach us how to produce belief of any given proposition. For though they would enable us to discover premises from which the required conclusion might be logically inferred, they possess no machinery which would qualify us for judging whether those premises would command the belief of those whom we wished to convince. Logic could neither inform us whether our premises are absolutely true, nor (which is here the real subject of inquiry) whether they are likely to seem true to others. Therefore, even for producing conviction by pure reasoning, the discovery of arguments is a task, and one of unquestionable importance, which logic cannot perform; and if rhetoric, or any other science, undertakes to lay down principles facilitating its execution, we shall do well to examine, at least candidly, its capacity for fulfilling its professions.

I. (2.) Extra-logical principles of rhetoric founded on the active powers.

But, in the next place, the mind of man is not so simply constituted, and his position in the system of nature has, as it were, fenced round his rational faculties with those powers which issue in action. The emotions pervade every operation of the mind, as the life-blood circulates through the body: within us and without, in the corporeal world and in the spiritual, in the past, the present, and the future, there is no object of thought which they do not touch, few, very few, which they do not colour and transmute. The argument which, if it could be presented pure to the reasoning faculties, would be fairly weighed, and calmly received or rejected, is sometimes disguised by passion, as completely as a landscape is by clouds, whose stormy piles we mistake for the distant mountains; and in almost every case the conclusion or its proof, or both the one and the other, are seen through a medium more or less hazy, in which they present themselves as the objects of our bodily appetites, or our mental fears and desires, as instruments or hindrances of our affections, kind or malevolent, towards our fellow-men, or as falling under the jurisdiction of that supreme judge and monarch, the moral faculty, which sits enthroned in the inmost recesses of the heart, always able, when accurately informed, to confirm the decisions of reason, but, like other despots, often allowing its power to slumber, and often misled by faithless ministers. If we would command the belief of minds thus variously affected, it is manifest that other principles, besides those of logic, must aid us both in the discovery of arguments, and in their form and arrangement. 1. As to the discovery of arguments, we must always, both for protecting our own minds against error, and for qualifying us to deal with men of cold and unimaginative temper, aim at making ourselves masters of such premises as would probably command the belief of those on whose minds pure reasoning could fall directly, without being turned aside by intervening obstacles. We may always encounter some men whose minds, when directed to certain objects, are more or less nearly in this position. 2. In regard to the same department of our business of conviction, we must endeavour to perform the far more difficult task, of discovering what propositions are likely to be received as truths, by minds affected by all the incongruous influences of imagination, passion, self-love, and ill-instructed conscience. The proof of a proposition from considerations of moral duty may appear weak to a man in whom some strong passion rebels against the principle; but it may yet be possible for us to combat his scepticism by arguments of other kinds, drawing their topics, perhaps, from self-love, or from other passions to which we know him to be subject. 3. The necessity of watching the operations of the active powers of the mind, before we determine on the form and arrangement of arguments, may be sufficiently illustrated for the purpose here in view, by tracing the example last given for one step farther. Our proof of a proposition from ethical principles, although, in the case supposed, it would probably be met by incredulity or ridicule if stated at the outset, may gain a very different reception after we have cut a path for it by arguments addressed to the personal feelings of the auditor. When we have convinced him, that the truth on which we insist is conducive to his interest, and that, if it opposes one of his strongest passions, it is favourable to another, we have prepared his understanding for receiving attentively, and without prejudice, that argument from morality on which the proof of the proposition truly rests.

2. Dissimilarity of the ends of eloquence and poetry.

Those applications of the principles of eloquence which have been last before us, lead to the consideration of the second question that was proposed as to the connection of this branch of philosophy with others:—what is the relation which eloquence bears to poetry? Both endeavour to arouse the imagination and the feelings; the latter indeed always aiming at this effect, but the former too striving to attain it on those occasions when it puts forth all its strength: what, then, is it that distinguishes the one art from the other? The answer is not hard to find. Both arts, in attempting to excite the fancy and the feelings, are only using means, which each applies to its own peculiar end; and the ends which the two propose to reach are essentially dissimilar. The dissertation on poetry in this work has correctly stated the end of that art to be "the creation of intellectual pleasure:" we have here considered the end of eloquence to be "the production of belief." Poetry, like the other fine arts, appeals to the taste; its compositions attain their proper and final result in the pleasure of contemplation; and the truth or falsehood of their representations, and, in short, their agreement or disagreement with all the laws of the mental system, are qualities which enter into our conception of the essence of poetry only so far as they are subservient to that one peculiar result. The mathematician who complained that the Paradise Lost proved nothing, stated accurately the principle which separates poetry from eloquence and science.

Practical uses of this distinction.

Indeed the principle of distinction, when thus broadly enunciated, is something very like a palpable truism; but it is one of those truths, unfortunately common in the affairs of real life as well as in the field of speculation, which are in theory universally acknowledged, and in practice very frequently forgotten: and no age can more pressingly need to be reminded of this truth than one like our own, in which what is called poetical prose has gained such general favour. We are in constant danger of being led astray by the fact, that eloquence, in addressing itself to cultivated minds (which is the only application of its powers that entitles it to be called an art, or to be investigated either philosophically or critically), does always include the gratification of taste as one of its purposes. We forget that this purpose is altogether a subordinate one, and that, if it ever comes in competition with the proper and principal purpose of the art, it ought to be unhesitatingly sacrificed. The authority of Aristotle will once more support our view, to which indeed his reasoning has conducted us. It is one of the earliest and most valuable propositions in his treatise, that the arguments and other instruments tending to produce belief constitute the essence of eloquence, and that everything else is merely accessory.

The two principal objections to rhetorical studies.

Our review leads us, in the next place, to consider two objections, which are very often urged against the study of the subject. The first of these is chiefly directed against the practical application of eloquence, the second against the science or art which undertakes to expound its laws.

Objection I. That the art is dishonest.

First, it is said that rhetoric is a dishonest art, which, so far as it is supposed to have any practical uses, is designed to qualify its students for inculcating falsehood as readily as truth. In answering this cavil, we must, if we would not altogether lose sight of the real principle, face boldly the difficulty which it suggests. We cheerfully admit that rhetoric directs the student to search, not for such propositions as are absolutely true, but merely for such as are likely to *seem* true to those whom he wishes to convince or persuade. But, in the first place, it does not follow that it directs him to search for falsehoods, or that these are the propositions which will best serve his purpose. The very reverse is the fact. The highest of all authorities on the subject lays it down most justly, as at once an essential principle of human nature, and a warning to the aspirant after eloquence, that mankind have a natural love and predisposition towards truth, and seldom fail in finding it out. Eloquence may doubtless be abused by being applied to wrong purposes; but so may every science, mental and physical, which admits of any practical application at all, with the single exception of the science of morals, which, unlike all other branches of inquiry, has moral good for its object, and, if it has discovered the truths which it seeks, has thereby secured itself against all misuse of its investigations. Eloquence may be used for disseminating falsehood or heresy, as it may be for teaching truth and recommending genuine religion; and the most important discoveries in physics may be turned to purposes of destruction, or made to promote the comfort and happiness of mankind. But, it must be once again repeated, he who attempts to apply this art, or any other which uses for its materials the principles of moral belief, to ends adverse to the cause of truth and morality, will speedily discover that he is misusing his instrument, by the imperfection of the results which he will usually produce. In the second place, however, rhetoric, assuming it to be capable of fulfilling the promise which it holds out, is not merely harmless, but positively beneficial, and is in fact necessary for the protection of truth and goodness. The argumentative writer or speaker, in the legitimate exercise of his art, addressing himself with the view of expounding or proving valuable truths to men in general, who possess but fragmentary knowledge, and are unaccustomed to discussions in scientific form, knows that he cannot convince the understanding, unless he at the same time engages the attention and conciliates the affections; and also that he possesses no media of proof by which he can arouse the discursive faculties of those whom he addresses, except the knowledge and opinions which are already fixed in their minds. A felicitous image presented to the fancy, a gentle dealing with angry passions, an avoidance of collision with a rooted prejudice, may, without the slightest violation of truth or moral rectitude, open the minds of an assembly or a nation to receive with honest conviction a system of knowledge, religious, ethical, or political, which philosophical reasoning or uncompromising dogmatism might have striven for ages to force upon them, and striven in vain. But skill in rhetoric admits of another application. It may and will enable one to detect and expose sophistry and empty declamation. The art does unquestionably aid those who wish to mislead; but it is on that account the more necessary that an instrument so powerful should not be abandoned to dangerous hands. A mischievous boy in a steam-vessel may, by the simple pressure of his foot, cause an explosion that shall destroy the ship's whole company; but the danger should induce us, instead of undervaluing or discarding this wonderful combination of machinery, to study means which make it difficult or impossible to effect the mischief. This is really the result which such risks of abuse have produced in all the powerful applications of mechanical science; and it is the result which ought to be produced in those far more important cases where the materials of the art are seated in the mind, and the evils which may be derived from them extend over the moral world.

Objection II. That the art is useless.

The second objection frequently taken to the art of rhetoric is, that it is useless. The objectors of this class are not by any means agreed as to the ground on which their allegation is to be defended; but the only section of them whose argument is plausible enough to deserve refutation, are those who, while they admit that practice and the study of models are necessary for the production of eloquent compositions, deny the utility of attempts to investigate the principles of eloquence systematically and philosophically. In this shape the opinion is very far from being uncommon; and, like all other common prejudices, it appears on analysis to contain a mixture of truth along with its errors. The discussion of it will bring us yet nearer to the point which, in all these general observations, it is our wish to reach.

Answer 1. The principles of rhetoric are universal principles of human nature.

In the first place, then, the objection, in whatever shape it is put, assumes the fact, of which also the objectors make much use in maintaining their argument, that the laws of eloquence are inherent in every intelligent mind, and are put in daily practice by those who are quite guiltless of rhetorical studies. Now this is the fact which lies at the root of all philosophical discussions on the subject, and of all rules which can be fairly deduced from the investigations. "All men," says Aristotle, "in some sort practise both dialectics and rhetoric; for all to a certain extent endeavour both to discover arguments and to maintain them, to accuse and to defend. Accordingly, of people in general, some, in the performance of these tasks, obey merely the impulses of their own minds, without having present to their thoughts any rule or general principle; while others avail themselves of all the principles and precepts which they have been able to gather from experience and practice. Now, since the end which men thus speaking have in view, can be reached both in the one way and in the other, it is manifest that both classes must act upon the same principles, and that these, since they at the same time form legitimate subjects of speculation, and are capable of being put to practical uses, may be combined so as to form a system of rules which will be universally admitted to deserve the name of an art." Those, if there are any such, who go so far as to maintain that the natural powers are sufficient for the production of eloquence without training of any sort, are contradicted by notorious and invariable facts. And those who maintain or conceive that practice and the study of models are in themselves sufficient aids, must be reminded that, so far as their success exceeds that of the unlearned speaker, it is gained for them by this circumstance, that, whether they are conscious of it or not, they obey more closely than he does those principles which are common to them with him. If we suppose that the practised speaker who decries rhetoric is a perfect orator, he may be safely assured that no sound system of rhetoric which he may condescend to study, will expound to him a single principle which he has not already reduced to practice; and even if we suppose him more moderately skilled in the art, he may be told with equal truth, that the system will not contradict any principle which he has used in practice, and found effectual for his end.

Plausible forms of the objection.

If, then, a student of eloquence, who declines to listen to a rhetorical exposition of the principles of his art, attempts to justify his refusal by maintaining, as an universal proposition, that, in every art, a systematic acquaintance with the principles is useless or injurious to one who wishes to practise it, his assertion, contradicted by common sense and immemorial experience, deserves no serious answer. But if he maintains that this particular art forms an exception to the general rule, and that in regard to it his proposition is true, he will find that the arguments by which his position may be most plausibly supported are two. He may allege, either, first, that the experience of modern Europe has shown rhetorical studies to be useless for the end at which they profess to aim, or, secondly, that rhetoric has failed in furnishing such a systematic view of principles as can be considered either complete or useful. These arguments lead us to consider a difference, to which we have not yet adverted, between the ancient and the modern methods of studying eloquence.

Answer 2. The argument from experience fails.

We have already fully admitted, or rather we have laid it formally down as an element in the view which we take of the subject treated in these pages, that the philosophical principles, or (which in certain respects is the same thing) the preceptive rules, of rhetoric, are not by themselves sufficient even for that negative purpose which, as we have also said, all schemes of mental training have most prominently in view. A critical examination of models in oratory, and the other branches of literature, is an indispensable part of the task which the rhetorical student is bound to perform. Now, of these two divisions, or modes of studying eloquence, the former is emphatically the ancient, and the latter the modern method.

The character of the ancient rhetoric.

Aristotle's treatise is strictly and wholly didactic: his criticisms are short, infrequent, and closely limited to the immediate purpose of explaining his argument; and although he strenuously recommends the study of the historical and other branches of literature as a means of collecting the materials of eloquence, we cannot with certainty gather from any part of his work a distinct advice to the prosecution of these studies, as furnishing models of composition. From the temper of the great philosopher's mind, it may not be rash to suspect that, even if he had been unfettered in his method of dealing with his subject, he might perhaps have placed a higher value than most men will do on the systematic precepts of the art, and have too much neglected its critical portion; but there are certain reasons which deprive us of the right to infer positively that this was really his view of the matter. His main purpose was the formation of a system of precepts for spoken eloquence, written composition being adverted to but occasionally, and by way of digression; but, down to his time, the only high specimens of spoken oratory were the harangues of his Attic contemporaries; and for him, the tutor of Alexander, and the pensioner of Philip, the orations of Demosthenes (if the best of these were composed before the treatise on rhetoric, which is a doubtful point) were no safe themes of criticism or commendation. After Aristotle's time, it is true, criticism became more prominent in the manuals of eloquence: the best works which remain to us of some of its most renowned teachers, such as Dionysius of Halicarnassus, are purely critical; and in the writings of some others, which are principally preceptive, by far the most valuable portions are critical analyses of literary works, examples of this latter sort being the spirited and refined dissertations of Cicero, the judicious and liberal remarks of Quinctilian, and the severe but often very instructive criticisms of the boy-philosopher Hermogenes. But although criticism grew as the models of excellence accumulated, the tendency to theorize and systematize kept equal pace with its increase; and in the latest and worst days of ancient rhetoric, criticism, which, if not so difficult as philosophical generalization, demands a wider union of powers and knowledge, died entirely away, leaving the rhetorical systems as bare of the highest kind of illustration as Aristotle's work, while they were a thousand times more complicated in the rules which they expounded.

Modern views of rhetoric.

Since the revival of learning, men seem in general to have derived their opinions as to the real nature and value of the ancient rhetoric, not so much from the works of Aristotle, or even those of Cicero, Quinctilian, and Hermogenes, as from treatises like the curious rhetorical dialogue of Alcuin with Charlemagne, a production which, with its burdensome, wearisome, and useless subdivisions, its odd, impossible, and unpractical examples, and its confident claims to infallibility, is a fair specimen, but by no means one of the worst, of those treatises which fill the collection of the Rhetores Latini, and the separate volumes of such men as Theon, Aphthonius, and the other Greek rhetoricians of the declining ages. We have consequently, in modern times, run into the opposite extreme; and, as we have already admitted, the prevalent tendency has long been to deny that the systematic rules are of any use whatever. The writings of a few very able men have been insufficient to stem the current, although the list of rhetorical writers includes Bacon in our own country, and Fenelon in France.

Specific answers to the argument from experience.

But we must return to the two arguments against rhetorical studies, from which we have diverged in order to collect materials for answering them; and, first, as to the objection from the supposed experience of modern times. In the first place, it will surely be confessed that there is an antecedent presumption against the supposition that the study of principles is unnecessary; and, in the next place, any appeal to the success of modern oratory or prose literature in general, in proof that certain methods are useless which the ancients practised and the moderns do not, would require to be accompanied by an assertion,—which, if we are competently informed, we shall scarcely venture to make,—that in excellence of composition, taken in its highest sense, modern oratory and prose literature are not inferior to those of the ancients. But, further, we must also recollect that the study of models is in itself a study of principles, if it be conducted with intelligence, or so as to serve any good purpose whatever; for he who adopts this mode of study to the exclusion of the other, is just playing the part of a traveller, who, undertaking a journey on foot through a difficult country, begins by throwing his map into the fire, and resolves to trust to the guidance of chance passengers. We are, indeed, strongly inclined to hold one doctrine, which, if it be sound, would compel us to believe that the immediate study of the principles is far more necessary in modern times than it ever could have been in the ancient world. We believe that, for the attainment of a certain degree of success, this study may be much more safely dispensed with by the public speaker than by the author who gives his thoughts to the world in books. The former is, in the delivery of his harangues, instituting per force a series of experiments, from which, doubtless at the expense of many a mortifying failure, he must, if he possesses natural powers capable of producing eloquence in any circumstances, at length learn, or approach to learning, both the principles of eloquence, and its most useful practical rules. The author almost wholly wants this aid. His experiments, if they are to be called so, are usually few, and he has but the most imperfect means of judging what has been their issue; for the success or failure of a book is dependent on so many circumstances, that it can seldom enable the writer to determine how far it has been owing to his success or failure in the great end of composition. But, lastly on this head, a late writer, Whately, has thrown out a hint which has in it much truth as well as ingenuity. He remarks that, after all, the modern disavowal of rhetorical studies may not be strictly consistent with truth. The suspicion of rhetorical artifice, he says, creates such distrust that every one is eager to disclaim it, and none more so than those who have availed themselves of it most widely and successfully. The ancients were freed from the necessity of this venial duplicity by the peculiar nature of their education, in which, under the name of rhetorical training, were included all the branches of learning requisite for the accomplishment of a man qualified to shine in political life. The Greek rhetorician taught his pupil the principles of politics, legislation, and every department of general knowledge; and the pupil, when he had taken his place in the nation as a public man, was called an orator (ῥήτωρ) and not, as we should now call him, a statesman. No man required to conceal his having studied the subsidiary sciences; or rather every one wished to have it believed that he was familiar with them; and his skill in rhetoric proper escaped notice in the general muster. The dissimilar position of the ancients is further illustrated by a second consideration, which is commented on for a different purpose by another writer of high authority, namely, that the Greek orators seem always to have had in view the communication of an æsthetical pleasure to their hearers, as an end scarcely subordinate even to the principal one of moving their minds to belief and action. An assembly which did not listen to Demosthenes with the less admiration, nor with the less disposition to be convinced by his argument, for knowing that he had devoted months to the preparation of his speech, and who recognised in some of its most impassioned appeals whole paragraphs which they had heard him pronounce before, were not likely to be staggered by reflecting that the speaker had long studied oratory under Isocrates.

Answer 3. The argument from incompleteness fails.

But the second objection, levelled against the preceptive section of rhetoric, asserts that every system of the kind is incomplete, and therefore useless. The allegation of incompleteness is perfectly true; but it does not warrant the inference. No rational inquirer into rhetorical principles has ever pretended to have fully explored all the regions of mind over which eloquence holds its empire; indeed, in entering on such investigations, as far as they involve simply matters of fact and experience, he is encroaching on the province of other branches of the mental philosophy, and abandoning that of rhetoric, which, receiving its facts from without, busies itself properly in determining the relation which the facts bear to a certain end. Neither from ordinary and unscientific observation, nor from the systematic inquiries of philosophy, do we yet know nearly all that may be learned as to the principles of the mental economy; and, moreover, when psychology and its kindred sciences shall have reached their utmost development, they will still find their province to be surrounded on all sides by a darkness which created intellect cannot penetrate. But those who have studied the philosophy of mind most practically and most profoundly, are also those who can bear the most decided testimony to the fact, that the incompleteness of its results does not deprive it either of interest or usefulness. The same thing is even more palpably true of this particular branch of inquiry, in which every experiment is instituted with a direct view to a certain practical end.

The essential character of sound rhetorical precepts.

The avowed incompleteness, however, not merely of all existing, but of all possible, rhetorical systems, not only forms no valid ground for denying their usefulness, but may suggest very strong positive arguments in their favour. Those rhetorical rules which are really sound and useful do not mark out, like guide-posts inscribed with the penalties of a turnpike statute, one fixed road in which they tell the student of eloquence that he must travel, although there are other roads which will equally well lead him to his journey's end: the most important and certain of them, indeed, are not even directions which indicate to him the best road in which to travel; but they are peremptory warnings, set up at certain places to inform him, that the cross-roads which at these points diverge from the highway, will lead him quite astray if he shall be tempted to strike into them. Now, it so happens that rhetoric would completely attain this its purpose of protecting us against error, if, discarding all special rules, it were simply to hold up to view, at all points suspected of being the commencement of bewildering paths, a statement of its own fundamental and ruling principle, and of two or three of the most obvious corollaries which the principle involves. If the student of eloquence has been enabled, no matter by what means, firmly to apprehend and retain these essential truths, he has made an acquisition which is more valuable than any other connected with his art.

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To the apprehension of those truths we have here endeavoured to aid in leading him. The aim of all composition not poetical being the Production of Belief, the great task of the speaker or writer should be the study of the character of those whom he addresses, or, in other words, the study of human nature, in all its regions, if possible, but at any rate in those with whose peculiarities his purpose is most likely to bring him into collision. This study must be prosecuted both in the closet and in the world, by reflection as well as by study and observation. In those departments of it which bear reference to human nature in the abstract, the hints of some writers on eloquence may aid a little, and metaphysical studies greatly more; but even in this field the investigation of the recluse will often be barren; and for the infinitely more varied and interesting study of individual character, the aspirant after literary or oratorical fame must repair to the crowded scenes of active life. But the knowledge with which study so conducted will store and fortify the mind, must be applied by the mind, in its constant meditations, to the special purpose of enabling us to accommodate our discourse both to the intellect, the imagination, and the feelings, the temper and prejudices, the state and amount of knowledge, and, in short, to the whole character, of our readers or hearers. There are some minds endowed with vigorous understanding, active imagination, and deep and varied sensibilities, in which much of this knowledge seems to be almost instinctive; the possessors of such minds are men of genius, and eloquent almost as soon as experience has enabled them to overcome preliminary and practical difficulties; and it is only from minds thus naturally full and strong that eloquence of the highest class will ever issue. Even genius, however, is a light that too often leads astray; and the highest genius has always been the most warm in its gratitude to philosophy for stretching out her hand to lead it back to truth and nature. But there are innumerable and endless degrees and kinds of intellect, all below the highest, all imperfectly fitted for the tasks of conviction and persuasion, all requiring aid from without, all capable of receiving and profiting by such aid, and all more or less deficient in a distinct apprehension of the true aim of eloquence. In eloquence, as in morality, every class of minds is liable in its own way to forget and abandon the right path. The man of strong intellect and firm will degenerates into dogmatism, and reasons with his fellow-men in the same spirit in which the Jews built the second temple, where every man worked with one hand, and with the other hand held a weapon. If, in the common intercourse of society, we refuse to humour the characters of those around us, we shall receive our reward in the loss of confidence and love; if, when we reason with or endeavour to instruct them, we refuse to make a similar allowance for those principles in their minds on which we seek to operate, the result will be that we shall leave them careless, uninformed, and unconvinced. On the other hand, the man of fancy and warm feelings soars into the fairy-land of poetry; amidst clouds of imagery and tempests of passion his hearers catch but the faintest glimpse of the truth which he designed to unfold; and a weighing of proofs or a comprehension of explanations are things altogether out of the question. The poet and the dogmatist are equally distant from genuine eloquence; and both equally forget, that he who wishes to convince others of a truth should aim principally at discovering, not in what aspect the assertion and its proofs present themselves to his own mind, but in what light they are likely to be viewed by those to whom he is about to communicate them.

II.

Rhetoric here taken as embracing all argumentative composition, and no other class.

Rhetoric, though etymologically referring only to spoken eloquence, was, even by the ancients, considered as fairly and necessarily embracing written composition likewise; and in modern times, in which the press discharges so many of the functions which the public speaker of old exercised in his own person, the extension is quite indispensable. In the widest acceptation, then, Rhetoric is the art of Composition in Prose. However, even in treatises far more detailed than the present, it has been found convenient to limit the subject to Argumentative Composition; and accordingly this view will be taken in the illustrations now to be offered. One who has accurately studied the philosophy and practice of Rhetorical Argument, will have little to learn when he turns to other branches of composition.

Threefold division of the subject after Aristotle.

It will be advisable to adopt, with only an immaterial deviation from the order, the division of the subject which is laid down in the treatise of Aristotle; according to which the rules of Rhetoric will be treated in three sections; the first embracing the principles on which Belief must be produced by rhetorical composition; the second treating very briefly of the Disposition or Arrangement of the Parts of an argumentative discourse; and the third entering on the examination of the principles of Style.

PART FIRST: Aristotle's three grounds of rhetorical belief.

It is laid down by Aristotle, as the foundation of the rhetorical art, that the Belief which it is the purpose of eloquence to produce, flows, so far as it is produced by the discourse, from one or another of three causes, and from no others. Either, first, the conclusion has been proved, or seems, to those to whom it is addressed, to have been proved, by arguments directly appealing to the understanding; or, secondly, the discourse has created a bias in favour of the writer or speaker, which makes the conclusion be received on the authority of his assertion; or, thirdly, the discourse has excited in the minds of the hearers or readers other feelings (besides those favourable to the speaker or writer), by which the understanding is in the same way biassed. These in their order will now engage our attention.

I. The production of belief by arguments.

Under the first head we are invited to examine the principles which should direct us in the Discovery of Arguments, and in their Arrangement.

The two ancient modes of discovery of arguments.

And, first, as to the Discovery of Arguments. For assisting the writer or speaker in this task, the ancient rhetoricians offered means of two kinds. The one was a Classification of Arguments into their different kinds, with illustrative hints as to the proper uses of each. The second was the amassing of a collection of Topics or Common-places, of which some were arguments that admitted of being applied in any question of moral reasoning; while others, although not so widely available, were so for all questions embraced under the particular department of oratory in which they were classed.

1. The ancient common-places.

In modern times the use of common-places has been universally decried, as a mere device for qualifying a man to speak or write fluently on subjects of which he is utterly ignorant; and if all objections to the art were as well founded as this, it would be truly a waste of time to study it. The invention was well suited for enabling a subtile and flowery declaimer, like the sophist Gorgias, to justify his famous boast, that he could speak extempore on any given question; but the systematic use of these storehouses of universal topics was utterly preposterous in the business of real life. "Such discourse," says Blair, with great truth, "could be no other than trivial. What is truly solid and persuasive must be drawn *ex visceribus causæ*, from a thorough knowledge of the subject, and profound meditation on it. They who would direct students of oratory to any other sources of argumentation, only delude them; and, by attempting to render rhetoric too perfect an art, they render it in truth a trifling and childish study." If we thought the ancient Topics really worthy of defence, we would not be deterred from defending them, either by this grave reasoning, or by the recollection of Corporal Trim's extemporaneous oration on the white bear; but the rebuke of the critic, and the ridicule of the wit, are both well deserved. And yet in this, as in most other errors, we detect merely the misapplication of a truth. For the invention of the Topics is founded on a consideration of the common principles and relations of matters of reasoning in general, and of those matters which are embraced under each particular division of knowledge; and it is manifest that reflection on such general truths as these, although it should not be applied as those ancient sophists applied it, is in itself not merely an unobjectionable, but a positively useful and necessary duty, for those who wish either to write well or to think rightly. Even as to the practical use of common-places, no one who has been accustomed to hear practised public speakers can have failed to remark, that most of them fall more or less into the repetition of set phrases and ideas, which are as truly common-places as if they had been learned by rote from Boethius or Fortunatianus: and in the oratory of the bar, where extemporaneous fluency is indispensable, the systematic use of common-places is to some extent both advantageous and ordinary. For written compositions common-places are unnecessary and absurd; and we are not much encouraged to their adoption by the example of Cicero, who, having sent to Atticus a treatise prefaced by an eloquent introduction, was reminded by his friend that he had already used the passage as the prooemium of another work.

Aristotle's views regarding the common-places.

Knowledge of the subject of the composition, and meditation on its facts and principles, must, as our authority just cited has told us, be substituted for treasuries of common-places; and no one has insisted on the necessity of such studies more strenuously than Aristotle, who, although he wrote with the view of aiding public speakers, and therefore, both in his Rhetoric and his Topics, collected those common-places which he considered most useful, yet broadly and repeatedly lays down the doctrine of their total insufficiency as the principal source of the orator's materials. One chapter of the Rhetoric contains as much practical sense on this subject as might satisfy the most determined of modern utilitarians; and we cannot do better than dismiss the topics by stating its substance, which, although addressed immediately to the case of public speaking, possesses much value even with regard to purely literary compositions. It has been observed, says he, that, for plebeian assemblies, unlearned men are by far the most persuasive orators. And why is this? Simply because they state the particular facts from which they themselves have drawn their inferences, and which the audience know and are qualified to comprehend; while instructed men, addressing the same hearers, puzzle and repel them by enunciating universal truths. This remark is followed by four advices to the orator. First, he is warmly urged to the anxious study of his subject, as in every view essential to his success. Secondly, the advice is enforced by reminding him, that the more facts he knows as to the matter to be handled, the better chance has he of discovering among them some argument which will prove convincing. Thirdly, he is warned that the general rule of oratory which directs the speaker to study and condescend to the characters of his hearers, must be specially applied, so far as his means of knowledge allow him, to the particular persons whom he happens to address. Fourthly, he is cautioned not to shun the statement of common and well-known facts, but rather to consider these as the great magazine of his arguments.

2. The classification of arguments after their kinds.

The second sort of aid which the ancient rhetoricians held out for the Discovery of Arguments, namely, that which results from a Classification of their Kinds, is as truly sound and valuable as the other sort is the reverse. It has, however, met with little more favour in the eyes of the moderns; but in our own times, one of the ablest writers on rhetoric has adopted Aristotle's division of arguments, analysing it satisfactorily, and increasing its utility by several excellent supplements of his own. All that follows on this part of the subject may be considered as either suggested by Aristotle and Whately, or in substance directly borrowed from them, except a few incidental remarks and illustrations.

It must be premised, however, that in every thing to be said on this head, reference is made solely to moral truths, as the conclusions sought to be established in argument. All reasoning is of course ultimately founded on admitted truths, and such reasoning as will serve the orator's purpose must be founded on truths admitted by those whom he addresses. Necessary truths, constituting the first principles of the mathematical sciences, can scarcely ever enter into rhetorical consideration in any shape, and may be safely left out of view altogether. Contingent truths, composing the other great class of ultimate principles, and embracing truths moral and physical, compose the great quarry of materials for human thought and reasoning; the latter class, however, occupying, in most applications of rhetorical principles, a place comparatively subordinate.

The three kinds of arguments.

With regard to the Division of Arguments, then, it is to be observed, in the first place, that the division which aids the rhetorical student, is one neither founded on differences in the mode of stating them (as syllogistic, unsyllogistic, or the like), nor on differences in their subject (as moral or necessary), nor on differences in the purpose of using them (as direct or indirect, probative or refutative arguments). That which is here useful is a division of arguments *as such*. Upon this principle Aristotle may be understood as dividing all arguments in moral reasoning into three kinds; what he calls the εἰκὸς (literally, Proof of Probability); the Sign or Symptom (σημεῖον); and the Example (παράδειγμα). Whately first divides all arguments into Two Classes, the first consisting of "such as might have been employed to *account for* the fact or principle maintained, supposing its truth granted;" the second, of "such as could *not* be so employed." The former class he considers to be the εἰκότα of Aristotle, and terms them Arguments *a priori*, or Arguments from Antecedent Probability. Those of the second class he considers as all referable to Aristotle's two classes of Signs and Examples.

(1.) The argument from antecedent probability.

The εἰκὸς, or Argument *a priori*, is an argument from cause to effect, these words being understood in the popular and ordinary sense. The conviction which it bears evidently admits of innumerable degrees of strength, from the faintest shadow of likelihood to complete moral certainty. The shades of distinction cannot be marked by appropriate terms, either in the language of common life or in that of philosophy; both because they run into each other imperceptibly at every point of the progression, and because the same proof, perhaps, does not appear to any two minds as involving exactly the same strength of evidence. Nevertheless there are in popular language some distinguishing words, of which rhetoric may advantageously avail itself. The two most ordinary and useful of these are, Plausibility and Probability, both of them wide words, but each marked in common use by its own essential and distinctive character. Probability, indeed, in the philosophical and proper sense, embraces all the degrees of moral evidence; but in the popular meaning here adverted to, it imports a degree of evidence higher than that of plausibility. Plausibility is a faint degree of likelihood, whose essence Campbell, quite accurately as it should seem, has analysed thus. The hearer considers an argument as plausible which does not contradict his own experience, or that system of general truths which, more or less extensive in different minds, has been collected by every mind from particular facts remembered. If the argument goes farther than this point, it loses the character of plausibility, and acquires a higher rank, passing, in ordinary language, into the class of probabilities; if it falls short, by contradicting any of our habitual conclusions, it is less than plausible, and utterly worthless towards effecting conviction. The only objection to the term plausibility arises from this; that, on account of ordinary associations, it suggests to most minds an unfavourable impression, which does not necessarily or properly belong to the species of evidence it is here used to designate; for, although a plausible proof must never be taken for more than it is worth, it may often do infinite service in preparing the way for others more convincing. Campbell has proposed to substitute for it the word verisimilitude, but his advice has not been followed. It has been observed by the same writer, that this quality of a non-contradiction of experience, is the essential condition of what in poetical invention is called truth to nature. We pronounce the characters in a poem to be well sustained if the acts ascribed to them are similar to those which we have seen such men perform in such circumstances; and as the poet undertakes to prove nothing, we rest in the intellectual pleasure which the invention affords us. If a similar picture of character in action is laid before us, as a step towards convincing us that a certain act has really been done, we try the representation by the former test; but then, if the argument holds good to the extent to which it professes to go, we retain our conviction of this faint antecedent probability, as an element to aid us in judging of the sufficiency of other proofs, if such shall afterwards be adduced. Arguments *a priori* which deserve the name of probable, go farther than this, and rise gradually till they operate complete conviction. "As far as any cause, popularly speaking, has a tendency to produce a certain effect, so far its existence is an argument for that of the effect. If the cause be fully *sufficient*, and no *impediments* intervene, the effect in question follows certainly; and the nearer we approach to this, the stronger the argument."

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The class of Signs forms a very large numerical proportion of our materials in argumentative composition. It is satisfactorily analysed by Whately, whom we here follow closely in all our observations on it, venturing only on one point a silent dissent. "As far as any circumstance is what may be called a *condition* of the existence of a certain effect or phenomenon, so far it may be inferred from the existence of that effect; if it be a condition absolutely essential, the argument is of course demonstrative; and the probability is the stronger in proportion as we approach to that case. Of this kind are the following arguments. A man is suspected as the perpetrator of a murder, from the circumstance of his clothes being bloody; the murder being considered as, in a certain degree, a probable *condition* of that appearance; that is, it is presumed that his clothes would not *otherwise* have been bloody. Again, from the appearance of ice, we infer decidedly the existence of a temperature below the freezing point; that temperature being an essential *condition* of the crystallization of water."

Subdivision of the argument from signs.

Arguments which infer effect from cause having been ranked as our first branch, and examples, the third branch, being, as we shall immediately discover, incapable by themselves of leading to absolute moral conviction,—the class of signs must include both those proofs which from an admitted phenomenon infer its cause, and those which from the same datum infer a condition which is not the cause. And, first, as to those arguments which prove the existence of causes by that of their effects, it must be specially observed, that the cause "is never so proved *so far forth as* it is a *cause*, but so far forth as it is a *condition*, or necessary circumstance." This is far from being so shadowy a distinction as might be supposed; it enters radically into the mode in which the mind is affected by the different methods of using causes and effects to prove each other. The proposition as it is here maintained, without involving, or tempting us to institute, any inroad into the debateable land of the philosophy of causation, is simply this: that my conviction of the existence of a fact, from my knowledge of another fact which is its effect, is exactly the same kind of conviction as I should derive of the same truth from my knowledge of any fact which was not an effect, but a simple condition, or other concomitant; any difference in the strength of evidence in particular cases depends solely on the circumstances, and, as these vary, the one kind of proof may now be the stronger, and now the other. From the fact that Moscow was burned in the month of September 1812, we infer the existence of the city in the preceding month, because that previous existence, although no cause of the conflagration, in any sense of the word, is a condition, but for which the catastrophe could not have taken place; and as the previous existence is a necessary condition, the conviction which the inference gives amounts to complete moral certainty; but, from the same fact, as it is now stated, we can draw, as to the causes of it, no inferences whatever that amount to more than the weakest of all plausibilities, being just an enumeration of causes, by any of which it is possible the event may have been produced, though, with regard to most of them, we cannot pronounce any one to be more probable than the rest. On the other hand, if, when we have perused the writings of an author, our feelings and our critical judgment agree in declaring them to possess high and genuine eloquence, we infer at once the genius of the writer (the cause, or one of the concurring causes, of the excellence), and our inference is one of positive certainty, because we know genius to be a necessary condition, without which the work could not have possessed the merit it does: while, in the same case, on this naked enunciation of it, our inferences as to many of those conditions of the excellence, which are not in any sense causes, must be founded on plausibilities as weak as those described under the last example.

The argument from testimony included in the class of signs.

Of Signs, then, many are not causes. It is needless to illustrate this species of signs further by individual examples; but it is important to observe, that some general classes of arguments fall under this second division of signs. Of this sort is the Argument from Testimony, to which, if we were to embrace in our view any besides moral truths, we should have to add the argument from Calculation of Chances, on which so much rests in the science of natural theology. Both of these arguments are signs from which we infer conditions that are not causes. The argument from testimony has been thus analysed. "The premise is the existence of the testimony; the conclusion, the truth of what is attested; which is considered as a *condition* of the testimony having been given; since it is evident, that so far only as this is allowed (*i. e.* so far only as it is allowed that the testimony would not have been given had it not been true) can this argument have any force." The testimony of the inspired writers is before us, declaring the truth of the Bible history; we believe in the truth thus testified, because,—assuming that we have examined the antecedent steps of the argument, and have reached the point at which the argument from testimony comes in unmixed,—we believe the witnesses, or, in other words, we are convinced that, but for the truth of their testimony (its condition), it would not have been given. On this head we must content ourselves with simply urging the study of one of the most deeply important inquiries connected with the argument, namely, the genuine test of concurrent testimonies. The subject is ably treated both by Campbell and Whately, and the former writer thus states the principle. "In a number of concurrent testimonies (in cases wherein there could have been no previous concert), there is a probability *distinct* from that which may be termed the sum of the probabilities resulting from the testimonies of the witnesses,—a probability which would remain, even though the witnesses were of such a character as to merit no faith at all. This probability arises purely *from the concurrence itself.* That such a concurrence should spring from chance, is as one to infinitude; that is, in other words, morally impossible. If, therefore, concert be excluded, there remains no other supposition but the reality of the fact."

(3.) The argument from examples.

We now pass to the third and last kind of Arguments, those from Example, which Whately analyses thus. In all the arguments designated by this name, "we consider one or more *known* individual objects, or instances of a certain class, as fair *specimens*, in respect of some point or other, of that class; and consequently draw an inference from them respecting either the whole class, or other *less known* individuals of it. In arguments of this kind, then, it will be found, that, universally, we assume as a major premise, that what is true (in regard to the point in question) of the individual or individuals which we bring forward and appeal to, is true of the whole class to which they belong: the minor premise next asserts something of that individual; and the same is then inferred respecting the whole class; whether we stop at that general conclusion, or descend from thence to another unknown individual; in which last case, which is the most usually called the argument from example, we generally omit, for the sake of brevity, the intermediate step, and pass at once, in the expression of the arguments, from the known to the unknown individual."

Its various kinds.

These principles apply not only to the common argument from Example, but to those from Induction, Experience, Analogy, and the like.

Logical tests applying to the whole class.

The easiest way of discovering the real force of this class of arguments for direct conviction, is (for those at least who are not wilfully resolved on creating difficulties for themselves) to examine its relation to the principles of logic. Both the Argument from Antecedent Probability and the Argument from Signs are strictly logical; or, in other words, they can be so stated that their form will of itself show whether the conclusion is legitimate or not; for, in order to reduce arguments of these kinds to formal syllogisms, we have only to restore the premise suppressed in ordinary discourse, and to limit in such a way the expression of both premises, that the degree of probability may distinctly appear in each, and may thence pass regularly into the conclusion. If the premises are certain, the conclusion will be so likewise; if that element is wanting, the conclusion will only reach one or another of the infinite degrees of probability. Now, on the other hand, the Argument from Example, in all its varied shapes, is always one which will not stand the test of transformation into a logical shape. We may comprehend this most readily in the case of a rhetorical Induction, which, assuming Whately's analysis as our guide, is an argument stopping short at the general conclusion from the premises, without going on to the last step, which infers as to the unknown individual. The process thus performed corresponds with what most logicians call an Imperfect Induction, which is truly no logical induction at all, but merely something wearing the appearance of it. The logical induction (to borrow again from a high metaphysical authority already cited) is governed by the rule, "That what belongs (or does not belong) to *all* the constituent parts, belongs (or does not belong) to the constituted whole." The imperfect or rhetorical induction assumes, that what belongs (or does not belong) to *some* of the constituent parts, belongs (or does not belong) to the constituted whole. This conclusion may or may not be true in the particular case, but it is always illogical.

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There is a pressing reason for urging the importance of this view of the subject. In matters of moral reasoning, the argument from example is oftener misused than any other, and is altogether a very dangerous one in unskilful hands, the mischief sometimes falling on him who uses it, and sometimes on those to whom it is addressed. We are apt to be widely misled by the analogies of physical science, which give the name of induction to arguments in which an inference is drawn respecting a whole class from experiments on a few individuals, or even from one solitary experiment. If this experiment has been cautiously and unobjectionably made, so as to insure the essential point, that the individual is truly an adequate specimen of the class, the inference is sound and the induction valid. The process of reasoning, in short, sets out from a number of silent assumptions, and it is worthless if any one of these has been unwarranted. The history of the material sciences abounds with instances of the most grievous errors which have arisen from such assumptions of false data; and this notwithstanding the facilities generally existing there for decisive experiments, by which the philosopher may place the subjects of his inquiries almost in any circumstances he will. In moral science we can scarcely ever experiment at all: we are confined to the task of watching the phenomena which the course of nature evolves, and of drawing our conclusions from facts as to which we are often exceedingly in doubt whether we may not have misapprehended their real nature and causes. "The *experimentum crucis*," says Playfair, in his Preliminary Dissertation to this work, "is of such weight in matters of induction, that in all those branches of science where it cannot easily be resorted to (the circumstances of an experiment being out of our power, and incapable of being varied at pleasure), there is often a great want of conclusive evidence.......Men deceive themselves continually, and think they are reasoning from fact and experience, when in reality they are only reasoning from a mixture of truth and falsehood." I learn from a few experiments that certain acids act on certain other bodies as solvents; and the inferences are correct, not because they are logically drawn, but because all the assumptions on which they proceed have been tested by observation, and discovered to be well founded. Afterwards, turning to subjects of moral reasoning, I infer that all political revolutions are accompanied by wars and bloodshed, because I know that such evils attended the French Revolution of the eighteenth century, and that which took place in England in the first half of the seventeenth. The conclusion, as every one will tell me, is false; but it is also logically inconsequent; for the reasoning has silently assumed as true an infinite number of principles, all of which are essential to its validity, and many of which are utterly destitute of truth and probability.

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The principles to which it has been here attempted to invite the student's notice, are convincingly illustrated by Campbell, in his analysis of arguments from experience. The evidence of Analogy, as the same writer observes, "is but a more indirect experience, founded on some remote similitude;" and its force is always small, requiring indeed a very unusual accumulation of comparisons before it can be relied on for any further purpose in argument than that which it has often served so well, namely, the repelling of captious refutations. In this kind of argument, quite as strictly as in any other instance of example, the things compared are assumed, in regard to the point of comparison, to belong to the same genus; but there is evidently here a still greater risk than that which prevails in other reasonings of the same class, of either over-estimating or under-estimating the weight of the evidence. The generic and specific names in common use alternately involve us in mistakes and help to extricate us from them. All of these are accurate for their own purposes; but the purpose for which we use the example may, though quite legitimate, be extremely different from that which has dictated the common divisions. If, taking any number of men, who form a class in respect of social or civil relations,—a nation, a civic community, or even a large household,—we discover a certain physical peculiarity in one individual, and thence, without examination, infer it of another,—we are arguing, not from similarity, but from one of the remotest and most worthless of all analogies; an analogy founded, not on any of those qualities of the individuals which came into view in their classification, but on one which merely happens to belong to one of them, and possibly or probably may not be found in any other, being, in short, what logicians would call an inseparable accident. On the other hand, direct and close similarities may be continually discovered between individuals which have in ordinary language no common name, and which could not be classed together for any of the practical purposes of life. Amidst the countless variety of natures and ends which divides the universe into such an interminable number of classes, genera, and species, all the individuals are united by at least one common relation, that which the created bear to the Creator; and when we endeavour to contemplate the world in its position towards God, we discover near and essential resemblances between the highest sentient beings and the most insignificant atoms of matter,—between the spirit of the archangel and the trodden grain of sand.

Test of special argument from example.

In estimating the force of Arguments from Example, our great task should always be, to discover the principle of the division which the reasoning assumes. If we clearly apprehend the principle, and keep it steadily in view, we shall be able to steer safely through all the perplexities of individual cases. When the alleged point of similarity makes up the whole essence of the genus, the proof, supposing the genus really to exist, is morally certain: when it appears on analysis to be only a separable accident of an individual, the proof is a worthless analogy. Between these two extreme points lies the wide channel through whose shoals the principle will always be able to pilot us.

3. The comparative efficiency and proper arrangement of argument.

In regard to the Comparative Efficiency and the Proper Order of the several kinds of arguments, as indeed in regard to every other point essential to the rhetorical art, Aristotle will furnish us with the germ of all the principles, and with many of their elucidations; but Whately's work is extremely valuable in this section, and will aid us scarcely less than it has aided us in the inquiry which we have just left. All that is most important on this subject may be comprehended under the answers to three questions.

(1.) Comparative efficiency in reference to the nature of the conclusions.

First, what is the Comparative Efficiency of the several sorts of arguments, considered with reference to the nature of the conclusions sought to be established by them? Our guide answers as follows. "Matters of opinion, as they are called (that is, where we are not said properly to know, but to judge), are established chiefly by Antecedent Probability (arguments of the first class, from cause to effect), though the Testimony of wise men is also admissible; past facts, chiefly by Signs of various kinds (that term, it must be remembered, including Testimony); and future events, by Antecedent Probabilities and Examples." Cases may often occur which form exceptions to these principles; but reflection will easily convince every one that the outline of them here given is substantially accurate; and any doubts which may arise on an abstract consideration of the question may be certainly removed by an examination of the most convincing argumentative compositions. In few instances where argument is applied to practical uses, does any of the several sorts of conclusions constitute the whole of the end which the discourse proposes; but, in every discourse, one or another of the kinds holds the most prominent place. Compositions chiefly designed for instruction or exhortation, such as ethical and most religious discourses, being principally conversant about conclusions of the first class, appeal mainly to the argument from cause to effect, strengthening this argument by authorities fairly and judiciously selected, and also making frequent use of examples, seldomer however as proofs than as illustrations, which are not introduced for the purpose of proving anything, but merely in order to place imperfectly-apprehended propositions in a stronger light. Judicial oratory, when employed on those questions which fall within the province of juries, has mainly reference to the second class of conclusions, so that signs compose the chief weapons of the legal speaker's armoury. Harangues addressed to deliberative assemblies embrace the whole field of conclusions, but in most cases are chiefly directed towards those of the third class.

(2.) Comparative efficiency in reference to the position of the parties.

Secondly, what is the Comparative Efficiency of the several sorts of argument, considered with reference to our position towards the party whom we desire to convince? Which sort is best calculated for direct Conviction? and which for Refutation? We again borrow an answer. "It should be considered whether the principal object of the discourse be, to give *satisfaction to a candid mind* and convey *instruction* to those who are ready to receive it, or to *compel the assent or silence the objections* of an opponent. The former of these purposes is in general principally to be accomplished by the former of those two great classes into which arguments were divided (viz. by those from cause to effect), the other by the latter. To whatever class, however, the arguments we resort to may belong, the general tenor of the reasoning will in many respects be affected by the present consideration. The distinction in question is nevertheless in general little attended to. It is usual to call an argument simply *strong* or *weak*, without reference to the purpose for which it was designed; whereas the arguments which afford the most *satisfaction* to a candid mind, are often such as would have less weight in *controversy* than many others, which, again, would be less suitable for the former purpose. For example; the internal evidence of Christianity in general proves the most satisfactory to a believer's mind, but is not that which makes the most show in the refutation of infidels. The arguments from analogy, on the other hand, which are the most *unanswerable*, are not so pleasing and consolatory."

(3.) The principles and rules of the arrangement of arguments.

Thirdly, where we are in possession of arguments of all the kinds, all bearing on the conclusion which we wish to reach, what Arrangement of these is most effectual for producing conviction? This question is one of the most important in rhetoric: indeed there is scarcely any other which goes so closely to the foundation of all eloquence. A just Arrangement of Arguments is indispensable towards success in conviction or persuasion; and the leading principles of eloquence carry us by a very short journey to general rules on the subject, which may be considered as infallible. Aristotle has not enlarged on this point further than to press the necessity of using probative examples in the very last place; but Whately has very justly observed that the principle should be extended much more widely. The three kinds of argument,—supposing that in the particular case each is accessible, applicable, and necessary,—should be used in the order in which they were explained in preceding paragraphs; the Argument from Antecedent Probabilities coming first, that from Signs second, and that from Examples last of all. If we violate the principle of this rule, we cripple every branch of our proof, as we may readily convince ourselves by trying the experiment on any case in which all the classes of argument must have place. Let us take the instance of a judicial address, intended to convince a jury that a certain man has committed a murder, supposing also the state of the proof to be such that the speaker rightly considers it necessary to use all the three kinds of argument; and let us adduce the arguments in the order opposite to that which the rule suggests. By commencing with analogical arguments, or other proofs from example, we instantly prepossess our hearers against the conclusion which we wish to establish. All men feel, more or less, the weakness of this sort of proof when taken by itself, whether they clearly perceive the cause of the weakness or not; and the defect will strike them forcibly and painfully in a case like that supposed, in which they are naturally reluctant to come to the conclusion which is urged on them: a single example is in such a place even worse than worthless; accumulated examples perplex the mind, and excite it to an effort of memory which withdraws it from its proper task; and, lastly, the argument, if adduced at this stage, is a building reared without a foundation; for, as we have proved no circumstances of the special fact, our hearers have no materials for determining whether our analogy holds or not. Let us next proceed to the argument from signs: we still want something. For, even although we had been able to convince our hearers by the first branch of our argument, that our allegation has in it nothing which common experience has shown to be impossible, or very highly improbable, we have as yet not advanced a single step towards proving *a priori*, that the fact is positively likely to be true, and our audience are still indisposed to believe that it is so. On the supposition made, the proof from signs is stated as in itself not conclusive (for, if it were so, there would be no use for either of the other two kinds of proof); and, the case being so,—the fact being, by its accompanying circumstances, made more or less probable, but not certain, and nothing having been established which, like a strong motive, or such probable cause, would lead our hearers to anticipate the fact as likely, before they become acquainted with the corroborating symptoms,—we shall still have failed in gaining our end, and perhaps have come little nearer to it than the point at which we stood in the beginning. In order to complete our evidence, we must, therefore, proceed to the third series of arguments, tending to establish antecedent probability, which now come forward with every possible disadvantage. Our hearers have to apply the argument to the preceding facts, by a toilsome exertion of memory, which prevents the discursive faculties from acting freely, and, if the proof is complicated, may, after all, be completely unsuccessful; or, if we endeavour to remove this risk, we must do so by a recapitulation, which will be wearisome, inefficient, and in itself an adequate reason for believing that our arrangement has been radically wrong. Let us reverse the arrangement, and everything will find quick and easy access to the mind. We first establish that our conclusion has antecedent presumptions in its favour, and the hearers are thus prepared for receiving with attention, candour, and even prepossession, all specific proofs in support of it. We next adduce those concurrent circumstances which we maintain would not have happened had not the fact taken place which we wish to prove. And, lastly, after we have conducted thus far those whom we address, examples or analogies complete the chain of probabilities. "After the other proofs have been adduced," says Aristotle, "a single example comes in with as much force as the testimony of a single honest witness." The application of the same principles to the refutation of an address like that now analysed, is too obvious to require illustration.

Tests o rhetorical fallacies real and seeming

In any treatise which should aim at following out the principles of rhetoric to their detailed consequences (a design far beyond the limits of these pages), it would be of the highest advantage to devote a separate section to a systematic consideration of the most usual Rhetorical Fallacies. Under this head would be analysed, not only those artifices by which falsehood may in argument be most easily made to pass current for truth, but also those others, by means of which conclusions may be represented as fallacies without really being so. It is not more important to expose the foundations of real fallacies, than to exhibit the unsoundness of those objections which represent as fallacies arguments truly sound. Although this double task belongs, in most of its applications, to logical science, there are many cases in which it is from the principles of rhetoric, not from those of dialectics, that the refutation of the error must be drawn. From Aristotle's two admirable chapters on Fallacies, and on the Refutation of Arguments and of Objections, only one observation shall here be cited, on account of the practical importance of the truth which it contains. Where, remarks the philosopher, the aim of an argument is merely to establish a probability, contrary facts may always be truly alleged. But the existence of such facts does not prove the argument to be fallacious; for a probability is not disproved till we have proved that the fact does usually happen contrariwise. The cavil which this remark exposes, lies at the root of very much of the sophistry which has been put in use against truth, both in religion and in politics.

II. The productio of belief the chara ter of the speaker o writer.

Our next subject of inquiry is Aristotle's Second Rhetorical ground of Belief; namely, that which arises from the favourable impression created by the discourse as to the Character of the Writer or Speaker. The impression here meant is one arising wholly from the discourse; for, so far as it is produced by previous knowledge possessed by those who are addressed, it is no subject of rhetorical consideration. This is a ground of belief, which, although it is sometimes very effective in written discourses, and although in such discourses the violation of its principle often occasions lamentable failures, has yet its principal field in spoken oratory. A speaker who is skilled in producing conviction in this way, has often applied to him, in common language, the epithet of plausible. Aristotle places high reliance on this ground of belief; observing of it, in two different places, that it is most effectual indeed when the audience are very imperfectly informed on the matter of the discourse, but that, taken all in all, it is probably the most extensively powerful of all means of persuasion; and that, in deliberative assemblies, it very often triumphs over all other oratorical artifices. The speaker's Character must be favourably developed in three particulars; the hearers must be led to have faith in his Moral Worth, in his Understanding, and in his Good Dispositions towards them. It is scarcely possible to overrate the power of the first point. Indeed the art of persuading the audience into a belief of his high moral principle, or of his perfect honesty and fairness, is one of the most valuable an orator can acquire. Its attainment should be a leading aim; but it is not equally attainable in every kind of oratory; and, in particular, the acquisition of this kind of plausibility is one of the most difficult tasks of a barrister who struggles for success in addressing juries. His difficulties are of two kinds; the one arising from his audience, mainly founded on their knowledge of his professional position, and their consequent tendency to distrust; the other inherent in himself, founded on the abstract nature and the over-cautious, captious spirit, of the legal arguments which in most courts form the greater part of the ordinary practice, and which, as we see in everyday experience, disqualify most lawyers, by various defects (and most of all by want of apparent candour), from success as popular speakers. For success in pulpit-oratory, this instrument of persuasion is absolutely and without exception indispensable. The hearer's confidence in the speaker's understanding requires scarcely any illustrative remark but this; that it must not be a confidence in his oratorical skill, which has an inevitable tendency to check belief: but it may advantageously extend to an unlimited admiration of his general intelligence, and of the profundity of his acquaintance with the matter of the address; with this restriction, however, that the display of these qualities will lose all their force, if, by exhibiting a want of modesty, they draw the speaker into a violation of the first section of the rule. The hearer's confidence in the speaker's good-will is as essential as the rest, and the want of this confidence is the main obstacle which makes a speaker on political questions almost inevitably unable to make an impression on men belonging to an opposite faction.

III. The production of belief by the excitement of emotion.

We have now reached the Third Ground of Belief; that which the writer or speaker produces by exciting, in the minds of those whom he addresses, such an Emotion, or series of Emotions, as for a time excludes the application of their discursive faculties to the arguments regarding the question discussed. The operation which Eloquence here effects on the mind is, it must be observed, complex. The faculty primarily excited is the Imagination; but the agency of this faculty is merely instrumental; for the office which it is made to discharge is, that of calling up images which are adequate objects of the Emotions, and are calculated to arouse them. But, further, these objects of the imagination and the feelings, so far as they are useful towards the Production of Belief, are either themselves conclusions presented to the Reason to be pronounced by it true or false, or they are at least steps leading towards such conclusions. This appeal to the Reason, however, is the very last stage of the process: and if the discourse has effected its end, the operation of judgment is instantaneous, and as it were instinctive: the conclusion is admitted by the mind, not as the result of a train of argument, but as an element, so to speak, of the mind's own experience or consciousness.

The uses of the eloquence of emotion.

This is the true analysis of all animated and passionate eloquence; and yet, when so represented, this process, in which the art gains its highest triumphs, and without which it would be quite powerless as an instrument for persuading the mass of mankind, may at first sight appear more open to the charge of unfairness than any other means which literature and oratory employ. But the objection is unsound. This, like every other element of eloquence, is a neutral power, which may be made to ally itself either with good or evil, being, however, always most willing to serve truth and rectitude. We shall be enabled to discern its real position, by examining two of its most usual applications.

Case of simple persuasion.

The first case is that in which the aim of the discourse is to determine the hearers or readers to a certain course of action, of whose abstract justice and propriety they are convinced by a simple statement of its principles, but towards which neither the abstract statement, nor their previous feelings on the subject, tend strongly enough to prompt them; in other words, a case in which persuasion (in the strict sense of the word), not conviction, is the proper aim. The mere conviction would clearly not lead to the result required; because men act not from convictions, but from motives; not from simple belief of truth, reposing ultimately in the understanding, nor even from a belief superinduced on this, that the truth is also an object adequate to the gratification of one or more of the active powers of the mind,—but from the suggestions of these active faculties themselves, aroused to energy, and directed to the truths in question as their fittest or only objects. Eloquence strives to communicate the impulse thus needed. The most important truth stated abstractly and barely, and the same truth set forth with the adornment of eloquence, often bear to each other, in respect of their comparative value for mankind, the same relation which the skeleton-hull in the building-yard bears to the gallant ship at sea, armed, manned. and in full sail.

Cases where prejudices are to be combated.

We next take a case which brings us nearer to the disputable ground; being one in which we attempt, by the excitement of emotion, to lead men to a conclusion in which they would not have acquiesced but for such excitement. There is nothing to prevent us from assuming, that the conclusion which we maintain in the case supposed is true, although it may seem to those whom we address to be either positively false, or exceedingly problematical. Now this belief or doubt of theirs, adverse at once to the truth and to the end of the discourse, may arise in their minds in a variety of ways, all of these, however, being reducible to two; for it must either be founded on an antecedent process of pure reasoning which has gone on in their minds, or it must rest on some other antecedent mental process, in which the discursive faculties are either not at all, or not alone, active. The former class of wrong conclusions arise much seldomer from any defect in the process of reasoning which has conducted to them, than from the assumption of erroneous premises; and this makes it the more difficult to combat them directly by argument. The latter class, however, is that to which belong the great mass of common prejudices; opinions often resulting from an inextricable combination of shallow reflection, hasty observation, ruling passion, imperfect views of moral duty, and personal or local affections and dislikes; prepossessions on which arguments can take no hold, but which are often quickly displaced by other notions suggested without argument: just as, in a siege, the shot and shells rebound without effect from the masonry of a casemated bastion, which a storming party, if they can once enter the trenches, will carry at the first assault. If we undertake to instruct or convince minds engrossed by false opinions of either class, we have only two alternatives: either a direct attack on the reason by argument, which will meet with an inevitable and signal repulse, or a well-directed appeal to other principles of the mind, which will often insure a gratifying success. No doubt it would be better if truth could be protected and disseminated without the use of these indirect methods: no doubt we can conceive, and ardently desire to witness, an advancement of human knowledge, a purification of human desires and affections, an elevation of the standard of conscience as well as intellect, which should make a simple presentation of truth to the reason always adequate for the dislodgement of error: but our mortal nature does not stand on this height, and will never rise so high till it has put on immortality; and the aspirant after eloquence, like the philosopher and the man of business, must, in his endeavours to act on the minds of others, be contented to take their condition as he finds it. This is all that Aristotle has said, or intended to say, in a passage which has been strangely cited as expressing an opinion, that all the appeals of eloquence to the passions are wrong and illegitimate; we say strangely, when the assertion is made as to a writer who placed so much weight on this instrument of the art, that he devoted a large proportion of his rhetorical work to an analysis of the most common passions, although, according to his own view of the province of rhetoric, the subject lies beyond its limits.

The Aristotle of modern times has at once beautifully illustrated and convincingly defended the operation of elo-

Bacon's illustration of the eloquence of emotion.

quence on the imagination and the feelings. "If the affections in themselves," says Bacon, "were pliant and obedient to reason, it were true there should be no great use of persuasions and insinuations to the will, more than of naked proposition and proofs. But in regard of the continual mutinies and seditions of the affections, reason would become captive and servile if eloquence of persuasions did not practise and win the imagination from the affections' part, and contract a confederacy between the reason and imagination against the affections. For the affections themselves carry ever an appetite to good, as reason doth: the difference is, that the affection beholdeth merely the present; reason beholdeth the future and sum of time. And therefore, the present filling the imagination more, reason is commonly vanquished: but after that the force of eloquence and persuasion hath made things future and remote appear as present, then upon the revolt of the imagination reason prevaileth."

The eloquence of emotion essentially dependent on the natural powers.

But this is a department in which rhetoric can aid the student less than in any other. As it is the field in which genius gathers its fairest harvest, so it is also that which she is called on chiefly to cultivate from her own resources. No rules, and no study or experience, will qualify one for attaining this loftiest stage of eloquence, unless the mind glows spontaneously with that warmth and depth of feeling which its exertions aim at communicating to the breasts of others. To the active and searching intellect, whose suggestions, operating on the stores of knowledge possessed by the writer or speaker, lead him to the sources and instruments of conviction in the argumentative part of his task, and whose acuteness and energy can be incalculably aided by philosophical and critical study, and by experimental practice,—to this foundation and groundwork of success must be added, for the acquisition of excellence in impassioned eloquence, natural powers to which external aids can minister but weakly. A very few observations, therefore, may suffice on this head.

The class of mental phenomena which illustrate it.

The philosophy of those regions of the human mind on which eloquence here seeks to work, must be learned, not from rhetoric, but from consciousness, observation, and the systematic study of the mental philosophy. It is most usual to consider the class of mental phenomena which are here brought into play as embracing only the active principles of human nature; but the student will unquestionably gain many incidental hints which would otherwise have escaped his notice, and will probably find his general view over this province of the art made at once clearer and wider, if he investigates with reference to it the whole of that class of phenomena which Thomas Brown ranks together in his analysis of the emotions, in their three genera of the immediate, retrospective, and prospective, and their subdivision (still more valuable for the present purpose) into those which do, and those which do not, involve the feelings that form the criterion of the objects of the moral faculty.

Some of the rhetorical precepts deducible from its principles.

All advices which rhetoric can give on the subject are immediate corollaries from one part of the proposition laid down as our definition; namely, that the emotion sought to be produced excludes the action of the discursive faculties. The moment an argument, or a hint towards one, is suggested by the impassioned portions of a discourse, the emotion begins to be chilled, and the effect is lost. The emotion is generated through the excitement of the imagination; and this fact, with the exclusion of argument, is nearly all that art can here teach.

(1.) The wish to move the feelings must not be avowed.

"The first and most important point to be observed in every address to any passion, sentiment, feeling, &c. is, that it should not be introduced as such, and plainly avowed." This rule follows both from the principles just laid down, and from another consideration: if the feeling sought to be excited is wrong, the avowal of the intention is manifestly destructive: if it is right and honourable, the self-love of those whom we address is offended by having it hinted that they are deficient in it.

(2.) The address should be circumstantial.

Another rule, following from the instrumentality of the imagination, teaches us that conciseness, which in argument is a virtue if it does not degenerate into obscurity, is in the impassioned parts of a discourse always a positive fault. The imagination is operated on, not by general views, but by special circumstances, by pictures held up to it and brought close that they may be distinctly seen. On this, as on other questions connected with the impassioned parts of a discourse, Cicero, himself one of the greatest proficients in this branch, peculiarly attached to its study, and inclined to undervalue other sections of the art, has thrown out, in his attractively desultory fashion, hints that are extremely instructive.

(3.) The circumstances chiefly powerful over the feelings should be studied.

A third rule, nearly akin to the last, which may indeed be considered as a portion of it, prescribes an examination and knowledge of all those circumstances which are chiefly instrumental in affecting the feelings; and Campbell has ably illustrated this precept, classing the most obvious of such circumstances under the seven heads of "probability, plausibility" (which he considers as different from probability in kind, not in degree), "importance, proximity of time, connection of place, relation of the actors or sufferers to the hearers or speaker, and interest of the hearers or speaker in the consequences."

(4.) Tediousness must be shunned.

But, fourthly, such an examination will discover to us many circumstances which tend to check the flow of feeling, and against which consequently we must guard. Among these, a prominent place is occupied by tediousness, a fault into which the second rule just propounded may entice those who want a complete apprehension of its principle. "Nothing," says an ancient critic, "dries up more quickly than a tear;" and what is thus true of the softer feelings, is equally so of the more vehement: none of them can be adequately supported by eloquence for more than a certain period, the length of which an impassioned orator must learn from his own consciousness and observation, being always, however, in danger of extending its limits too far, rather than of unduly restricting them. Appeals to the sense of the ludicrous by means of wit or humour may, if well supported, be responded to for a much longer time than the serious emotions, even although they should be conducted with little variety and intermission; but no class of feelings is more completely inconsistent with the exercise of the reasoning faculties; and a discourse which rests its strength solely or mainly on the use of ridicule, thereby shows that, whatever the author's motives may be for the choice, he is at any rate disinclined to attempt reaching his end by any thing like pure conviction. Some of the instruments of the ludicrous, too, are apt to fail in their purpose with many people, from being misunderstood; and against irony in particular, the sharpest of all the weapons of wit, dulness of heart or fancy cases very many in armour of proof. This truth has been remarkably experienced by Swift, who is perhaps the greatest master of irony in any language, but whose polemical dissertations, often clothed in an ironical dress from beginning to end, are thus, in many cases, as little appreciable by a large majority of his readers as if they had been written in an unknown language. As instances of this fault, we may cite two of his most severe satires; the one his "Argument against abolishing Christianity," aimed both at the irreligion and the false religion of the times; and the other, still more celebrated, the "Modest proposal for preventing the children of poor people in Ireland from being a burden to their parents or country, and for making them beneficial to the public," being the bitterest of all sarcastic invectives against the misgovernment of that unhappy island, whose miseries Swift professes to see no possible means of alleviating, except by devoting the superabundant population to the shambles. The only other questions connected with the inquiry which we shall allude to, are those which address themselves to the case

(5.) Means should be studied for allaying and diverting unfavourable emotions.

in which those whom we address are already under the influence of some emotion, which we must endeavour to allay, or to divert from its original object. The main principle applicable to this head is, that a passion may generally be destroyed most easily, not by the excitement of another which may be considered as its opposite, but by that of passions which do not lie so far distant from it. Anger towards a person, for example, may be removed, not only by exciting good-will towards him, but by holding him up as a proper object of fear. "Compassion, likewise, may be counteracted either by disapprobation, by jealousy, by fear, or by disgust; and horror and envy either by good-will or by contempt." Aristotle, in his minute analysis of the passions most usually appealed to in oratory, which is well worthy of being deeply studied, has several very valuable observations on this head; as Whately and Campbell have on the whole subject of impassioned eloquence: and Cicero and Quinctilian are much more useful here than they are in relation to the philosophy of arguments.

Part Second: The principles of Disposition, or the arrangement of the parts of a discourse.

Our general plan of the Systematic portion of Rhetoric now presents to us its Second Division, which treats of what the ancients called Disposition, or the Arrangement of the several Parts of a Discourse. This department of the inquiry, a favourite one with the classical rhetoricians, especially those of the later ages, has, in modern systems of the art, seldom received a place as a distinct branch, and has, indeed, been generally overlooked altogether; but the consideration of it suggests illustrations of the laws of eloquence, which claim for it some attention at least, although we shall not be tempted to dwell long upon it.

The principle on which all precepts as to division are founded.

In reference to the animation of a discourse, and to every appeal which it makes to any principles of the mind besides the reasoning powers, Cicero has well said, that an eloquent composition should be constructed on the principle of the climax, rising gradually in its demands on the fancy and feelings of those to whom it is addressed, in the same ratio in which it has succeeded in opening the way for their rational conviction. This rule is in truth a very simple application of the fundamental proposition of rhetoric; and all special directions regarding arrangement will, so far as they are sound, be immediately deducible from it. Aristotle, desirous, as he always is, to expel the prevailing errors of his time, by maintaining the due prevalence of the argumentative element of eloquence, observes that, in despite of that complication of divisions which already reigned in the schools, the essential parts common to all argumentative compositions are two only; the proposition or statement of the question, and the proof or argument in support of it. And this is quite true; for every other portion is introduced solely for the sake of these two, and has no value, unless in so far as it promotes their purpose. In most cases, however, an argument cannot with advantage be maintained thus barely; but a complete discourse may always be with little difficulty analysed by a division into four parts; the Exordium or Introduction, the Proposition or Statement of the Question, the Proof or Argument, and the Peroration.

The exordium.

The Exordium, when it finds a place, is designed for conciliating the minds of the persons addressed; and Quinctilian reduces to three the dispositions which it should aim at producing—Good-will, Attention, and Docility. The materials of the introduction should be drawn as closely as possible from the subject of the discourse, and as little as possible from common-places; and it therefore follows, that the ancient oratorical practice of keeping a stock of exordia prepared beforehand, which Cicero generally followed, and which Demosthenes has exemplified by a collection of more than fifty specimens, one or two of them introduced in his extant harangues, was unsatisfactory and dangerous even for public speakers, unless used with great judgment, and was quite preposterous in the case of all other writers. Both for the writer and the speaker, but more especially for the latter, the chief difficulty is, the passing naturally and safely from the theme suggested in the introduction, to that which is to be propounded in the next part of the composition.

The proposition.

If we say that the Proposition requires little illustration and few precepts, we shall find that Aristotle is with us, Quinctilian neutral, and the later rhetoricians, both Greek and Latin, decidedly against us. Even if we professed to deliver a complete system, we should not be easily induced to try the student's patience, by following Severianus, or the pseudo-Augustin, far through the mazes of the *Status Quæstionis;* but the principles which should guide us in laying down our proposition, and in choosing it when that is in our power, are far too little studied (if gross violation of the principle be a proof that it has not been studied or understood) by many argumentative writers, and by a still greater number of argumentative speakers. Preachers are in this respect decidedly the most faulty class; and orators of other kinds are protected against the error less by their own familiarity with the principles than by their liability to those checks by contradiction which the preacher wants. The most important rule, and one which is but too often broken, is to frame in our own minds a clear notion of the proposition, which involves among other contained rules that of ascertaining, that what we are about to argue is truly a proposition, and not a mere term. "In an ethical work," says Whately, "one may be treating of virtue, while discussing all or any of these questions—wherein virtue consists? whence our notions of it arise? whence it derives its obligation? &c.; but if these questions were confusedly blended together, or if all of them were treated of within a short compass, the most just remarks and forcible arguments would lose their interest and their utility."

The argument.

Of the Argumentative, or third portion of the composition, which has been already discussed at such length, little seems necessary to be added. It must, of course, include the Refutation of an opponent's argument, as well as the statement of those by which our own proposition is directly supported. The proper places for such refutative arguments, and the best arrangement of arguments in general, in cases where the rules drawn from the kind of the argument do not apply, have given rise to much discussion, and to many contradictory rules, from which it is not easy to extract general laws, or any very positive inference beyond the advice, to study the aspect of the evidence, and the disposition of those who are to judge of it. The rule most commonly received, which directs that the strongest arguments be placed first and last, and the weakest in the middle, is subject to constantly recurring exceptions, of which we only cite one from Quinctilian, namely, the case where a harangue preceding ours has created in the minds of the hearers on certain points an impression strongly unfavourable to us, which we must at all hazards endeavour immediately to remove. Under this head, in respect both of their nature and their place, fall most of those passages occasionally introduced in argumentative composition, which, under the names of Narration, Digression, and the like, rhetoricians have often classed separately as integral parts of a discourse; and here also there frequently occur fitting occasions for the introduction of appeals to the feelings.

The peroration.

But the Conclusion or Peroration is the place for pressing such appeals to the utmost, to which office it adds that of bringing together into one view, by a Recapitulation, when one is thought necessary, the heads of the argument, or at least the results to which the speaker wishes it to be believed that they conduct. The Recapitulation is, for those who are maintaining a weak cause, a favourite and advantageous place for varnishing over the defects of the proof,—by assumptions of things as proved which have not been proved,—by exaggeration of the favourable points in our own cause,—

by the explaining away of such points in the argument opposed to us,—and by other artifices belonging to the numerous class of Rhetorical Fallacies. In its passionate parts the peroration has, both in ancient and in modern times, prompted some of the noblest flights of human eloquence.

PART THIRD: The principles of style.

If Eloquence depended solely on Style, those lofty pretensions of rhetoricians which were alluded to in the first paragraph of this paper would be not merely excusable or plausible, but to a considerable extent justified by their results. The highest qualities of style indeed are emanations from the mind; but many of its excellences may be attained by industrious practice, conducted in obedience to systematic rules. The expression may be feeble, because words, phrases, and sentences cannot be strong, unless the thoughts which they represent be strong likewise; it may be wanting in precision, because this is another quality flowing essentially from the nature of the author's conceptions; and if ornament be introduced, it may be destitute of originality and liveliness, because no rules can confer either the power of felicitous invention or that of extensive and acute observation. But even in these very particulars, art, although weak, is not altogether powerless; accuracy, or even strength of thinking, and closeness of observation, may be increased by sound precepts and active exercise, which, by thus improving the faculties of the intellect, will necessarily facilitate the expression of its thoughts by language. And, again, if a man can only be taught to apprehend distinctly the limits of the province within which his mind may act with advantage, and to adapt the character of his style to that of his natural powers, the rules of composition may suffice to render his style, if not positively good, at least negatively faultless.

The true place of style as a rhetorical instrument of belief.

But Style, instead of solely constituting eloquence, might, if we chose to court contradiction by stating a truth in the shape of a paradox, be even said to be no essential part of it. It is an unavoidable inference from the principles which we have laid down, that all eloquence is relative. The harangues which a chief in the centre of Africa delivers to his fellow-savages, or by which a demagogue in religion or politics excites an uneducated mob, such as unfortunately may still be found in our country as well as in others, may be truly and powerfully eloquent, because fitted beyond all other discourses for convincing and impelling to action the persons on whose understanding and will they are designed to operate; and yet, not only may these orations contain constant violations of all rules of style, except those few which are directly referable to the thought, but they may owe to such violations no mean part of their persuasive efficacy. This view, however, is stated solely for the purpose of guarding against error in our notions as to the place which style really holds as an element of eloquence. In all the applications of preceptive systems of the art in civilized and cultivated society, or, in other words, in all cases in which such preceptive systems can arise, the rules of style must be obeyed more or less closely, and the acquisition of them is indispensable for every student of rhetoric.

Reference to works on style.

But the details of the subject cannot here be taught. Our plan is that of a mere outline, and in filling it up we confine ourselves to an attempt to illustrate some of those points which bear most strongly on the mental laws of rhetorical belief. Those useful rules which affect style chiefly or essentially as such, may be satisfactorily learned from many works of different kinds, both in our own language, and in others, both ancient and modern. The principles of style in the classical tongues are not truths foreign to our own, but only truths which, always analogically useful, do in many instances hold as to all languages, while in some they cannot be applied to the tongues of modern Europe, without cautions and modifications: we may learn much from Aristotle, Quinctilian, Dionysius of Halicarnassus, and even from the later rhetoricians and critics, Greek as well as Latin. On English style we have many good works: Campbell, Blair, Kames, and Whately, abound with valuable illustrations of the subject in its relation to rhetorical principles; and of those treatises which are designed chiefly as manuals of style, without aiming at a general exposition of the philosophical principles of eloquence, more than one might be safely recommended. Of those works which have attained reputation in this latter class, none will be found so useful as one of the latest, Irving's unpretending and excellent Elements of English Composition.

The three rhetorical qualities of style.

We may here confine ourselves almost to a simple enumeration of those Qualities of Style which are strictly Rhetorical, and which, availing ourselves of Whately's extension of the analysis proposed by Campbell, we may reduce to three: Perspicuity, Vivacity, and Beauty.

1. Perspicuity.

The first quality is of course an indispensable requisite in compositions of every kind; and the principles of rhetoric remind us, that, while style, in order to be perspicuous at all, must obey certain general laws, the quality is also in a very important sense relative to the knowledge and intellect of those whom the language is intended to instruct, convince, or persuade. The same statement which is abundantly perspicuous to one audience, may be quite unintelligible to another less informed. In the adaptation of style in this respect to different classes of readers and hearers, the student cannot be so much aided by any rules as by his own judgment and observation; but in order to avoid, on the one hand, the obscurity which may arise from conciseness, and, on the other, the wearisomeness which inevitably attends prolixity, it has been recommended to repeat the thought and argument in several different forms, "each in itself brief, but all together affording such an expansion of the sense to be conveyed, and so detaining the mind upon it, as the case may require." "Cicero among the ancients, and Burke among the modern writers, afford perhaps the most abundant practical exemplifications of this rule." But, as we shall speedily discover that an overflow of figurative language is inconsistent with perspicuity in all circumstances, we must not be thus tempted to believe that the style which is least figurative is the most perspicuous. Illiterate audiences, in particular, are not only pleased with figurative language, but may often by means of it be made to comprehend a principle, which would have remained perfectly dark to them if conveyed in abstract and unimaginative terms.

2. Vivacity.

Vivacity of style is the quality by which it makes its appeal to the imagination, or, through that faculty, to the passions and other active powers. Independently of those considerations as to the number and arrangement of words, upon which we cannot here enter, Vivacity is chiefly produced by the use of figurative language, which critical and rhetorical writers have divided into two kinds, Tropes and Figures. It has been said by some writers of authority, that the distinction implied in these terms is of little importance, because, it is added, "nothing can be built upon it in practice, nor can it always be clearly observed." The language of the imagination and passions, however, does naturally fall into two classes, the characteristics of which correspond substantially with those assigned by the rhetoricians to their two divisions; and the student of the principles of eloquence may find it worth while to recollect the distinction. In the former class, which one may consider as properly Tropes, taking the metaphor as an example, a word is used in a sense different from its usual and appropriate one. In the other class, composing the Figures, a word or sentence, without being either employed in a different sense from its usual one, or put into any unusual form, derives its figurative or exciting power merely from the fact, that the form of expression is not that which an unimpassioned mind would have used in the place where it occurs, but that which would have suggested itself to one whose feelings or imagination were at the time highly active: the Interrogation, the Apostrophe, the Exclamation, and similar rhetorical figures, may be cited as instances. There is at least one practical inference deducible from the distinction; namely, that the Trope proper may sometimes be safely used by rule, while the Figure proper will always be ridiculous unless prompted by genuine emotion. The former may have place in all the degrees of style, from the calmest to the most animated; the latter is appropriate to eloquence of a highly passionate or imaginative cast, and is indeed much more rarely admissible in written prose composition than in poetry or in spoken oratory.

3. auty.

Perspicuity and Vivacity are qualities of style, which minister directly to the great purpose of eloquence, and which, indeed, language must possess before it can reach its rhetorical end by both of its two leading paths; the former being essential for the conviction of the understanding, and the latter for the awakening of the fancy and the feelings. The same thing cannot be said, at least not without qualification, as to the third quality of style, namely, Beauty or Elegance, whose immediate purpose is the gratification of taste. Either in this place, or at a former stage of the inquiry, there might have been room for some curious speculations as to the functions which taste really exercises as an oratorical instrument of belief; but the practical inferences, on which alone it is proper to enter, are very plain, and may be very briefly stated. If it is found that the gratification of the taste of those whom we address is likely to impede our progress towards impressing on their minds the truth which we wish to teach, we should at once abandon all attempts to furnish such gratification, and pursue our principal end by means of clearness and animation. But if it is found, as it most usually will be, that our purpose may be promoted by gratifying the sense of beauty in our hearers, either through the general elegance of our composition, or even through longer and more sustained addresses to the imagination, not issuing in the excitement of passion, but resting ultimately in the mere pleasure of contemplation,—we shall be bound to use, so far as we are able, this lawful means of persuasion; taking care however to recollect, that, as soon as we have reason to believe the minds of the hearers in danger of being tempted towards such a lively attention to those incidental ornaments of our discourse as will exclude from their thoughts the main subject of it, we have thus evidence that it is time to discard the assistant, which, like a spoiled domestic servant, has begun to play the part of the master.

III.

The last division of the three, in which we undertook to treat the subject of this paper, embraces what may be called the Criticism of Rhetoric.

This branch, as it must present itself to the student, should engage him in an examination of the most celebrated efforts of eloquence which have been given to the world, either by speech or by writing, in ancient as well as in modern times; the philosophical principles of the art being assumed throughout as the standard, and the analysis of the works being instituted for the purpose of discovering the extent and particulars of their obedience to those fundamental laws, or their departure from them. In reflecting, however, on the limits within which the plan of this work necessarily and properly restricts our contribution to it, we have more than once, convinced of the inadequacy of all that could be here performed, towards aiding the student in this interesting and valuable department of his training, felt strongly inclined to content ourselves with a brief though earnest exhortation to this branch of rhetorical studies, as indispensable for all who would derive full advantage from a systematic acquaintance with the principles. But there is one consideration which imperatively forbids this. We would not willingly, it is true, be suspected of hoping that we shall be able to convert to the orthodox doctrine any who remain incredulous after perusing the higher and more elaborate works on rhetoric; but our outline may fall into the hands of some who either have not studied the subject at all, or have not derived their notions of it from the best sources. To such readers, indeed, our illustrations are particularly addressed; and we shall have failed altogether in our purpose, if our mode of treating the subject should lead to a radical misapprehension of the relative importance belonging to the several branches into which the study of rhetoric divides itself; a result which would be not unlikely to happen, if one essential department were dismissed with a simple recommendation, however warm.

Critical observations, to be here confined to political oratory.

But the plan adopted in our systematic section, resembling that of a map, in which the chief cities of an empire are laid down in their relative bearings, is inapplicable to the present division, in which, as we assume the office of topographers, we must select one or two narrow districts as the scene of our labours. The province from which our very few specimens will be exclusively selected, is that of Political Oratory, which offers to the student of eloquence peculiar advantages, arising chiefly from the universally acknowledged excellence of the ancient masterpieces, from the high merit, as well as interest, of many works of the kind in our own country, and from the immense variety which the compositions display, both in matter and in form.

I. ANCIENT ORATORY. Its superiority over that of modern times.

In many of the qualities essential to eloquent composition, the historical writings of the moderns, and some of their philosophical works, will, at least, suffer no dishonour by comparison with those of the ancients; although on a close and comprehensive parallel they cannot, with respect to the mere manner of delivery, be fairly said to equal the philosophy and history of the heathen world. But, in Public Speaking, the Eloquence of the Ancients has left modern oratory at an immeasureable distance; and in this field the Greeks are even farther superior to the Romans, than these are to the nations of Christian Europe.

The great age of Grecian oratory.

The great age of the Grecian Orators embraces scarcely three generations, and the most celebrated names are to be found about the middle of the period, all within the petty district of Attica. The critics of the Alexandrian school, when they issued in a later time that sovereign decree, which declared certain authors and no others, in every department of literature, to be classical and worthy of study, admitted into their approved list ten Attic orators, of each of whom, excepting Hyperides, we possess some remains. Antiphon, Andocides, Lycurgus, and Dinarchus, must not here detain us; and Lysias, Isocrates, and Isæus, can scarcely receive more attention, although their works are far from being undeserving of study as models of eloquence, and are singularly instructive as illustrating, in many varied cases of private litigation, points which bear upon the merits and character of the two great orators, and which present themselves less prominently in the political, and even the judicial harangues, which have been bequeathed to us by these latter. Lysias, one of the simplest and purest of Attic writers, is especially commended by the ancient critics for his skill in the introductory and narrative parts of his orations; and Dionysius of Halicarnassus considers Isæus as closely resembling him, with less real eloquence and less nature. Isocrates, who merely composed discourses to be delivered by others, and was the teacher of all the most celebrated orators who succeeded him, is one of the greatest masters of style whom Grecian literature possesses; while he unites this quality

The ten Attic orators.

Lysias, Isæus, and Isocrates.

with others of a higher class in some of his discourses, such as the oration written in the name of Archidamus, which, with another composition of the same author, is our only example of ancient political pamphlets, or argumentative discussions on temporary topics, avowedly composed for circulation, not for oral delivery.

The two great Attic orators, Demosthenes and Æschines.

But the most exalted place, not among the Athenian orators only, but among those of ancient times in general, belongs to the two celebrated contemporaries and rivals, Demosthenes and Æschines, of both of whom we possess adequate specimens.

The character of the genius of Demosthenes.

The fame of Demosthenes has suffered less question from modern critics, than that of any other ancient author whatever; and no one who studies the works of the mighty Athenian with intelligence, sensibility, and becoming information, will dream of dissenting from the universal judgment. The secret of his success lay unquestionably in that predominant quality which, difficult or impossible of analysis, but instinctively felt by his readers, while they are carried along on his irresistible current of thought and feeling, the ancients called his vehemence (δεινότης),—that strong firmness of soul with which he threw himself upon his subject, grasping its details in all their relations, forcing them to support him as he hurried towards the end which lay before him, and kindling them, by the flashes of his imagination and passion, into lights which illuminated his headlong course. Dionysius, one of his best critics,—who analyses his style into a combination of all those which had preceded, uniting, in particular, the austerity of the early orators and historians with the polish of the later,—describes the effects of his orations upon the feelings, when compared with that which is produced by such compositions as those of Isocrates, by saying that the latter leave us in the same contemplative mood as if we had been listening to strains of exquisite music, while the former inspire us by turns with all the passions incident to humanity, and with an agitation as fierce as that which raged among the initiated during the celebration of the mystic rites of Cybele. And yet the man who, by stamping upon his subject the impress of his own vigorous and impassioned mind, has made himself thus eloquent in the very loftiest sense which the word can bear, attained this high excellence and unchallenged fame by a course of self-training the most severe that is on record, and, after all his exertions, wanted altogether many of those lesser attractions, both of matter and of style, which have of themselves been sufficient to establish the fame of meaner orators. A writer in the Edinburgh Review in 1820, whose hand is easily recognisable as the same which annexed the Dissertation on the Eloquence of the Ancients to the collected edition of Lord Brougham's speeches, has not one whit overstated the amount of Demosthenes's deficiencies, in describing him as having gained his ascendancy "without any ostentation of profound reflection or philosophical remark—with few attempts at generalization—without the glare and attraction of prominent ornaments—with extremely few, and those not very successful, instances of the tender and pathetic—with a considerable degree of coarseness, and what we should call vulgarity—and absolutely without any pretension to wit or humour." "Could the manner of Demosthenes be copied," says David Hume, with an unusual warmth of commendation, "its success would be infallible over a modern assembly. It is rapid harmony exactly adjusted to the sense; it is vehement reasoning, without any appearance of art; it is disdain, anger, boldness, freedom, involved in a continued stream of argument; and, of all human productions, the orations of Demosthenes present to us the models which approach the nearest to perfection."

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It would be easy, if our limits allowed us, to indicate, in every one of the political orations of Demosthenes, instances illustrating his favourite and characteristic methods of influencing his hearers;—his striking and lively narratives of interesting facts, like the scene at Athens on the taking of Elatea, painted in the oration for the Crown;—the happy illustrations from familiar life which abound everywhere;—the metaphors few and brief, and effective in proportion to their briefness and rarity, like the example in the first Philippic, where Philip is represented as a hunter, and the Athenians as his prey lying quietly within the toils;—those tremendous invectives launched by turns against Philip and his Athenian partisans;—those apparently unpremeditated bursts of feeling, in which every strong emotion, personal or political, in the minds of the audience, is awakened by an honest, indignant, conversational remonstrance,—a class of appeals exemplified in the celebrated reproach to the Athenians for their newsmonging indolence, while events the most extraordinary were summoning them loudly to action (introduced originally in the first Philippic, and again more briefly in the speech on Philip's Letter);—and those grandest and most sustained flights of all, in which the nationality of Greece, and of Attica, the proudest tribe of Grecians, is at once aroused and flattered by the most dramatic exhibitions of their ancient glory and greatness. For those who wish to see most of the orator's characteristics developed within a moderate compass, none of the orations perhaps is better suited than the third Philippic. His favourite paradoxical argument, that the utter wretchedness of the Athenian affairs at that juncture, caused, as it had been, by their own shameful inactivity, gave them truly the best reason to hope for success on a change of measures,—is followed by an argument, not unlike Canning's in 1826 for the war with Spain, in which the speaker maintains that peace is unattainable from the position and character of the enemy, whose treachery is exemplified in a style of the most powerful irony: the arbitrary government of Philip, and its results, are set in strong contrast to the nature and consequences of the liberal supremacy which Athens, Sparta, and Thebes, had by turns exercised over the free states of Greece: a bitterly contemptuous simile, the celebrated one of the heir and the slave, introduces a noble parallel between ancient honesty and modern corruption: the story of Euphræus adds individual interest to the general picture of the misusage of the Greeks by Philip, which receives its finishing touches in the indignantly sarcastic description of the fate which had befallen Philip's submissive victims, the men of Oreum and Eretria: and the brief practical summary of advices which closes the speech is ushered in by a declaration which the speaker thunders in the ears of the Athenian people, with the majesty of a king commanding his subjects—that if all mankind should consent to be slaves, the struggle for liberty must still be maintained by them, who of old had been so proudly illustrious and free.

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But both Demosthenes and Æschines may be studied to most advantage in the extant orations delivered by each of them on two occasions, in which their personal character and fortunes were at stake. The former of the two was that on which Demosthenes impeached his rival for corruption and misconduct in the famous Embassy to Philip. His speech in support of the accusation is as characteristic as any of his which we possess, and, while it abounds with his other excellencies, is particularly happy in its wealth of picturesque and pointed incident; Philip's oath in the tavern, the anecdote of Satyrus, the supper of Phaidimos, and the melancholy group of the Olynthian prisoners, being singularly beautiful examples of this kind. The answer of Æschines is yet finer, being, indeed, the acknowledged masterpiece of that most skilful and eloquent orator, whose fame, but, for the overshadowing neighbourhood of his immortal rival, would have grown up higher and more widely than that of any other public speaker of the ancient world. But these two orations on the παραπρεσβεία, as they are usually called, are not so well fitted to become rhetorical exercises as the other two, being the Orations on the Crown, or the accusation and defence of Ctesiphon. Upon these we must enter more minutely, the latter being by far the most admirable of Demosthenes's works.

The two orations on the Crown.

While the Athenians were engaged in their struggle against Philip, Ctesiphon had moved and carried in the assembly of the people a decree for honouring Demosthenes with a civic crown, as a benefactor of his country. After the battle of Chæronæa had made Greece truly a province of Macedon, Philip and his son, by a very sound policy, allowed the Greek citizens to fight out their old political quarrels; and Athens continued to be torn in pieces by her two factions, as incessantly as when the one, headed by Demosthenes, had opposed Philip to the death, and the other, actuated by very various motives, and led by Æschines in alliance with the virtuous Phocion and others of the aristocratic party, had urged early submission to the conqueror. The latter faction eagerly seized Ctesiphon's decree as a means of crushing Demosthenes. It was grossly and undeniably illegal in two respects; having been issued before Demosthenes had given in his accounts for certain public offices which he then held, and having directed the proclamation of the honour to be made in the theatre, not in one of the national assemblies; both of which acts were forbidden by subsisting laws. If, then, the sole end had been to procure a conviction against Ctesiphon, and if the court appointed to try him had been well informed and impartial, the issue could not have been for a moment doubtful. The court, however, possessed neither of these qualifications; and, moreover, although Ctesiphon was nominally the person impeached, yet the sentence against him was avowedly intended to be used as a vote of censure on the whole political conduct of Demosthenes, and the proceedings would not, to the slightest extent, have answered the purpose of their promoters unless this should be their understood result. On this ground both parties prepared to fight the battle; and the contest, prompted by party spirit and personal animosity, involving in its decision no great political question, and debased in its progress by numberless instances of calumny and malevolence on both sides, has nevertheless given us two such specimens of eloquence as neither judicial nor political oratory has equalled before or since.

Analysis of the oration of Æschines on the Crown.

Those who recollect that this was the real state of the question, will admire the skill and judgment exhibited by Æschines in conducting his argument in support of the accusation; in which, if we are to believe that the parties understood Ctesiphon to be the real and only defendant, he cannot be absolved from the charge of having made a most injudicious, and indeed partially irrelevant choice of topics, and of having by his line of remark wilfully drawn upon himself the triumphant reply of his adversary.

The exordium.

The exordium is simple, but very fine: it contains a complaint of factious and unlawful exertions made by the opposite party, and of an inveterate disuse of certain old regulations, which disuse had enabled demagogues to carry laws destructive of the constitution: it declares the right of impeaching the proposers of such measures to be the only remaining safeguard of the state: and it concludes with an animated address, calling on the judges to deal fearlessly with the cause, as the sworn administrators of justice and as citizens intrusted with the protection of the laws and of freedom, like soldiers placed in the front of the battle.

The proof and argument.

The speaker instantly passes to the strong part of his case,—a clear exposition of the several laws which Ctesiphon's decree was alleged to have transgressed, a proof from the public records that the decree had in fact violated those enactments, and a statement and refutation of every sophism by which the adversary could be conceived likely to support the plea that the laws did not apply to the notorious facts. His argument, in all its parts, is completely unanswerable; but it occupies barely a sixth part of the oration; and the words of the decree, assigning as reasons for the honour conferred on Demosthenes, his virtue, his courage, and his constant pursuit of the true weal of the state, give the cue for the commencement of the attack upon him, the real object of the prosecution. The nominal defendant is dropped as an incumbrance, and the orator girds himself manfully for the serious part of the onset. We cannot follow him through the details of his enemy's political conduct, private life, doubtful pedigree, and faulty oratory, all of which are described with a plausible minuteness, and with the keenest sarcasm. Political folly is the slightest of the charges: Demosthenes is accused, at every step, of political dishonesty,—of peculation and corruption,—of favour to the Persian king, and co-operation with his views, a charge which was quite true and quite creditable to the accused, but was as skilfully chosen for rousing Athenian prejudices as a charge of combination with France would have been for exciting an English mob in 1793,—and (which sounds rather oddly) he is roundly taxed with a secret attachment to the Macedonian interest, and with the secret acceptance of bribes from Philip. There were two points in which Æschines had a strong hold on his antagonist, and with which he therefore taunts him incessantly: the unhappy issue of the war with Philip, which, it is again and again asserted, had been wholly caused by the policy of Demosthenes; and that orator's unfortunate deficiency in personal courage, which had prompted him to a disgraceful flight at the battle of Chæronæa. There are many fine passages in the earlier parts of this long review; but the orator does not begin to rise steadily till, in closing the main section of his argument under this head, he recalls the glory of the Persian times, and contrasts the simple honours which rewarded the patriotism of Miltiades, Aristides, and the soldiers who conquered in the battle of the Strymon, with the profuse decorations now every day lavished on the chiefs of petty factions.

He then reminds the judges that, after all, from the terms of those articles of impeachment which they sat there to try, even his failure in convincing them that Demosthenes was a bad man and a bad citizen would not entitle Ctesiphon to an acquittal, since his decree, as proved in the first part of the argument, was at any rate manifestly illegal: he urges them to insist on Ctesiphon or his advocate keeping closely to the point; and he exhorts them yet more strenuously to compel his adherence to the division of the argument which Æschines had laid down, and still more particularly to the order of the topics adopted in that division. He now proceeds with increased rapidity and vehemence. He anticipates Demosthenes's passionate style of address, cautions the judges against its effects, and endeavours to render it ridiculous by mimicry. He answers by anticipation, and with much manliness and candour, though with severe recrimination, the personal abuse which he professed to be certain that Demosthenes would heap upon him.

The peroration.

He then, entering on his peroration, passes to a summary of the whole argument, amounting to this, that the decree was illegal, and that, although it had been perfectly regular, Demosthenes was utterly unworthy of the honours which it conferred. He thence rises into one of the noblest and most effective exhortations which the records of oratory have to exhibit; opening with skilfully chosen instances of the severity with which the existing laws had recently punished citizens who deserted their country, as Demosthenes had deserted his place in battle and his duty as an adviser of the state; reminding the judges of those feelings of shame with which the Athenians would appear in the presence of Greece at the approaching national convocation, if they should have failed to brand with infamy the destroyer of their country; and closing with what is perhaps the very grandest extant example of solemn imaginative eloquence.

He calls on the judges to conceive the wise and good of old as rising and surrounding the tribunal,—Solon entreating the judges to respect their oaths and the laws,—Aristides in anguish deploring the perversion of justice. "Think ye not," exclaims he in conclusion, "think ye not that Themistocles, and they who died at Marathon and at Platæa,—ay, and the very graves of your forefathers,—will utter groans, if he who avows that he conspired with the barbarians against the Greeks shall be publicly honoured by your decree?" It is provoking to be compelled to add, that this admirable close does not conclude the oration. A few common-place words of application would have wound up the discourse in the usual way; and these accordingly Æschines does not fail to insert; but not till, with the sound of his own magnificent exorcism still ringing in his ears, he has marred everything by a tragic invocation of the earth and the sun, and virtue, and intelligence, and instruction, conceived in the very worst taste of Euripides, all but nonsensical in itself, misplaced in any oration, and in this a most humiliating spectacle of incorrect judgment degrading and disarming genius.

Every one knows what was the issue of the contest. Ctesiphon was acquitted; and his accuser, having failed in gaining the number of votes which would have protected the charge from being considered frivolous and malicious, was fined, and compelled to go into exile. We do not possess such materials as enable us to judge of the relative strength of the two factions among the numerous judges who pronounced this decision; but the splendid oration of Demosthenes for the defence, now perused by us under every possible disadvantage, would tempt us to believe that, in an audience so volatile and susceptible as the Athenians, who were confessedly on many occasions impelled hither and thither by the orators at their will, even party-spirit may for once have been compelled to deny its own nature, and to become silent and impartial.

Analysis of the oration of Demosthenes on the crown.

The oration of Demosthenes, admirable though it be, will not call for a more minute analysis than that of Æschines; both because it is better known and more generally accessible, and because its strain may in part be anticipated from the outline which has just been given. Many of its most striking beauties we must pass unnoticed, and we can but indicate one or two others; such as the skill of insinuation throughout, with which the orator endeavours at once to kindle the feelings of his own party, and to conciliate those of the other; the frequent felicity of illustration, as where he compares Æschines to a physician, who, after having watched his patient through a long sickness, propounds his remedies for the first time on the day of the funeral; the fine sketches of character, like that noble one of Philip, crippled in every member of his body, but unsubdued in mind, and burning with the love of power and honour.

The exordium.

The Exordium is exceedingly skilful. After briefly claiming credit for good will, the speaker protests, with a very well acted indignation, against the attempt of his adversary to bind him to a particular order of topics, which, he asserts, the judges cannot countenance without violating their oath and every principle of justice: he then, after adverting to his own disadvantages, declares with artful earnestness, that the turn which Æschines had given to the accusation had, as he now found, put the character of Demosthenes himself distinctly in issue, forcing him, whether he would or not, to defend the whole tenor of his public life: he asserts peremptorily, that if Æschines had confined himself to the matters really suggested by the articles of impeachment, he, in the defence, would have entered at once on the question of the legality of the decree, but that he was now obliged to follow a different course in order to dispel unfounded prejudices: and he closes his introduction by insinuations against the accuser, both for his long delay in bringing the charge, and for the form in which it was at length presented.

The propo- sition an argument

He commences the body of the oration by intimating his intention to answer specifically each article of the charge, after he shall have premised a general view of the state of affairs when he first entered on political life. We cannot follow him through the details by which he redeems, or seems to redeem, this promise; but two or three points may be selected as prominently instructive. Indignant denials of unproved charges are thrown out at the very commencement, and accompanied by that overwhelming strength of recrimination which is exerted in almost every page of the whole speech: again and again, from the very opening of the argument, he protests that his line of reasoning had been forced on him by his adversary; and not till after he had endeavoured to destroy the whole credit of the accuser, by repeated and detailed charges of gross dishonesty and corruption, does he venture to approach the articles of impeachment themselves. At length he recites them, and enters on his answer; but, protesting once more against the accuser's tactics, he professes himself compelled to defend, in the first place, that part of the decree which sets forth his own character, which he vindicates by a long and animated history. He then, with a contemptuous negligence of expression, intimates that there seems to be no other task left him, than to prove the strict legality of the decree, in favour of which he delivers an argument extending to about one twentieth part of the whole discourse. On this point, which was the one formally at issue, his defence is as lame as can well be conceived: Æschines, indeed, by his arguments in anticipation, had beaten away from beneath his feet all the ground on which he could have hoped to stand: one such plea, however, from the existence of a contradictory law, he does plausibly support; and one unanticipated ground which he urges, intended as a denial of the fact, proves, on close examination, to amount nearly to this, that although he had not accounted when the decree was passed, he had done so before the accusation was brought, and his accounts had not been challenged.

But the great orator, strong as was his faith in the legal inaptitude and factious prepossessions of the judges, dared not to close his case on such sophisms as this; and accordingly, when he leaves the question as to the legality of the decree, never again to mention it, the oration is not quite half over. He immediately resumes his former detail of facts, grappling, however, more and more closely with Æschines, and following up every proof of his own patriotism and sagacity with a stinging contrast between his conduct and that of his enemy. Of the two points on which his argument was weakest, the one, his own personal courage, does not draw from him a single word; but the other, the undeniable failure of the policy which he had advised, it behoved him to touch; and as it was a matter in which, till some answer should be attempted, there might prevail in the minds of the audience a lurking conviction ruinous to Demosthenes and his cause, he summons up all his energies to dislodge the impression, introducing the subject boldly almost immediately after he had dismissed the legal argument, and disposing of it in one of his noblest appeals to national pride and the sense of honour. This magnificent passage of the speech is composed in the same lofty key in which we heard the orator closing the third Philippic: it rolls on in a mingled flood of rapid illustration, of proudly patriotic spirit, and of declarations of that love of freedom which must burn in Athens though all the world besides were dark; and it is terminated by the tremendous oath, in which the brave who had died in battle for their country are called as witnesses to the truth of the principles which the speaker maintained. This most eloquent and celebrated passage is not an argument: it will bear no analysis as such; but it is one of the most strongly felt and admirably wrought of all addresses to the feelings of national honour, pride, and independence. The alternations of argumentative with narrative matter which make up the staple of the oration are next resumed, and close at last in a remonstrance against the unfairness of the comparison proposed by Æschines, between the honours of the ancient times and those now conferred.

Th ero-rati .

A short peroration follows, in which Demosthenes, without attempting any summary, claims for himself, and denies to his rival, credit for possessing what he maintains to be the two principal qualifications of a good citizen; namely, unchangeable love for his country, and a constant inclination to prompt his countrymen to noble and ambitious deeds. The foreign faction are then painted with a few bold and hurried strokes; and the oration closes with a prayer to the gods to convert them if they will be converted, and if they will not, to cut them off from among the people, destroying a few men that the nation may be saved.

The re-cian o-quen of the wer Emp e.

We had designed to attempt exhibiting the eloquence of the great Attic masters in a yet stronger light, by contrasting it with specimens from the lowest ages of Greek oratory; and for that purpose we had selected one or two disputations of the learned and skilful sophist Libanius, the panegyrist of Julian the Apostate. Want of space, however, compels us to abandon this intention; and as the same cause prevents us from entering minutely on the Orations of Cicero, we prefer leaving these altogether untouched, to passing them with a few vague generalities. The characteristics of Cicero's admirable eloquence, and the differences between it and that of Demosthenes, are matters familiar to every one; and the study of the Latin orator is more common than that of the Greek, nearly in the inverse proportion of the real merits of the two.

The o-quen of Rom and of C ro.

II. M ERN ORA Y.

Aristotle, in his Rhetoric, makes an observation which has been sometimes treated as an extravagant paradox. He says that courts of law are the great field for the display of impassioned eloquence; and that, on the other hand, deliberative assemblies, being convened for the purpose of determining on their own affairs, will always force a speaker to keep to the point, and are of all audiences the most intolerant of declamation. Now, with regard to the judicial tribunals of Greece in the philosopher's own time, the first part of his assertion was unfortunately quite true; and as to the latter part, if the proceedings in the Ecclesiæ of Athens did not justify it, which they probably did, those in our own British houses of parliament, which may still be considered as the only great modern schools of political eloquence, have most signally demonstrated its truth. The eloquence of our statesmen is remarkable for its tone of practical sense, the closeness of its adherence to the business immediately in hand, and its general avoidance of oratorical excitement and display, even on occasions when these are justly called for. The character of our great speakers as statesmen likewise has been inextricably mixed up with the consideration of their strictly oratorical merits; and hence more than one of them hold in universal estimation a rank as orators, which they owe in no mean degree to their talent and success as political leaders. Altogether, while there has generally prevailed among us, and more especially till the beginning of the present century, a tendency to depreciate unduly the eloquence of our statesmen, there are yet very few of them indeed whose works could be recommended, unless with much qualification and explanation, as models for the rhetorical student. The speeches of the younger Pitt, eminently characteristic both in grasp of intellect and haughty stubbornness of will, often admirable and masterly as details of facts or expositions of principles, and frequently most highly successful in the speaker's favourite tone of contemptuous recriminative sarcasm, are but indifferently adapted for the end which we at present have in view. Those of Fox are entitled to rank far higher as specimens of oratory; and indeed, for those who have purity of taste enough to relish the severer graces of a manly and practical eloquence, always drawing its materials from a vigorous and richly stored understanding, always animated by at least a calm and lofty feeling of truth and freedom, and sometimes inspired by a genuine and rapid enthusiasm, but never stooping to be graceful, nor pausing to gather ornaments on its way,—for minds which can appreciate eloquence like this, the speeches of Fox will form a treasure of models, in which they will not only find successful exemplifications of most of the principles of eloquence, but much that will remind them of the calmer moods of Demosthenes. But several others of our British statesmen, especially of those who flourished in the end of last century and the earliest years of this, deserve from the student of eloquence more industrious study than those two great men. Among these, we can do no more than name Grattan, Erskine, and Sheridan; and we pause at the threshold of the present age, naming no man who is still alive.

The c racter politic orator n Great ri-tain.

he spe h-s of P d Fo

The speeches of Grattan, Erskine, and Sheridan.

The three great orators.

But of the political orators who have preceded the present time both in the last century and this, by far the most remarkable, in a merely rhetorical point of view, were these three; Chatham, Burke, and Canning.

The eloquence of Lord Chatham.

Very many of Chatham's speeches are unreported; many of the earlier ones have reached us with much distortion; and there are but a very few in which we can believe ourselves to be listening throughout to the exact words of the speaker. But enough remains to convince us that Chatham was the most powerful and striking political orator whom our country has ever produced. His celebrated youthful retort to the elder Horace Walpole bears unequivocal marks of being, in the shape in which we possess it, the manufacture of Samuel Johnson; and we have scarcely any speech completely and genuinely reported, which was delivered before his fiftieth year. In the orations succeeding that time, our recollection of the speaker's age and lofty position in the state prepares our minds to harmonize with the tone of address, and to consider that as noble boldness, which in a younger and meaner man might have received another name. The tone is never varied; it is always uncompromising, stern, and admonitory: the speaker is not an advocate devising means to conciliate and persuade, but a preacher of truth and right, denouncing judgments on political transgression. Chatham's mind never grew old; to the last hour of his public life the feelings glowed as passionately, and prompted images as vivid, and alternately checked, and impelled, and transformed the language, in figures as abrupt and varied, as in the morning of his youth and dawning ambition; the sickness and decay of the body were overcome by the resistless energy of the fiery soul; and the British House of Lords trembled before the cripple who stood up feebly in the midst of them, to grow strong as he spoke by the impulse of his own fervent imagination. The idol of Chatham's mind was the baronial constitution of England as confirmed in Magna Charta, which, indeed, with the Petition and Bill of Rights, he himself called the Englishman's political bible: all the strong and diversified powers of his intellect, in observation, judgment, and rapidly convincing argument, and all the array of his chivalrously generous feelings, did continual homage at the one sacred shrine: attempts from below to widen the area of the political edifice, that the mass of the people might come in, the aristocratic Whig would have laughed to scorn: insidious endeavours from above and within to shake the pillars of the temple, roused him repeatedly to overwhelming indignation. His eloquence found its most favourable field of display in two questions of his time: the famous elections of Wilkes for Middlesex, which were made the occasion of fierce debates as to the constitutional rights of the subject; and the more

The statesman, like the clergyman, the [illegible] and [illegible], has a sort of uniform which important discussions on the American war. The former of these themes, in which Chatham stood forth as the champion of the people against the supposed usurpation of the House of Commons, drew from him some of his most electric flashes of passion and imagery. One is the speech in 1770, on the Marquis of Rockingham's motion for an inquiry into the state of the nation; in which occurs the splendid passage beginning with the bold prayer for the prevalence of discord, if freedom could not otherwise be preserved, thence passing to the parallel between the scriptural records and the charters of the English constitution, and ending with the stern allusion to the value which the Revolution of 1688 possessed as a warning to succeeding British monarchs. But it is to the American question that we owe his finest speeches; and on this subject we have a series of harangues, exhibiting in admirable union the intellectual, the imaginative, and the passionate elements of oratory, and invaluable to the student, both for their high rank in these points of excellence, for the pointed nervousness of the style, and for the singular force and nature of the rhetorical figures,—indignant interrogation, sudden self-correction, and anxious and solemn repetition. The finest of all is undoubtedly the speech on the address to the throne in November 1777. But no parliamentary speech whatever is more interesting, or more honourable to the speaker, than the extemporaneous address elicited from the old man in the same year, by the ministerial defence of the employment of the Indians in America. In the imperfectly reported speech which he delivered on that memorable evening, his last in public life, when he fell down in convulsions, on rising to reply to the attacks of the Duke of Richmond, he related the whole history of the war with America; he repeated the predictions which he had himself day after day pronounced as warnings to the state; and, like a dying prophet reproaching an unbelieving generation, he followed his recital of every prediction by the words, "And so it proved!"

The eloquence of Burke.

Burke's speeches and political pamphlets compose by far the most valuable body of lessons in eloquence which our language possesses. They instruct us sometimes by those failures into which the orator was betrayed by his teeming, imaginative, and exciteable genius; but they teach us at least as often by examples of the most signal and splendid success. As Burke, more than any other of our statesmen, nourished the ambition of rivalling ancient eloquence, so his works, in the variety of their oratorical qualities, and in the finish which they frequently exhibit, do unquestionably come nearer than any others to the ancient character. They are, it is true, in their prevailing manner, more like to the ornate and redundant elocution of Cicero, than to the severe simplicity of the great Athenian; but some of their happiest images and thoughts are derived from Demosthenes, and some equally happy are not unworthy of him. Burke's style, while it is highly argumentative, is distinguished, beyond that of any other political writer or speaker, for the continual distrust which it exhibits in the hearers' ability or willingness to follow trains of pure argument: the imagination is constantly excited by illustration and imagery: and, to use our rhetorical terminology, the favourite argument is the example, instances real and fictitious being crowded upon each other, as if the speaker were resolutely determined to appropriate one to every individual who listened to him; and the argument being at length usually closed by a strongly worded aphorism, sometimes true and as often erroneous, very seldom logically proved by the arguments which have preceded it, but always strikingly illustrated by them, and exhibited in the most conciliating and attractive light. Perhaps Burke's oratorical skill and genius are not anywhere displayed so remarkably as in his Reflections on the Revolution of France, in which the writer, besides the prejudice to which he exposed himself by his sudden change of party, had another and stronger disadvantage in his own mind; namely, that of defending and representing as paramount a series of principles in politics and legislation, which, if he had not substantively denied their truth, he had at least, in common with his party, always represented as subordinate to other principles which it was now his task to decry. But the man of genius did not shrink from the undertaking, and the powers of his remarkable mind bore him triumphantly through it; for no discourse could have been more skilfully conducted, or better calculated to make a strong impression. He even labours again and again to enlist in his new cause those feelings in favour of constitutional freedom, which he had so long been accustomed to rally round him; but he rests his hopes of success mainly on the excitement of other ideas and feelings, which he paints to the fancy in colours as bright as any in which his pencil was ever dipped. The horror of bloodshed, attachment to order, and fear of anarchy, now hold in the writer's mind that prevailing place which had formerly belonged to the hatred of despotism and the love of freedom: the sentiment of chivalrous devotion to kings and ladies is aroused by that beautifully and pathetically romantic picture of the Queen of France as the morning star: the departure of the ancient days of knightly strength and honour is seriously and warmly deplored; their very vices, it is declared, have given place to others worse, and their religious superstition is boldly preferred to the philosophical superstition of the modern sceptics. Among Burke's speeches, the masterpieces are admittedly those on the impeachment of Warren Hastings, which compose a field too wide to be here surveyed. Of the minor speeches there is scarcely one that is not both characteristic and highly instructive. None of them possesses greater variety than the speech of 1775 for Conciliation with America; the beauties of which it is not easy to select:—the vision of the guardian angel, who, drawing aside a curtain, displays the glories of Britain in sunshine, darkened but by one faint and distant spot (an image which, like many others of the same speaker, hovers on the very verge of poetry, and can scarcely have been successful in the House of Commons); the picturesque description of the kingdom of the backwoodsmen; the animated appeals to English freedom and free habits, like that in which he tells his hearers, that if they preach unconstitutional doctrines to the Americans, their English speech will betray them; the bold figures by which he introduces the resolutions which he was to move; and the classical image of the temple of peace, with which the oration closes. The speech of 1780, on Economical Reform, is at once manly, practical, and well reasoned, and full of the most happily-conceived ridicule. The celebrated speech at Bristol, and that on Fox's East India Bill, although possessing high oratorical merit, and abounding with fine passages, are yet less valuable to the student than to the politician. The speech on the Nabob of Arcot's Debts exhibits Burke at once in his full strength, and with much of his weakness; it is full of pertinent inferences from granted facts; rich in picturesque oriental imagery; and adorned by a profusion of oratorical figures, varying in character and success from the grand image of Hyder Ali and the cloud (after Demosthenes), down to the familiar one which represents the minister as sowing corruption broadcast, and the disgusting one in which one of the orator's most disliked adversaries is compared to the most unclean of animals.

The eloquence of Canning.

Of Canning we mean to say very little, besides recommending his speeches to the student as exceedingly instructive lessons. They are in the hands, and familiar to the recollection, of every one; and no estimate of their merits could be complete which should not analyse, by way of comparison, the oratory of one or more of his rivals who have not yet quitted the scene. In Canning's speeches, the orator seldom rises into strong passion himself, and never elevates the audience along with him: the loftiest atmosphere in which he ever moves is that of noble and generous feeling, expressed with warmth enough to kindle its glow in the breasts of others, but never so warmly as to deprive either them or the speaker of perfect self-possession. The direct and ultimate appeal to the imagination is practised much oftener and more boldly, and, in many beautiful and poetical pictures, is conducted with singular taste and success: a keen and playful wit, now veiled in irony, now half disguised in bitter sarcasm, and now shedding a fiery shower of open invective, is everywhere present, and almost everywhere holds a prominent place; and the oration, considered as an address to the understanding, is always clear and well reasoned, generally close and pointed, and often, in dealing with difficult materials, distinguished by consummate rhetorical skill. Of Canning's ingenuity in debating a delicate and hazardous question, we can desire no better instance than his eloquent and most skilful argument against Parliamentary Reform, delivered at the election dinner at Liverpool in 1818. The most passionate specimens of his eloquence are contained in some of his speeches on Catholic Emancipation; and his genius probably nowhere displayed its powers so commandingly as in two of its latest efforts, the speech and reply on the projected invasion of Portugal by Spain, delivered in December 1826. (B. L.)

RHINE, one of the circles of which the present kingdom of Bavaria is composed, and what till the treaty of Vienna in 1815 formed the French department of Mont Tonnere, and parts of the departments of the Lower Rhine and the Saar. It is situated on the left bank of the river from which it takes the name, and is bounded on the north-west by the Prussian territory; on the north by Hesse Darmstadt; on the east by the river Rhine, which divides it from Baden, and by France; and on the west by the Prussian province of Saarbruche. It extends over 3080 square miles, and contains 410,156 inhabitants, living in forty-four cities and towns, and in 665 villages. The number of the Catholics and Protestants is nearly equal. The province is divided, according to the former system introduced by France, into four departments or districts, and these are subdivided into cantons and communes. The face of the country is generally mountainous, with valleys between of considerable fertility; but none of the elevations exceeds 2200 feet. A large portion of the circle is covered with woods. Sufficient corn for the consumption is produced. Much wine is made; but little care being devoted to that article, it is almost wholly applied to internal consumption. There are some large mining operations in iron, and coals are found in abundance. Some mines of silver are now at work on a small scale; and several of quicksilver, copper, lead, and cobalt. Pot and pearl ashes are made extensively; and there are numerous saw-mills in operation. There are considerable manufactures of woollen, and also of hardware; and linen and cotton are manufactured to a small extent.

Rhine, *Lower*, a department of France, formed out of the German dominion of Alsace, and the territories of the former princes who were sovereigns of the several subdivisions. It is situated between 48. 12. and 49. 8. of north latitude, and between 6. 49. and 8. 9. of east longitude. It is bounded on the north by the department of the Moselle, and by the Bavarian province of the Rhine, from which it is separated by the river Lauter. On the east the Rhine is the boundary which divides it from the duchy of Baden. On the south it joins the department of the Upper Rhine, and on the west that of the Vosges and of the Meurthe. It extends over 1,045,760 acres, equal to 1634 square miles; and it contains 561,859 inhabitants of German origin, and the greater part of whom speak only that language. Though the majority adhere to the Catholic Church, the two sects of Protestants are numerous; the Lutherans being estimated at 160,000, and the Calvinists at 28,000. The eastern part is a rich level plain extending along the side of the Rhine, and watered by small streams issuing from the hills in the western part, and emptying themselves into that stream, after fertilizing the soil. The state of culture is good; and the land, cultivated like a garden, produces most abundant crops. In proceeding westward from the river, the ground rises gradually from hills 300 feet in height to mountains between 2500 and 4000 feet of elevation. In this mountainous district the soil is stony or sandy, and of ungrateful kind; but it abounds with extensive and valuable woods, whilst in the valleys some rich pasture-land is found. In the lower districts the chief bread-corn grown is wheat or winter barley, on the hilly parts rye and oats; but the whole department has a surplus of grain to aid the districts around them with one twelfth of its produce. On the levels great crops are raised of hemp, flax, tobacco, mustard, aniseed, hops, coriander seeds, poppy and other oil plants, and abundance of madder scarcely inferior to that of Holland. The hills afford fuel and timber, and their sides are covered with vineyards yielding abundance of wine of various kinds, and some very highly esteemed. Apples, pears, and plums, are abundant everywhere. Wine and fruit are considerable branches of the export trade. The mineral productions are insignificant, and confined to small portions of iron and some coals. There are various manufactories carried on in other parts of the district, but the chief are in and about Strasburg. They are ironmongery and fire-arms (including cannon), linen-weaving, spinning and weaving cottons, tanning leather, making paper, and some porcelain, and several minuter commodities. The Rhine facilitates commerce with Germany, with Holland, and with Switzerland, all of which branches are on the increase. The department elects four deputies to the legislative chamber. It contains four arrondissements, thirty-three cantons, and 554 communes. Strasburg is the capital, with a population of 57,885 inhabitants.

Rhine, *Upper*, a department in the south-east of France, formed out of Upper Alsace, the Sundgau, and the territory of Mulhausen. It is situated between 47. 27. and 48. 14. of north latitude, and between 6. 41. and 7. 27. of east longitude. It extends over 1584 square miles, and comprehends three arrondissements, twenty-nine cantons, and 489 communes. The population amounts to 447,019. They are generally of the German race, and speak a corrupt dialect of that language, very little differing from that spoken in Switzerland. They are for the most part of the Romish religion; but there are 40,000 Calvinists, 16,000 Lutherans, 3000 Menonites, and about 10,000 Jews, all equally recognised by the government. It is bounded on the north by the department of the Lower Rhine, on the east that river divides it from Baden, on the south it touches on Switzerland and on the Doubs, and the departments of the Upper Saone and of the Vosges bound it on the west. It is generally a hilly, in some parts a mountainous district, especially on the western side, where the range of the Vosges enters and approaches the Jura Mountains. The chief rivers are the Rhine and the Ille, both of which are navigable. There are several small internal lakes, some of them in very elevated situations, especially the Black and the White Lakes, the former of which is three miles in circuit, and the latter said to be 1000 feet

Rhode Island.

in depth. There are also many small canals, some to facilitate conveyance, and others to promote irrigation. The agriculture is conducted with a rigid adherence to old customs. The corn does not suffice for the consumption. Wheat is only grown in a few favoured spots; the greater portion of bread-corn is rye, and potatoes are extensively cultivated as a substitute for grain. The valleys afford good fattening and dairy land; but the black cattle are for the most part brought from Germany when young, and on the pastures here yield good butter, cheese, and meat. The breed of sheep has been much neglected. The horses are a small race, and not numerous. The hills have extensive vineyards, and produce abundance of wine, some of which is good, and forms an article of considerable export trade. The best sorts are those furnished in the vicinity of Colmar, Turkheim, and Befort. There are a great number of fruit-trees, but especially of cherries, from which a distillation is made; and the spirit called *kirchenwasser* is highly valued in Switzerland. This is a mining district, which formerly produced silver, copper, and lead; but the operations are now chiefly directed to obtaining iron and coal. These are the foundations of the chief manufactures, which employ a great number of hands in making cast and hammered iron, and ironmongery goods of various descriptions. There are several paper-mills, and many for spinning both cotton and flax. There are also manufactures of wool and hosiery. Much potash is also made, and some porcelain and glass. These are the basis of what trade exists. The capital of the department is the city of Colmar, with 15,958 inhabitants.

RHINOCEROS, a genus of quadrupeds belonging to the order of belluæ. See MAMMALIA.

RHODE ISLAND, one of the United States of North America, is bounded on the north and east by Massachusetts, on the south by the Atlantic Ocean, and on the west by Connecticut. It is forty-nine miles in length by twenty-nine in breadth, and contains an area of one thousand three hundred and fifty square miles, which lie between 41. 22. and 42. 3. of north latitude, and longitude 71. 6. and 71. 38. west from Greenwich. This portion of country includes what was formerly known by the name of Rhode Island and Providence Plantations, originally constituting two plantations or provinces. Compared with its limited extent, Rhode Island is a very diversified state. In the north-west part the country is hilly and broken, but it becomes gradually level towards the Atlantic Ocean. The state may be divided into three natural sections: the first, constituting four fifths of the whole, is a pretty hilly parallelogram, lying west from Narragansett Bay; the second consists of the delightful islands of Narragansett Bay; and the third section is a small irregular slip lying along Massachusetts, and east from Narragansett. This bay extends from north to south through nearly the whole length of the state, and embosoms a number of islands, of which the most important are Rhode Island, Connecticut, Prudence, Patience, Hope, Dyer's, and Hog Islands. Block Island, in the Atlantic, lying south of the state, is the most southerly land belonging to it. These islands, and the country bordering on the bay, are of great fertility, and are celebrated for their fine cattle, their numerous flocks of sheep, and the abundance and excellence of their butter and cheese. The state generally is better adapted to grazing than tillage. A large portion of the western and northwestern part of it has a thin and lean soil, which affords small crops of New England productions. Cider is made for exportation. Corn, rye, barley, oats, and in some places wheat, are produced in quantities sufficient for home consumption; and the various kinds of grasses, fruits, culinary roots and plants, are in great abundance and perfection. In some parts iron is found in large quantities; copper is also met with; and the state abounds in limestone, particularly the county of Providence. Anthracite coal is wrought on the island which gives name to the state, but it is not held in high estimation. There are several rivers in this state, but their courses are short: the principal are called Pawtucket, Providence, Pawtuxet, Pawcatuc, and Wood Rivers. These, and also the bays, swarm with many varieties of excellent fish. The climate is as salubrious as that of any other part of America, and more temperate than that of the other New England states, particularly on the islands where the ocean breezes have the usual effect of tempering the heat of summer and moderating the cold of winter.

Rhode Island.

The island called Rhode Island, situated in the bay of Narragansett, and which gives name to the state, is about fifteen miles in length from north to south, and three and a half in breadth. It is divided into three townships, Newport, Portsmouth, and Middletown. This island is highly celebrated for its salubrity, and here numbers of invalids resort from southern climates. It is also of great fertility, and noted for its breeds of sheep, neat cattle, and horses. The whole is under high cultivation, and in some months of the year presents so delightful an appearance as to have obtained for it the name of the Eden of America. Long. 71. 20. W. Lat. 41. 25. N.

In no state in the Union is so large a proportion of the population and capital employed in manufactures as in Rhode Island. The principal article is cotton goods, for the manufacture of which there are above one hundred mills. many of them extensive establishments. For the year ending September 1836, there were eighty sets of machinery in operation for the manufacture of other kinds of goods, including broad cloths, satinets, jeans, linseys, and the like. The quantity of wool produced was 265,261 pounds, valued at 133,957 dollars. Iron, ardent spirits, and some other articles, are likewise amongst the manufactures of Rhode Island. The exports consist chiefly of flax-seed, lumber, horses, cattle, beef, pork, fish, poultry, and cotton and linen goods. For the year ending September 1836, the exports of domestic produce were to the amount of 212,297 dollars, and of foreign produce 16,123 dollars; the total value of exports being 228,420 dollars, which appears to be considerably less than in some previous years. The value of the imports for the same period was 555,199 dollars. The amount of shipping of this state may be reckoned at about fifty thousand tons; but so rapidly have commerce and manufactures extended, that a period of only a couple of years is sufficient to produce an increase in these branches of industry which could not have been looked for in such a limited space of time. In 1837 the banks were sixty-two in number, having specie to the amount of 243,482 dollars, a circulation of 1,864,132 dollars, and a capital of 9,837,171 dollars.

Amongst the institutions of Rhode Island is Brown University, at Providence, a flourishing seminary. Academies are established in all the principal towns, and the state pays ten thousand dollars per annum for the support of free schools. The most numerous religious sect is that of the Baptists, who have about eighteen churches. There are, besides, the usual religious diversities which characterise a North American state, including many Friends.

Among the public works of this state may be mentioned the New York, Providence, and Boston Railway, extending from Stonington in Connecticut to Providence in Rhode Island. About forty miles of it lie in the latter state. It is connected with another railroad, and forms part of a line from Boston to New York. Other works of the kind are in progress.

The population of Rhode Island in 1839 may be estimated as amounting to at least 125,000. The capital of the state is Providence, an account of which will be found under that head.

Population of the Counties and County Towns.

Counties.	Population 1820.	Population 1830.	County Towns.	Population 1830.	Distance from Providence.	Distance from Washington.
Providence	35,786	47,014	Providence	16,832	...	394
Newport	15,771	16,534	Newport	8,010	30	403
Washington	15,687	15,414	South Kingston	3,663	31	389
Kent	10,228	12,784	East Greenwich	1,591	15	406
Bristol	5,637	5,466	Bristol	3,054	15	409
	83,109	97,212				

Newport, which shares metropolitan honours with the capital, being the seat of government every alternate session, is beautifully situated on the south-west end of the island of Rhode Island, five miles from the sea, and in latitude 41. 29. north, and longitude 71. 21. west. The town lies north and south, upon a gradual ascent east from the water, and exhibits a beautiful view from the harbour and the neighbouring hills. The principal street is more than a mile in length. The harbour, which spreads westward in front of the town, is one of the finest in the world, and spacious enough to allow a large fleet to anchor and ride in perfect security. The entrance is safe and easy, and it is defended by three strong forts. Newport contains a state-house, a jail, several banks and insurance offices, a valuable public library, and houses of worship for most of the religious denominations that are found in New England. A very elegant building is appropriated to the library. This town is famous for the salubrity of its climate, and more noted than any other American town for the variety and excellence of its fresh fish. Newport was first settled in 1636, and before the American revolution had attained to considerable commercial importance. During that war it suffered severely, being for a long time occupied by the British. It maintains some trade with the East Indies, Europe, and Cuba; but the most important branch of its commerce is the coasting trade with the middle and southern states. Its fisheries are very valuable. The population of Newport in 1839 may be estimated at about 10,000.

Pawtucket is a flourishing town, partly situated in that part of this state called North Providence, partly in Massachusetts. It is noted for the number and extent of its manufactories, which are situated near a fine cascade on the river Pawtucket. This town contains several public buildings, two or three banks, more than twelve cotton factories, and as many others of different kinds. This is reckoned one of the most flourishing manufacturing villages in the United States. The population may be about 5000. Bristol is a neat commercial town, situated on the east side of Narragansett Bay. It has a safe and commodious harbour, owns a good deal of shipping, and is a place of considerable trade. The population at present (1839) may be about 4000. Warren, South Kingston, East Greenwich, Smithfield, Portsmouth, and Warwick, are the only other places of any note. The last-named town contains above 6000 inhabitants.

The settlement of this state was commenced at Providence in the year 1636, by Roger Williams, a person of some celebrity in the annals of America. He was banished from Massachusetts on account of the religious doctrines which he preached. Two years afterwards the settlement of the island of Rhode Island was begun. In 1643 Williams went to England, and in the following year obtained a charter by which Rhode Island and Providence Plantations were united under one government. This writ continued in force till 1663, when a new charter was granted by Charles II., and this document has ever since formed the basis of the government. This state is the only one in the Union which is without a written constitution, according to the American form of these things. The legislative power is vested in a general assembly, consisting of a senate and a house of representatives. The latter consists of seventy-two members, six from Newport, four from each of the towns of Providence, Portsmouth, and Warwick, and two from each of the other towns in the state. They are elected semi-annually in April and August. The senate consists of ten members, who are elected annually in April. The executive power is vested in a governor; and a lieutenant-governor is elected along with him, on whom the duties of the executive devolve in case of the office of governor being vacated. The other officers of government are a secretary of state, a treasurer, and an attorney-general. The general assembly meets four times a year; at Newport on the first Wednesday in May, at the same place in June; at Providence and South Kingston alternately in October; and in January at East Greenwich, Bristol, or Providence. The judiciary power is vested in a supreme court, and a court of common pleas for each of the five counties. All the judges are appointed annually by the general assembly. A chief justice and two associate justices preside in the supreme court. Each of the courts of common pleas comprises five judges. Rhode Island has a well-constituted militia force, which is called out for duty twice a year.

(R. R. R.)

RHODES, an island celebrated from the remotest antiquity as the seat of commerce and of naval power, as well as of literature and the arts; but now reduced from its ancient splendour to a state of extreme depression and poverty, by the devastations of war and the tyranny of its Turkish rulers. It is situated in the Mediterranean, near the coast of Asia Minor, and is about twelve leagues long from north to south, and about six broad. It is of a triangular form; and its circumference is commonly estimated at about forty-four leagues.

Aspect of the country.

The island is diversified in its surface, and contains in its centre an elevated mountain named Artemira, which commands a view of the whole island. It is so steep that it is impossible to ascend it on horseback, and a person clambering up on foot would not be able to reach the summit in less than four hours. From this height there is a most extensive prospect of the whole island around its base; of the elevated coast of Caramania on the north; on the north-west the Archipelago, studded with its numerous islands; on the south-west is seen Mount Ida, veiled in clouds; and on the south and south-east the vast expanse of waters which wash the African shore. Here and there on the island are seen ranges of moderately elevated hills, on which are found numbers of ancient pines, planted by the hand of nature: these forests were formerly very thick, but they are now greatly thinned by the Turks, who cut them down, and take no care to plant others in their place. On the farther side of this nearest range of hills the surface of the island falls lower, and several hills in the form of amphitheatres extend their bases as far as the sea. In more than half the island the land slopes towards the sea-shore by a gentle and scarcely perceptible declivity.

Climate.

Rhodes was famed in ancient times for its delightful climate, and it still maintains its former reputation. The air is pure and salubrious, and there is hardly a day throughout the year in which the sun is not visible. The winds are liable to little variation; they blow from the west often with great violence for nine months in the year, and at other times from the north; and they moderate the summer heats, which are chiefly felt during the months of July and August, when the hot winds blow from the coast of Caramania. There is no frost or snow during the winter, which is uncommonly mild and humid.

Produce.

Rhodes, in addition to its fine climate, is blessed with a fertile soil, and produces a variety of the finest fruits and vegetables; and if the industry of the inhabitants corresponded to their natural advantages, it might possess all the materials of wealth and commerce. But they have long groaned under the iron rod of Turkish oppression, by which those happy abodes are now converted into scenes of devastation. "The gardens," says Dr Clarke,[1] "are filled with delicious fruit. Here, as in Cos, every gale is scented with the most powerful fragrance, which is wafted from groves of orange and citron trees. Numberless aromatic herbs exhale at the same time such profuse odour that the whole atmosphere seems impregnated with a spicy perfume." A single river, named Candura, which name it gives to the cape in whose vicinity it discharges itself into the sea, waters the interior of the island; but numerous smaller streams and rivulets, which take their rise from the shady summit of Mount Artemira, water the surrounding plains and valleys. The inhabitants have a great taste for gardens; and around the villages are several cultivated fields and orchards, containing fig, pomegranate, and orange trees. The peach-tree, which is said by Pliny to have produced no fruit in his time, is now more fruitful; but the fruit is deficient in flavour, from the inhabitants not knowing the art of ingrafting trees. The palm-tree is as flourishing as in ancient times. In the uncultivated valleys which abound throughout the island, wild roses hang around the foot of the rocks; beds of flowing myrrh perfume the air; laurel roses adorn the banks of the rivulets with their gaudy flowers; and the fertile soil is besides covered with a profusion of weeds and useless plants. Fine trees formerly crowned the highest mountains, the resin from which supplied abundantly the wants of the navy; but they have been generally cut down by the Turks. On the sloping hills fig-trees, carob-trees, and others both useful and agreeable, still grow abundantly: the vine also holds its place, and produces a species of wine which was highly valued by the ancients, and is still extolled on account of its delicacy and perfume. The valleys afford rich pastures, and the plains produce every species of grain: the wheat is of an excellent quality, the ear weighty, and filled with the finest grain, as white as snow, and which makes excellent bread; and, but for the extortions of its barbarian rulers, the island might be the seat of agriculture, as well as commerce, and might export large quantities of corn. But the Turks are lazy and ignorant, and the Greeks are loaded with *corvées;* and, being further discouraged by the fear of being robbed of the produce of their labours, leave these rich plains unimproved.

Cities and population.

There are two cities in the island, namely, Rhodes, the capital, which is inhabited chiefly by Turks, with a small proportion of Jews; and the ancient Lindus, which is now reduced to a hamlet, situated on the east side of the island, nearly in the centre. It is entirely peopled by Greeks, who are almost all employed in commerce; and its harbour, which is far from spacious, is much frequented by the small craft of the country, which thence export the produce of the island, and bring back foreign goods in exchange. A few are employed in rural labours. There are five villages occupied by Turks, and by a small number of Jews; and there are five towns and forty-one villages inhabited by Greeks. According to Savery, the number of families in the island is 7300; namely, of Turks 4700, of Greeks 2500, and of Jews 100. Estimating five persons in each family, the population of the island will amount to 36,500. Turner, on the other hand, a later traveller, estimates the inhabitants at only 20,000; namely, 14,000 Greeks, who are dispersed in forty-two villages, and 6000 Turks, with a small mixture of Jews, chiefly residing in the capital.

Condition of the people.

Rhodes has long groaned under the despotic rule of the barbarous Turks, by which the people have been impoverished, and the country depopulated. The pachas, to whom is delegated the supreme rule of the grand signior, generally use their authority for the purpose of extortion, and accumulate riches by robbing the unfortunate inhabitants committed to their charge. According to Savery, the revenue in Rhodes is derived from numerous taxes, namely, a poll-tax, a land-tax, the tithe of the crops, a port duty, a tax on houses, cattle, on salt, on vineyards, on wax, at tolls, and the farming of bagnios. But it is of little moment what taxes are established. There is no restraint on the power of the pacha, who seizes on the people's substance wherever he sees it, and from whose vigilant rapacity no accumulation of property can be concealed. "Ask not," says Savery, in his letter to his correspondent, "what is become of that powerful people, who, taking advantage of their happy situation, of their forests, harbours, and of the fertility of their soil, crossed the Mediterranean with their victorious fleets. Liberty is no more; and genius and science exist only where they are encouraged by her smile. The Turkish government has filled up the measure of their misfortunes; and a few wretches, without commerce, arts, or industry, because they are without property, wander here and there over the desolated plains of the country of their ancestors."

Antiquities.

The antiquities in Rhodes are not of an earlier date than the residence of the knights of Malta. The remains of their fine old fortress are still to be seen, namely, a venerable moated castle of great size and strength, so fortified as to seem almost impregnable. The cells of the knights are yet entire, forming a street within the works; and near these is the cathedral or chapel, where doors of sycamore wood, curiously carved, are preserved in their original state. The sanctuary has been converted by the Turks into a magazine for military stores. Dr Clarke observed several inscriptions at Rhodes on marble altars of a cylindrical form, adorned with sculptured wreaths and festoons, supported by rams' heads. Several vases of great antiquity were also dug up in a garden, of which he obtained one with upright handles.

History.

Rhodes was one of the most distinguished states of ancient Greece. Its early history is either lost in the darkness of antiquity, or it is disfigured by fabulous traditions. The Rhodians were early celebrated as expert navigators; but it was not till the time of the Peloponnesian war that they were known as an independent state. The city was afterwards built, and the people were at this time rent into two factions, one of whom favoured the Athenians, the other the Spartans. The latter acquired the ascendency, and an aristocracy was established. The island was afterwards oppressed by Mausolus, king of Caria, and the inhabitants applying to the Athenians, by their assistance regained their liberty. From this period to that of Alexander the Great, the Rhodians enjoyed uninterrupted tranquillity. They voluntarily submitted to that conqueror, from whom they experienced great favour; but no sooner did they hear of his death than they took up arms against the Macedonian garrisons, and expelled them. About this period the city of Rhodes and the inhabitants suffered severely from a dreadful inundation, which was accompanied with violent showers of rain; and hailstones of an extraordinary size beat down many houses, and killed a number of the inhabitants. By the bursting of the wall the extraordinary accumulation of water was allowed a free passage to the sea, by which the danger was removed. From the effects of this unexpected disaster the Rhodians quickly recovered, by their close application to navigation and trade; and during the wars that took place among Alexander's successors they observed a strict neutrality, and gradually grew to be one of the most opulent states of the age. They were, however, connected in strict alliance with Ptolemy of Egypt, with whom Antigonus being at war, he demanded succours of them, which they refusing, drew on themselves the full weight of his hostility. He accordingly sent his son Demetrius with an immense armament provided with all sorts of machines for war and sieges, and an army of 40,000 troops, who laid siege to their city. This remarkable siege lasted for a year, and called forth on the part of the Rhodians the most brilliant efforts of valour and patriotism. Demetrius, with all his knowledge of the known resources of war, and all his skill to invent new machines of unheard-of power and magnitude, was finally repulsed, with a prodigious slaughter of his bravest troops, and the loss of his military fame. The Rhodians after this siege applied themselves as before to commerce and navigation, and Rhodes became a flourishing city. In the year 203 before the Christian era the Rhodians were engaged in a war with Philip of Macedon, in which being assisted by the Romans, it was terminated to their advantage. In the wars that followed with the Romans and Antiochus, and afterwards with Mithridates, the Rhodians were useful allies of the former, whom they assisted with their naval power. In the civil wars of Rome they aided Pompey against Cæsar; and after his death they joined Cæsar, which drew on them the resentment of Cassius, by whom their city was taken and plundered. Their privileges were restored by Marc Antony; but the island was finally reduced into a Roman province during the reign of Vespasian. Rhodes continued under the Roman dominion, and was little heard of in history, till, on the downfall of the eastern empire, the island became one of the last retreats of the knights of Jerusalem, under whose rule it became illustrious by its heroic resistance to the Turkish conquerors, then at the utmost height of their power. They baffled by their valour the efforts of Mahommed II., the conqueror of Constantinople; and they sustained a memorable and sanguinary siege from Solyman the Great, who invested the city with a fleet of 400 sail and 140,000 troops. He was often repulsed by the brave knights with great slaughter; and he only made his way over the ruins of the city by the effect of numbers. A capitulation was at length agreed upon, by which the island was surrendered to the Turks, under whose dominion it has ever since continued.

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[1] Travels in Europe and Asia, chap. viii.

Rhodes is the capital of the above island, and stands on the site of the ancient city, though it is not above the fourth part of its extent. It is situated to the north-east of the island; and from a distance, its advantageous position at the extremity of a promontory, its magnificent buildings, the strength and solidity of its walls, and its towers planted on rising rocks, still impress an idea of its ancient grandeur. The interior of the city does not correspond to its outward appearance. Those ancient streets which were laid out with such art and on so great a scale, and that uniform series of buildings which were monuments of taste, have been succeeded by narrow winding streets, and buildings without grace, ornament, or regularity. There are still some monuments which testify that the island was once possessed by the knights of Rhodes, namely, their arms, and the several busts of the grand-masters, which were engraved on marble, and still adorn the fronts of several buildings; the walls and towers also bear marks of their heroic resistance to the Ottoman arms. But there is no longer any monument of its grandeur in times of antiquity; there is no theatre, no magnificent temples nor spacious porticoes. The statues, colossi, and paintings for which Rhodes was famed in the early ages of Greece and Rome, have all been removed. Not a vestige is to be seen of the colossus described as seventy cubits high, and reckoned one of the wonders of the world. The streets bear everywhere marks of desolation. One half of the houses in the city are in ruins, and one half in the suburbs are uninhabited, though those occupied by the Greek inhabitants are beautiful, consisting of good stone houses, with gardens well stocked with all the fruits of the climate. On the declivity of the neighbouring hills are about 400 country houses, the residences of the principal inhabitants. The principal buildings which remain are the church of St John, which is become the principal mosque; the hospital, whence the charity of the knights was liberally dispensed to the faithful from all quarters of the world, which has been transformed into public granaries; the palace of the grand-master, falling into ruins and almost deserted; and the senate-house, which still contains some marbles and ancient columns. Of the streets the best and widest is a long street which preserves the name of Rue des Chevaliers. It is perfectly straight, and formed of old houses, on which remain the armorial bearings of the members of the order. On some of these buildings are still seen the arms of the pope.

Rhodes has at present two harbours. The least of these, towards the east, is named Dorca, and its entrance is obstructed by a barrier of rocks, so as to admit the entrance of one ship at a time. It is sufficiently sheltered from the winds by high moles; but by the negligence of the Turks the sand has been suffered to accumulate until the entrance has been gradually choked up; and merchant-ships can only enter after being obliged previously to unload their cargoes. The other harbour is larger, and bears the name of Rhodes; here frigates of thirty guns may anchor, and are sheltered from the west winds, though they are in danger of being dashed against the walls of the city, or the rocks, from the north and north-east winds. The two harbours are separated by a mole which runs obliquely into the sea; the two extremities are defended by towers 800 feet apart, while in the centre of the mole is a square tower 120 feet high. There is a dock-yard, which, like all the other departments of the public service, is a scene of disorder and corruption. The population consists of 5000 Turks and about 1000 Jews. Long. 28. 12. 15. E. Lat. 36. 26. N.

RHOMBOIDES, in *Geometry*, a quadrilateral figure whose opposite sides and angles are equal, but which is neither equilateral nor equiangular.

RHOMBUS, in *Geometry*, an oblique-angled parallelogram, or quadrilateral figure, whose sides are equal and parallel, but the angles unequal, two of the opposite ones being obtuse and two acute.

RHOMB Solid consists of two equal and right cones joined together at their bases.

RHONE, a department of France, formed out of the ancient districts of the Lyonnois and the Beaujolais. It is situated between 45. 26. and 46. 25. of north latitude, and between 4. 12. and 4. 37. of east longitude. It extends over 982 square miles, and is divided into two arrondissements, which in the year 1836 contained twenty-five cantons and 253 communes, with 482,024 inhabitants, who mostly adhere to the Catholic Church. The face of the country is irregular, in all parts hilly, and in some mountainous. The vales between the several elevations are narrow, and have a soil poor and stony, except in that division on the rivers Saone and Rhone which includes some level tracts of greater extent, well cultivated, adorned with fine trees, and presenting a mixture of corn-fields, meadows, and vineyards. The chief rivers are the Rhone and the Saone, the latter of which falls into the former near Lyons, having received the water of the Izeron, the Garon, the Gier, with that of several smaller streams, which empty themselves at length into the Mediterranean Sea. Both the Rhone and the Saone are navigable through the whole of their course within this department. The climate is mild, but, from the vicinity of the mountains, is very variable, and from the same cause vegetation is late in the spring. The productions are, the common domestic animals, wax, honey, and abundance of game, wild fowl, and fish. The produce of corn is deficient for the annual supply by about six weeks' consumption. Hemp, flax, poppies, rapeseed, saffron, almonds, chestnuts, and potatoes, are extensively grown. The vine is extensively cultivated, and those on the banks of both the Saone and Rhone have, under a variety of names taken from the respective districts, acquired great celebrity. There are some, but not considerable, mines of copper, and others of vitriol and of coal. The manufacturing industry is great. The silk manufacture is the most extensive, and is chiefly carried on in and around the city of Lyons, the capital of the department.

RHONE, *Mouths of the*, a department in the south of France, formed out of the western part of the ancient province. It extends in north latitude from 43. 12. to 44. 1., and in east longitude from 4. 18. to 4. 46., comprehending 1804 square miles, or 512,991 hectares, equal to 1,154,230 English acres. It is bounded on the north by the department of Vaucluse, on the east by that of the Var, on the south by the Mediterranean, and on the west by the department of Gard. It is divided into three arrondissements, and these into twenty-seven cantons and 106 communes, containing, in 1836, 362,325 inhabitants. They chiefly adhere to the Romish church, though there are about 5000 Protestants, and in the city of Marseilles many Jews. They speak a peculiar patois, nearly the same as, in the time of the Troubadours, was the written language of Provence.

The surface of the eastern and southern portions of the department is mountainous. A range of hills extends from the department of the Var. Of one of them, San Venture, the height is 3120 feet. In the northern part is a chain of hills extending from Vaucluse, beginning on the banks of the Durance, and stretching from east to west to the neighbourhood of the Rhone, and rising to the height of 2500 feet above the level of the sea. The south-west part is wholly a level plain, full of morasses, and including the island of Camargue and the island Plan, in which, though some spots are fertile, yet the greater portion exhibits either heaps of pebbles or unhealthy marshes. The river Rhone is the chief stream, into which many others empty themselves before it reaches the sea. The navigation of that river is hazardous on account of its having three outlets, the passages through which are very variable, sometimes one being passable, and then in a few days nearly closed, when another is opened. To remedy this inconvenience, a canal has been opened from Arles to the small haven of Bouc, near the sea. There are several smaller canals, which serve partly for the purpose of communication, and in some measure for those of irrigation. One of the most important public works recently undertaken in France is the navigable canal which terminates in this department. It connects together the two great rivers the Rhine and the Rhone. It was begun in 1804, and was originally called the Canal Napoleon: it was afterwards designated the Canal of Monsieur; and it now bears the more appropriate name of the Canal of the Rhine and Rhone. It was completed in 1832, at an expense of 26,640,000 francs, or about L.1,200,000. The whole length is about 210 miles; and in its progress it comes into direct communication with other great rivers. It is divided into four portions. The first commences at the Saone, and proceeds to Dole, where it joins the Doubs. The second portion is connected with Orchamps, Besançon, Baume, Clival, Lisle, and Vougeancourt, where it terminates. The third portion passes by Montbeliard, Burogne, Valdieu, Mulhausen, Brisach, and Grapenstadt, where the canal enters the river Ille, which falls into the Rhine half a mile above Strasburg. The fourth part consists of branches from Mulhausen to Basel and Huningen, fed by water from the Rhine at the latter place. There is a sanguine anticipation that this last branch will form a cheap communication between Switzerland and the Mediterranean. In one part of its progress it communicates with the Seine, and is thus adapted to supply articles of great weight and little original cost, such as iron, wood, and stone, to the city of Paris.

As nearly one third of the surface of this department, consisting of mountains, small lakes, and morasses, is uncultivated, it does not produce a sufficient supply of corn for its own consumption. The corn is not thrashed, but, as in other warm countries, is trodden out by oxen. Neither cows nor horses are numerous, though on the island of Camargue many of the latter, of a small race, are bred, almost in a state of wildness. The sheep are numerous, and are moved to the hills or to the plains, according to the state of the pasturage. The chief agricultural productions on which the department depends for procuring the means of subsistence, are oil, wine, and silk. The olive-trees are abundant, but some severe winters have destroyed many of them, and diminished the price of oil one third.

Besides wine, the vineyards yield a great quantity of raisins of various excellent descriptions, which form an important source of wealth, as do other dried fruits, especially plums. A large portion of the grapes is converted into brandy. The cultivation of silk is very much diffused, but nowhere an exclusive pursuit, and does not yield more than 100,000 pounds of raw silk. The sea-fishery gives employment to a great number of persons; and salt being plentifully produced by natural evaporation, much of the fish taken in this department is cured for exportation. The only mines are those of coal; nor does their annual produce exceed 5000 tons. There are manufactures of silk, cotton, and other articles, chiefly confined to the cities of Marseilles and Aix, which likewise carry on the principal export trade, including the productions already noticed, and also figs, almonds, capers, coral, and essences of flowers, together with wool.

RHUBARB. The drug well known by this name is the root of some species of *Rheum*, an important genus of the natural order *Polygonaceæ*, Juss., and referred to *Enneandria Trigynia* in the Linnæan classification. The roots of all the species are thick and fleshy, generally a good deal branched, and striking deep into the earth. The leaves and stems are annual. The leaves, which are radical and petiolate, rise in spring, coming up in a thick head folded together, and gradually expanding. The footstalks of the leaves are thick, fleshy, and juicy, varying in length in the different species from a few inches to two feet. The leaves themselves are spreading, and very large, being sometimes two feet in diameter. The flowering stems begin to rise at the end of spring, come into flower in June, and ripen their seeds in August and September. The flowers are in a large terminal panicle or compound raceme. They consist of a coloured six parted perianth. The seeds are three cornered, winged, and have the withered perianth adhering to their base. The rhubarbs are extensively cultivated in this country for the sake of the footstalks, and likewise for the medicinal roots. When grown for the sake of the latter, they should be sown in the place where they are intended to remain, that the growth of the roots may not be interfered with; but when meant to be used for culinary purposes, or as ornamental plants, the seedlings may be transplanted in autumn. The most important use of the plants of this genus is to furnish the medicinal substance rhubarb.

It is not a little singular, that though this valuable medicine has been in use for centuries, we are still ignorant as to the precise species which yields it. Many endeavours have been made to ascertain this point, both by investigation of the countries from which the commercial rhubarb is brought, and by cultivating the known species and comparing their roots with the rhubarb of the shops, but none of these attempts hitherto has proved successful. Previous to 1732, rhubarb was believed to be yielded by the *Rheum rhaponticum*, Linn. This species is distinguished by its leaves being roundish ovate, obtuse, pale green, with a few hairs beneath on the nerves and margins. The footstalks are pale green, striated, channelled above, with rounded edges. The roots are large and thick, much divided, and, like those of most of the other species, reddish brown without, yellow within. It is not found, however, that in cultivated specimens the roots yield a product at all resembling true rhubarb; and as this species is a native of the wild land to the north of the Caspian Sea, between the Volga and Ural rivers, and not, so far as is known, of the country from which rhubarb is believed to come, the opinion that it is the true rhubarb plant has long been abandoned. It is chiefly this species, or hybrids of it, which is so commonly cultivated in gardens for the sake of the leafstalks, which are used extensively in the spring for making tarts and preserves. They have an agreeable acidity, owing to their containing, like some other plants of the same natural order, a considerable proportion of oxalic acid.

In 1732, some seeds sent to Paris and Chelsea as those of the true rhubarb plant were grown, and found to be *Rheum undulatum*. This species is distinguished by its leaves being oval, obtuse, extremely wavy, of a dark-green colour, and by the footstalks being downy, blood-red, with the upper edges elevated. It is a native of China and Siberia, and was long cultivated by the Russians in the latter country as true rhubarb. The culture, however, is now abandoned, and it is well known that the roots which it yields are widely different from those of the genuine drug.

In 1750, Kaaw Boërhaave obtained some seeds which were said to be those of the true rhubarb; and on being grown, they produced both *Rh. undulatum* and *Rh. palmatum*. The latter species is distinguished from all the others by its leaves being palmated, with acuminate segments; and its roots on cultivation have been found by M. Guibour to bear the nearest resemblance, in colour, taste, and smell, to the true rhubarb. It appears, however, from the inquiries of Pallas, that the Bucharian rhubarb merchants knew nothing of such a leaf as that of *Rh. palmatum*, and described the true rhubarb plant as having round leaves with waved edges. This has been supposed to come near to another species, *Rh. compactum*, which is also occasionally cultivated in our gardens, but its roots are found to differ from true rhubarb in many particulars. Notwithstanding the doubts raised by Pallas, however, the idea that *Rh. palmatum* is the true rhubarb plant is still extensively entertained, and it has been stated as such in the new edition of the London Pharmacopœia. It is very doubtful, however, if a decided opinion upon this point is admissible in the present state of our knowledge regarding this subject.

In the state of uncertainty to which these conflicting opinions gave rise as to the origin of rhubarb, the Empress Catherine II. of Russia, in 1790, sent an apothecary of the name of Sievers into Siberia, to endeavour to penetrate into the rhubarb country and ascertain the true plant; but after four years' attempts he was ultimately foiled, and returned with no further information than that nothing certain appeared to be known upon the subject.

More recently the *Rh. Emodi* of Dr Wallich (*Rh. Australe*, Don), and *Rh. Webbianum*, both natives of the Himalayah Mountains, have been found to be valuable as purgatives, and the former was supposed to be the true source of Chinese rhubarb; but Mr Pereira has found that the Himalayah rhubarb was quite different from the rhubarb of the shops.

It thus appears that the source of true rhubarb is still unascertained; nor is it at all certain that it is not yielded by more than one species. Professor Royle of King's College is of opinion, and apparently correctly, that it is obtained in the heart of Thibet, in about 95° east longitude, and 35° north latitude, a country into which as yet no scientific botanist has ever penetrated. It is worthy of remark, that this agrees with the statements of Pallas and other travellers, that the Russian rhubarb is gathered on the mountains surrounding Lake Kokonor, and that this is part of what has been assigned by Murray as the native country of *Rh. palmatum*.

Here, therefore, an excellent subject for investigation is still open; and it is to be hoped that this desideratum in our knowledge of the botanical materia medica may soon be supplied. Several circumstances however combine to render the attainment of this object difficult. The labour of penetrating into the wild country where the true rhubarb probably grows is not to be overlooked; and jealousy on the part of the dealers in this profitable article of commerce will likewise lead to much inconvenience. It is said that the trade in Russian rhubarb is monopolized by one Bucharian family, who farm it from the Chinese government; and it is not improbable that, in order to prevent the establishment of a rival trade elsewhere, they may already have embarrassed the subject, by purposely furnishing as the seeds of true rhubarb, those of different and inferior species. In attempting to ascertain the true officinal species by cultivation, we are likewise met by this difficulty, that the different species hybridise so readily that their distinctive characters are very readily lost. This is very apparent in the rhubarbs cultivated in our gardens, which, though commonly referred to *Rh. rhaponticum*, are in great measure made up of hybrids between that species, *Rh. compactum*, and *Rh. hybridum*.

Though the true rhubarb plant has not been seen by any scientific botanist, we have some interesting information from other travellers respecting its growth and production. The best accounts appear to be those given by Mr Bell in his journey from St Petersburg to Pekin. Sievers, in his attempts to discover the true rhubarb plant, likewise obtained some information respecting it, and the statements of these travellers differ only in some unimportant particulars. It appears that the plant is not made the subject of special culture, but that enough grows spontaneously to keep up the supply of this valuable drug. The marmots, which breed extensively in this country, contribute in a great measure to the propagation of the plant; for it seems that the seeds germinate almost exclusively on the loose earth turned up by these animals in making their burrows. The natives gather the roots in spring and autumn, and, after removing the cortical part, cut them in small pieces to facilitate the drying. They cut a hole through each piece, and then string them upon a small cord, by which they hang them up to dry on poles or trees, or more commonly about their tents, and occasionally, it seems, upon the horns of their sheep. By this last practice a considerable amount of loss is sustained, as, from the prolonged exposure to moisture, much of the root becomes decayed and useless. According to Sievers, the roots are dried under sheds, out of the rays of the sun, and they sometimes take a whole year to dry.

Several varieties of rhubarb occur in commerce. The first and most esteemed is *Turkey* or *Russia* rhubarb, which was formerly brought to Europe chiefly through the Turkish provinces of Asia Minor, but is now imported through Russia. It is brought from the native country to the frontier town of Kiachta in Siberia, where it is examined by a Russian government officer. All the pieces which are of bad quality are rejected and burned, and those which are good are transmitted to Moscow and St Petersburg, where they are again inspected, and any inferior pieces picked out. From this careful examination Russian rhubarb is always of good quality, and bears a higher price than any other kind.

The pieces of Russian rhubarb are generally from one and a half to two inches broad, sometimes of a flat shape, but more commonly two or three inches long, and somewhat conical. The external surface is always irregular and angular, the bark apparently having been removed in slices. They are always perforated by one large hole, through which the cord has been passed in drying them; occasionally some smaller holes are observed, not passing completely through, which have been made in Russia, for the purpose of examining the interior of the specimens. The colour externally is of a bright golden-yellow, owing to the pieces being covered by powder, formed by their friction upon each other. When broken across they present an irregular and rough surface, having a mottled appearance, owing to the interlacing of yellow and brownish-red veins, which are more distinctly seen when the surface is cut smooth. The smell of the rhubarb is strong and peculiar, and the taste is bitter, astringent, and slightly aromatic. Under the teeth good Russia rhubarb feels gritty, owing to the presence of small crystals of oxalate of lime, which are dispersed in tufts through the root, and which may be seen under the microscope, in a piece which has been boiled in water.

The second variety of rhubarb, though commercially distinct from the Russian, is perhaps originally derived from the same source. It is called *East India* or *Chinese* rhubarb, being imported chiefly from Canton or Singapore. It is distinguished from Russian rhubarb by the pieces being larger and heavier, and by their surface being not angular, but rounded, the bark having apparently been removed by scraping, and not by slicing. The holes by which it is perforated are generally smaller than those of the Russian rhubarb, and the portions of the root surrounding the perforation are frequently decayed. The fracture is uneven, and has a mottled appearance, but is usually of a darker colour than the Russian kind. The smell and taste of the Chinese is inferior to that of the Russian, but not in a very marked degree; and it is generally equally gritty under the teeth. The powder of Chinese rhubarb has rather a darker tint than that of the Russian; but the latter is seldom found in the shops pure, and the difference generally is not very apparent. As the Chinese rhubarb is not subjected to the same rigid examination and selection as that brought through Russia, it is of inferior quality, and brings a much lower price in the market. Thus, whilst Russia rhubarb in bond is quoted in the official returns of the prices current, at eight shillings and threepence per pound, the East India is stated to bring only from two shillings and sixpence to four shillings. It does not appear, however, that the Chinese rhubarb is in any essential respect inferior as a medicine to the Russian.

Another variety of rhubarb has been described under the name of *Dutch trimmed*, or *Batavian*, which, like the Chinese, is brought from Canton or Singapore, and is always quoted in the prices current as a distinct commercial kind. It is said to resemble the Russia rhubarb in external characters, but is not superior in value to the common Chinese sort, as it appears from the official returns that it brings the same price in the market.

The third commercial variety of rhubarb is the *English*, or, as it might more appropriately be called, *European*; for what is called in France *French* rhubarb is merely an equivalent sort grown in that country. The English rhubarb appears to be chiefly the roots of *Rh. palmatum*; it is cultivated to a large extent, especially at Banbury in Oxfordshire, where it was first extensively grown about the year 1780, by a Mr Hayward. Towards the end of last century many attempts were made to cultivate the rhubarb in England for medicinal use, accounts of which have been preserved in the Transactions of the Society for the Encouragement of Arts, Manufactures, and Commerce. The expectations which were then formed, and the opinions entertained, of the qualities of the English rhubarb were very sanguine; but though it is still cultivated to a considerable extent for this purpose, it is well known to be very inferior to the foreign kinds. In France a great many varieties of rhubarb are cultivated at a place called Rheumpole, in the department of Morbihan: they are chiefly *Rh. undulatum*, *Rh. rhaponticum*, and *Rh. compactum*. The cultivation of *Rh. palmatum* there has been abandoned, but for what reason is not very apparent. The produce of this cultivation is what is sold in France as *French* rhubarb.

English rhubarb is found in the shops under two forms; either in pieces cut so as to resemble some of the Asiatic kinds, in which case it is called *dressed* or *trimmed*; or in cylindrical pieces four or five inches long, and about one inch thick, which are obviously the smaller portions of the root dried entire or longitudinally split. This last kind is termed *stick* rhubarb. The first of these is the only one which can be mistaken for foreign rhubarb, but it may at once be distinguished by its being very much lighter than any of the Asiatic kinds, and by its being, especially towards the centre, of a much softer texture. Its fracture, like that of the Russian and Chinese rhubarb, is marked by the reticulated veins, but it has generally rather a pinkish tint. It is sometimes, though not commonly, gritty under the teeth; it has much less astringency and bitterness to the taste than the Asiatic rhubarb, being generally somewhat mucilaginous; and its smell, though often equally strong, is much less aromatic and agreeable. The external appearance of European rhubarb is often very deceptive, for it is a common practice to rub the pieces over with the powder of the Turkey rhubarb, to make it pass for the more valuable drug; but its pinkish colour is easily observed on brushing the specimen, and its light weight and softer texture at once proclaim the difference.

In selecting rhubarb, the pieces should be found to have a good colour and smell, and to be of a considerable specific gravity. Those which are worm-eaten, or are of a dirty-brown or blackish colour, should be rejected; and, to ascertain these points, brushing the surface should never be neglected, as inferior kinds are very frequently disguised by unprincipled dealers, by covering the surface with powder of good rhubarb; and worm holes are sometimes concealed by stopping them with a paste made of the powder of genuine rhubarb and water.

The chemical analysis of rhubarb is still very imperfect. A yellowish crystallizable principle has been obtained from it, to which the names of Rheine, Rhaponticine, and Rhabarbarine have been given; but these various terms have obviously been applied by different chemists to the same substance. This appears to be merely the colouring matter of rhubarb, and not its active principle, which may still be regarded as unknown. Whatever be the nature of the active part of rhubarb, as it exists in the plant it is soluble both in water and alcohol. Water takes up more of the purgative and less of the astringent principles of rhubarb than alcohol; hence infusion is a good liquid form for administering this medicine as a laxative. The watery preparations of rhubarb, however, should always be made by infusion, and not by decoction, as a high temperature impairs its purgative property. It is for this reason that the common extract of rhubarb of the shops is of no use as a laxative. Rhubarb, from its astringency, has been supposed to contain tannine, but this has not been satisfactorily demonstrated by chemical experiment. The roots contain a certain proportion of starch. This is most abundant in the English sort, which accounts for its generally having a somewhat mucilaginous taste.

The medicinal action of rhubarb varies according to the dose in which it is administered. In small quantities, as three or four grains, it is a gentle stomachic and astringent, and as such is employed in many cases of indigestion, and a relaxed state of the bowels. In cases of diarrhœa in children, which are generally attended with superabundant acidity of the *primæ viæ*, there is no safer or more effectual remedy than three or four grains of rhubarb, with twice that quantity of prepared chalk, which may be taken two or three times in the day.

In larger doses, as in quantities from fifteen to thirty grains, rhubarb is a mild and easy laxative, and, from its possessing no irritating qualities, is valuable in all cases where the bowels might be injured by more active substances. It is consequently well adapted to the more irritable constitutions of children and females. Where there is derangement of the stomach or bowels from indigestible matter, or from acidity, rhubarb is a very valuable laxative; and in such cases its action is very much improved by its being combined with magnesia. The well-known *Gregory's powder*, introduced by the late professor of physic at Edinburgh, consists of two parts of rhubarb, three of calcined magnesia, and one of ginger, and is one of the best remedies which can be employed in such cases. The usual dose of this for an adult is a tea-spoonful, which may be taken in water, combined with some aromatic tincture, or with a little of the tincture of rhubarb itself.

The colouring matter of rhubarb, and probably its purgative principle, are absorbed into the circulation during its action on the system. That the colouring matter is absorbed, is demonstrated by its presence in the urine, to which it communicates a reddish-brown colour; a circumstance always to be borne in mind in forming an opinion of any case in which rhubarb may have previously been taken. The absorption of the purgative principle is inferred from the fact, that the milk of nurses who are using this medicine sometimes exerts a laxative influence on children at the breast.

In the year 1835, the quantity of rhubarb imported into Great Britain amounted to 81,100 lbs., and in 1836 to 122,142 lbs., of which in the former year 44,522 lbs., and in the latter 44,468 lbs., were retained for home consumption; the duty being one shilling per lb., yielded a net revenue of L.2220 in the one year, and L.2236 in the other. (B. M.)

RHUMB, in *Navigation*, a vertical circle of any given place, or intersection of such a circle with the horizon; in which last sense it is the same with a point of the compass.

Rhumb-Line is also used for the line which a ship describes when sailing in the same collateral point of the compass, or oblique to the meridians.

RHYME, Rhime, *Ryme*, or *Rime*, in *Poetry*, the similar sound or cadence and termination of two words which end two verses, &c. Or rhyme is a similitude of sound between the last syllable or syllables of a verse, succeeding either immediately or at a distance of two or three lines.

RHYMER, Thomas the. See Thomas of Erceldoun.

RHYTHM, Musical. See Music.

RHYTHMOMETER, from ῥυθμὸς, and μέτρον, an instrument contrived to measure equal portions of sounds in musical performance, and to mark the time, at longer or shorter intervals, according to adjustment of the mechanism. Maelzel's *metronome* is the instrument of this kind most generally in use, although one more simple and less costly might easily be made. Diderot, in the fourth memoir of his mathematical works, suggested a musical chronometer, but added, "Le seul bon chronomètre que l'on puisse avoir, c'est un habile musicien qui ait du goût, qui ait bien lui la musique qu'il doit faire exécuter, et qui sache en battre la mesure." The chief utility of a rhythmometer consists in the power of fixing the duration of time which a composer wishes to give to the equalized portions of his composition, as indicated by the vibrations of a pendulum, and as marked by relative numerals affixed to characters of musical notation. Almost all pieces of music of classical importance are now printed with indications of the metronome measures of time; and this is a great improvement, inasmuch as before the present century we had nothing but tradition, and often no tradition at all, to guide us in the comparative slowness or quickness with which the notes of a musical composition were to be performed.

RIAO, an island in the Eastern Seas, about twenty-five miles in circumference, near the west coast of Morty. Long. 128. 2. E. Lat. 2. 25. N.

RIASAN, a government of Russia, so called from the ancient city of that name. It extends in north latitude from 53. 1. to 55. 41., and in east longitude from 38. 10. to 41. 14., and is 13,486 square miles. It contains twelve cities or towns, and 833 parishes or communes, with 1,250,000 inhabitants, a very great proportion of whom are in a state of vassalage. The district is an extensive plain watered by the rivers Don, Oka, Osetr, and Prona, and near to them it is highly fertile. In the other parts the soil is as productive as can well be expected in a climate so severe. The land is best in the southern division of the province, but the whole yields more corn than is required for domestic consumption. A surplus for exportation is produced of grain, and brandy made from it, of salted meat, of leather, wax, honey, and hops. The forests afford a large supply of timber. The manufactures are confined to clothing, chiefly linen, and to iron implements. The exports proceed through the Oka to the river Wolga. The capital is the city of the same name on the river Trubusch, and is the seat of a bishop. It contains twenty churches, an ecclesiastical seminary, and one for the higher classes, with 760 dwellings, and 5000 inhabitants, chiefly employed in making linens. It is 617 miles from Petersburg. Long. 39. 4. 58. E. Lat. 54. 58. 6. N.

RIBAUVILLER, a city of the department of the Upper Rhine, and arrondissement of Colmar, in France. It is situated at the foot of the Vosges Mountains, on the river Stambach. In 1836, it contained 6558 inhabitants, who were employed in cultivating the vine, and in carrying on extensive cotton manufactures.

RIBERA, a town of the intendency of Girgenti, and the district of Mazzara, in the island of Sicily. It stands on an unhealthy plain on the sea-shore, near the river Calatabellota, sixty miles from Palermo, and contains 4800 industrious inhabitants.

RIBERAC, an arrondissement of the department of the Dordogne, in France, 501 square miles in extent. It comprises seven cantons, and eighty-three communes, and in 1836 contained 71,457 inhabitants. The capital is the city of the same name, in a fertile vale on the left bank of the river Dronne. It is ill built, and in 1836 contained 3775 inhabitants, with but little commerce.

RICARDO, David, the most distinguished political economist since Dr Smith, was the third of a numerous family, and was born in the city of London on the 19th of April 1772. His father, a native of Holland, and of the Jewish persuasion, settled in this country early in life. He is said to have been a man of good talents and the strictest integrity; and having become a member of the Stock Exchange, he acquired a respectable fortune, and possessed considerable influence in his circle. David was destined for the same line of business as his father; and received, partly in England, and partly at a school in Holland, where he resided two years, such an education as is usually given to young men intended for the mercantile profession. Classical learning formed no part of his early instruction. He began to be confidentially employed by his father, in the business of the Stock Exchange, when he was only fourteen years of age. Neither then, however, nor at any subsequent period, was he wholly engrossed by the combinations and details of his arduous and difficult profession. From his earliest years he evinced a taste for abstract and general reasoning; and manifested that determination to probe every subject of interest to the bottom, and to form his opinion upon it according to the unbiassed conviction of his mind, which was always one of the distinguishing features of his character.

Mr Ricardo's freedom and independence of mind did not accord with the prejudices of his father, who had been accustomed to subscribe, without investigation, to the opinions of his ancestors, on all questions connected with religion and politics, and who was desirous that his children should do the same. But this system of passive obedience, and blind submission to the dictates of authority, was quite repugnant to the principles of young Ricardo, who, at the same time that he never failed to testify the sincerest affection and respect for his father, found reason to differ from him on many important points, and to become a convert to the Christian faith.

Not long after this event, and shortly after he attained the age of majority, Mr Ricardo formed a union, productive of unalloyed domestic happiness, with Miss Wilkinson. Having, in consequence of this conduct, been entirely separated from his father, he was thrown wholly on his own resources, and commenced business for himself. At this important epoch of his history, the oldest and most respectable members of the Stock Exchange gave a striking proof of the esteem entertained by them for his talents and the integrity of his character, by voluntarily coming forward to support and assist him in his undertakings. His success exceeded the most sanguine expectations of his friends, and in a few years he realized an ample fortune.

"The talent for obtaining wealth," says a near relation of Mr Ricardo's, from whose interesting account of his life we have borrowed these particulars, "is not held in much estimation; but perhaps in nothing did Mr Ricardo more evince his extraordinary powers, than he did in his business. His complete knowledge of all its intricacies; his surprising quickness at figures and calculation; his capability of getting through, without any apparent exertion, the immense transactions in which he was concerned; his coolness and judgment, combined certainly with (for him) a fortunate tissue of public events, enabled him to leave all his contemporaries at the Stock Exchange far behind, and to raise himself infinitely higher, not only in fortune, but in general character and estimation, than any man had ever done before in that house. Such was the impression which these qualities had made on his competitors, that several of the most discerning among them, long before he had emerged into public notoriety, prognosticated, in their admiration, that he would live to fill some of the highest stations in the state."[1]

According as his solicitude about his success in life declined, Mr Ricardo began to devote a greater portion of his time to scientific and literary pursuits. When about twenty-five years of age, he began to study some branches of mathematical science, and made considerable progress in chemistry and mineralogy. He fitted up a laboratory, formed a collection of minerals, and was one of the original members of the Geological Society. It is known, however, that he never entered warmly into the investigation of these sciences. They were not adapted to the peculiar cast of his mind; and he abandoned them entirely, as soon as his attention was directed to the more congenial study of political economy.

Mr Ricardo is stated to have first become acquainted with the "Wealth of Nations" in 1799, while on a visit to Bath, where he had accompanied Mrs Ricardo for the benefit of her health. He was highly gratified by its perusal; and it is most probable that the inquiries about which it is conversant continued henceforth to occupy a considerable share of his attention, though it was not till a later period that he became so exclusively occupied with their study.

Mr Ricardo first came before the public as an author in 1809. The rise in the market-price of bullion, and the fall of the exchange that had taken place that year, had excited a good deal of attention. Mr Ricardo applied himself to the consideration of the subject; and the studies in which he had been latterly engaged, combined with the experience which he had derived from the vast extent of his moneyed transactions, enabled him not only to perceive the true cause of the phenomena in question, but to trace and exhibit its practical bearing and real effect. When Mr Ricardo began this investigation, he had no intention of laying the result of his researches before the public. But having shown his manuscript to Mr Perry, then proprietor and editor of the Morning Chronicle, he was prevailed upon by him, though not without considerable difficulty, to consent to its publication, in the shape of letters, in that journal. The first of these letters appeared on the 6th of September, 1809. They made a considerable impression, and elicited various answers. This success, and the increasing interest of the subject, induced Mr Ricardo to commit his opinions upon it to the judgment of the public, in a more enlarged and systematic form, in the celebrated tract entitled "The High Price of Bullion a Proof of the Depreciation of Bank Notes." This tract led the way in the far-famed bullion controversy. It issued from the press several months previously to the appointment of the bullion committee; and is believed to have had no inconsiderable effect in forwarding that important measure. In this tract Mr Ricardo showed that redundancy and deficiency of currency are only *relative* terms; and that so long as the currency of a particular country consists exclusively of gold and silver coins, or of paper convertible into them, it is impossible that its value should either rise above or fall below the value of the currencies of other countries, by a greater sum than will suffice to defray the expense of importing foreign coin or bullion if the currency be deficient, or of exporting a portion of the existing supply if it be redundant. But when a country issues an inconvertible paper-money, as was then the case with England, it cannot be exported to other countries in the event of its becoming relatively redundant at home; and whenever, therefore, the exchange with foreign states is depressed below, or the price of bullion rises above, its mint price, more than the expense of sending coins abroad, it is a conclusive proof that too much paper has been issued, and that its value is *depreciated from excess*. The principles which pervade the Report of the bullion committee are substantially the same with those which pervade Mr Ricardo's pamphlet; but the more comprehensive and popular manner in which they are illustrated in the Report, and their being recommended by a committee composed of some of the ablest members of the House of Commons, gave them a weight and authority which they could not otherwise have obtained. And though the prejudices and ignorance of some, and the interested, and therefore determined, opposition of others, prevented for a while the adoption of the measures proposed by Mr Ricardo and the committee for restoring the currency to a sound and healthy state, they have since been carried into full effect, and afford one of the most memorable and encouraging examples in the history of the country, of the triumph of principle over selfishness, sophistry, and error.

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[1] See an account of the Life of Mr Ricardo in the *Annual Obituary* for 1823, supposed to be written by one of his brothers.

The *fourth* edition of this tract is the most valuable; for an Appendix is added to it, in which there are some acute and ingenious observations on some of the most difficult and delicate points involved in the theory of exchange; and which also contains the first germ of the happy idea of making bank-notes exchangeable for bars of gold bullion.

Among those who entered the lists in opposition to the principles laid down, and the practical measures suggested, in Mr Ricardo's tract, and in the Report of the bullion committee, a very prominent place is due to Mr Bosanquet. This gentleman had great experience as a merchant; and as he professed that the statements given in his "Practical Observations," and which are completely at variance with those in the Report, were the result of a careful examination of the *theoretical* opinions of the committee by the test of fact and experiment, they were well calculated to make, and did make, a very considerable impression. The triumph of Mr Bosanquet and his friends was, however, of very short duration. Mr Ricardo did not hesitate to attack this formidable adversary in his stronghold. His second tract, entitled "Reply to Mr Bosanquet's Practical Observations on the Report of the Bullion Committee," was published in 1811, and is perhaps the best controversial essay that has ever appeared on any disputed question of political economy. In this pamphlet, Mr Ricardo met Mr Bosanquet on his own ground, and overthrew him with his own weapons. He examined all the proofs which Mr Bosanquet had brought forward, of the pretended discordance between the principles advanced in his own pamphlet, and in the Bullion Report, and experience; and showed that Mr Bosanquet had either mistaken the cases by which he proposed to try the theory, or that the discrepancy was only apparent, and was entirely a consequence of his inability to apply the principle, and not of any deficiency in the principle itself. The victory of Mr Ricardo was perfect and complete; and the elaborate errors and mis-statements of Mr Bosanquet served only, in the language of Dr Copleston, "to illustrate the abilities of the writer who stepped forward to vindicate the truth."[1] This tract affords a striking example of the ascendency which those who possess a knowledge both of principle and practice, have over those familiar only with the latter; and though the interest of the question which gave rise to it be now subsided, it will always be read with delight by such as are not insensible of the high gratification which all ingenuous minds must feel in observing the ease with which a superior intellect clears away the irrelevant matter with which a question has been designedly embarrassed, reduces false facts to their just value, and traces and exhibits the constant and active operation of the same general principle through all the mazy intricacies of practical detail.

The merit of these pamphlets was duly appreciated; and Mr Ricardo's society was, in consequence, courted by men of the first eminence and consideration, who were not less delighted with his modesty, and the mildness and amenity of his manners, than with the reach and vigour of his understanding. It was at this period that he formed that intimacy with Mr Malthus, and Mr Mill, the author of the History of British India, which ended only with his life. To Mr Mill he was particularly attached; and he always felt pleasure in acknowledging how much he owed to the friendship, and to the clear, discriminating judgment of that gentleman.

Mr Ricardo's next appearance as an author was in 1815, during the discussions on the bill, afterwards passed into a law, for raising the limit at which the importation of foreign corn should be permitted, to 80s. Mr Malthus, and a "Fellow of University College, Oxford" (Mr West, afterwards Sir Edward West), had, in two able pamphlets, published almost at the same moment, developed the real nature, origin, and causes of rent.[2] But neither of them perceived the real value and importance of the principles which they had established. This was reserved for Mr Ricardo, who, in his "Essay on the Influence of a Low Price of Corn on the Profits of Stock," showed the real effect of the increase which must always take place in the price of raw produce, in the progress of society, on wages and profits; and founded an irresistible argument in favour of the freedom of the corn trade, on the very principles from which Mr Malthus had vainly endeavoured to show the propriety of subjecting it to fresh restrictions. This essay is particularly worthy of attention, as it contains a brief statement of some of the fundamental principles subsequently demonstrated in the "Principles of Political Economy and Taxation."

In 1816, Mr Ricardo published his "Proposals for an Economical and Secure Currency, with Observations on the Profits of the Bank of England." In this pamphlet Mr Ricardo examined the circumstances which determine the value of money, both when every individual has the power to supply it, and when that power is restricted and placed under a monopoly: he showed that, in the former case, its value depends, like that of all freely produced commodities, wholly on the cost of its production; while in the latter its value is quite unaffected by that circumstance, and depends entirely on the extent to which it has been issued compared with the demand. This is a principle of great importance; for it shows that intrinsic worth is not necessary to a currency, and that, provided the supply of paper-notes, declared to be legal tender, be sufficiently limited, their value may be maintained on a par with that of gold, or raised to any higher level. If, therefore, it were possible to devise a system for preserving the value of paper on a level with gold, without making it convertible into coin at the pleasure of the holder, the whole of the expenses attending the use of a metallic currency would be saved. To effect this object, Mr Ricardo proposed that bank-notes, instead of being made exchangeable for gold coins, should be made exchangeable for *bars of gold bullion of the standard weight and purity*. This device was obviously calculated to check the over-issue of paper quite as effectually as it could be checked by making it convertible into coin; while, as the bars could not be used as currency, it prevented any gold from getting into circulation. Mr Ricardo's proposal was recommended in the Reports of the Committees of the Houses of Lords and Commons, appointed in 1819, to consider the expediency of the bank's resuming cash-payments, and was afterwards adopted in the celebrated bill introduced by Mr (now Sir Robert) Peel, for the resumption of cash payments. But though the plan secured all the advantages which Mr Ricardo had in view, these were not the only considerations that had to be attended to. The discovery of means for the prevention, or at least diminution, of the extensive forgery to which the substitution of notes in the place of coins had given rise, was indispensably necessary to the success of Mr Ricardo's plan; and notwithstanding all the efforts that have been made, this desideratum has not yet been supplied. Forgery in the larger description of notes, or in those for L.5 and upwards, may, with due precaution, be prevented from becoming injuriously prevalent. But low notes, or those of the value of L.1 or L.2, having to circulate among the labouring classes, and in immense numbers, present facilities for the issue of spurious paper which it has been found impossible materially to diminish. Hence, in 1821, the plan of paying in bars of bullion was abandoned, and the Bank of England recommenced paying in specie.

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[1] First Letter to the Right Hon. Robert Peel, by one of his Constituents, p. 61.

[2] There was little that was new in either of these pamphlets; the origin, nature, and causes of rent having been quite as well, or rather better, explained in a pamphlet by Dr Anderson, the editor of the Bee, published in 1777 (Inquiry into the Nature of the Corn Laws), and in his Agricultural Recreations, published in 1801. But the investigations and discoveries of Anderson did not attract any attention, and were, indeed, totally forgotten; so that it was necessary the theory of rent should be re-stated (it is believed to have been re-discovered), to make it be understood and appreciated by the public.

At length, in 1817, Mr Ricardo published his great work on the "Principles of Political Economy and Taxation." This was a step which he did not take without much hesitation. He was not, and did not affect to be, insensible of the value of literary and philosophical reputation; but his modesty always led him to undervalue his own powers; and having already obtained a very high degree of celebrity as a writer on currency, he was unwilling to risk what he was already in possession of, by attempting to gain more. Ultimately, however, he was prevailed upon by the entreaties of his friends, and chiefly by those of Mr Mill, to allow his work to be sent to press. Its appearance forms a new era in the history of the science. With the exception of the "Wealth of Nations," it is the most important, as it certainly is the most original and profound, work that has appeared on political economy. It must, however, be admitted, that he has not been happy in the exposition of several of his peculiar doctrines; and the mathematical cast of his reasonings, the intimate dependence of his propositions on each other, and the new sense which he sometimes gives to terms in common use, are apt to repel ordinary readers, and give an appearance of obscurity to the work. But those who study it with the care and attention which it deserves, will find that it is eminently logical; and the powers of mind displayed in its investigations, the dexterity with which the most abstruse and difficult questions are unravelled, the sagacity evinced in tracing the operation of general principles, in disentangling them from such as are of a secondary and accidental nature, and in perceiving and estimating their remotest consequences, have rarely been surpassed, and will for ever secure the name of Ricardo a conspicuous place in the list of profound thinkers, and of the discoverers of useful truths.

The reader will find in the article POLITICAL ECONOMY a pretty full account of the leading principles advanced by Mr Ricardo in this work, and of his most material conclusions. It is to be regretted that he relied too much on theoretical reasonings, without making sufficient allowance for the circumstances natural to and inherent in society, which either counteract or materially modify some of the principles on which he laid the greatest stress. But despite the errors into which he thus necessarily fell, his work is of the very highest value. It is the first in which we find an analysis and generally just explanation of the circumstances which determine the distribution of wealth among the various ranks and orders of society, and which govern their apparently conflicting but really harmonious relations. Since the appearance of Mr Ricardo's work the whole face of the science has been changed, not merely by his numerous discoveries, and the new lights which he struck out in every department, but by the closer and more analytical method of reasoning which he introduced. In this respect there is yet, no doubt, much room for improvement; but any one who compares the economical writings of the last seven years, with those current before Mr Ricardo's work made its appearance, will be satisfied that there is now much less of loose generalization, and more regard to science and principle. The practical considerations which Mr Ricardo too much neglected have had their proper influence ascertained by subsequent inquirers; and his doctrines having been properly modified, and made applicable to the exigencies of society, have acquired a very high practical as well as theoretical value.

Previously to the publication of his Principles, Mr Ricardo retired wholly from business, with a very large fortune, acquired with the universal respect and esteem of his competitors. He afterwards spent the greater part of the summer at Gatcomb Park, an estate which he had purchased in Gloucestershire. But he did not retire from the bustle of active life to the mere enjoyment of his acres—*Non fuit consilium socordia atque desidia bonum otium conterere*—he had other objects in view; and while his leisure hours, when in the country, were chiefly devoted to the prosecution of the interesting science of which he was now confessedly at the head, he determined to extend the sphere of his usefulness by entering the House of Commons. In 1819 he took his seat as member for Portarlington. His diffidence of his own powers had, however, nearly deprived the country of the important services which he rendered in this situation. In a letter to one of his friends, dated the 7th of April 1819, he says, "You will have seen that I have taken my seat in the House of Commons. I fear that I shall be of little use there. I have twice attempted to speak; but I proceeded in the most embarrassed manner; and I have no hope of conquering the alarm with which I am assailed the moment I hear the sound of my own voice." And in a letter to the same gentleman, dated the 22d of June 1819, he says, "I thank you for your endeavours to inspire me with confidence on the occasion of my addressing the house. Their indulgent reception of me has, in some degree, made the task of speaking more easy to me; but there are yet so many formidable obstacles to my success, and some, I fear, of a nature nearly insurmountable, that I apprehend it will be wisdom and sound discretion in me to content myself with giving silent votes." Fortunately he did not adopt this resolution. The difficulties with which he had at first to struggle, and his diffidence in himself, gradually subsided; while the integrity of his character, the mildness of his manners, and the perfect mastery which he possessed over the subjects on which he spoke, and the unquestionable purity and disinterestedness of his intentions, speedily secured him a very extensive and powerful influence both in the house and the country, and gave the greatest weight and authority to his opinions.

Mr Ricardo was not one of those who make speeches to suit the temporary and ephemeral circumstances and politics of the day; he spoke only from principle, and with a fixed resolution never to diverge in the smallest degree from the path which it pointed out; he neither concealed nor modified an opinion for the purpose of conciliating the favour, or of disarming the prejudices or hostility, of any man or set of men; nor did he ever make a speech or give a vote which he was not thoroughly convinced was founded on just principles, and calculated to promote the true and lasting interests of the public. Trained to habits of profound thinking, independent in his fortune, and inflexible in his principles, Mr Ricardo had nothing in common with the vulgar tribe of party politicians. His country's good was the single and only object of his parliamentary exertions; and he laboured to promote it, not by engaging in party cabals, which he detested, but by supporting the rights and liberties of all classes, and by explaining and unfolding the true sources of national wealth and public prosperity.

The change which has taken place in the public opinion respecting the financial and commercial policy of the country, since the period when Mr Ricardo obtained a seat in the House of Commons, is as complete as it is gratifying.

That monopoly has still many defenders, must be allowed; but they defend it only because they are interested in its support. The most enlarged principles are now supported by all the leading members of both houses. All are now ready to admit that the exclusive system is founded on vicious principles; that it is not calculated to accelerate, but to retard, the progress of those nations by whom it is adopted; and that it is sound policy to admit the freest competition in every branch of industry, and to deal with all the world on fair and liberal principles. The writings and the speeches of Mr Ricardo contributed more than those of any other individual to accomplish this salutary and desirable change. As he was known to be a master in "the master science of civil life," his opinion, from the moment he entered the House of Commons, was referred to on all important occasions;[1] and he acquired a constant accession of influence and consideration, according as experience served to render the house and the country better acquainted with the rare and excellent qualities of his mind, and the singleness of his heart.

In 1820 Mr Ricardo was prevailed on to furnish an article on the "Funding System" for the Supplement to the Encyclopædia Britannica. This tract, though somewhat confused and perplexed in its arrangement, embraces many admirable discussions. Mr Ricardo was a decided friend to the plan for raising the supplies for a war within the year, by an equivalent increase of taxation; and he was also of opinion that it would be both expedient and practicable to pay off the public debt by an assessment on capital. In this article he has endeavoured, if not with perfect success, at least with great ingenuity, to defend both projects from the objections commonly urged against them.

In 1822, during the parliamentary discussions on the subject of the corn laws, Mr Ricardo published his pamphlet on "Protection to Agriculture." This is the best of all his pamphlets, and is, indeed, a *chef-d'œuvre*. The various and important questions respecting remunerating price, the influence of a low and high value of corn on wages and profits, the effects of taxation on agriculture and manufactures, and many other topics of equal difficulty and interest, are all discussed in the short compass of eighty or ninety pages, with a precision and clearness that leaves nothing to be desired. Even if Mr Ricardo had never written anything else, this pamphlet would have placed him in the very first rank of political economists.

Though not robust, Mr Ricardo's constitution was apparently good, and his health such as to promise a long life of usefulness. He had indeed been subject for several years to an affection in one of his ears; but as it had never given him any serious inconvenience, he paid little attention to it. When he retired to his seat in Gloucestershire, subsequently to the close of the session of 1823, he was in excellent health and spirits; and besides completing a tract, containing a plan for the establishment of a national bank, he had engaged, with his usual ardour, in profound and elaborate inquiries in relation to the theory of value. But he was not destined to bring this investigation to a close. In the beginning of September he was suddenly seized with a violent pain in the diseased ear: the symptoms were not, however, considered as unfavourable; and the breaking of an imposthume that had formed within it contributed greatly to his relief. But the amendment was only transitory; within two days inflammation recommenced; and after a period of indescribable agony, pressure on the brain ensued, which produced a stupor that continued until death terminated his sufferings on the 11th of September.

In private life Mr Ricardo was most amiable. He was a kind and indulgent father and husband, and a warm, affectionate, and zealous friend. No man was ever more thoroughly free from every species of artifice and pretension. He was sincere, plain, and unassuming, at once the firmest and the gentlest of human beings. He was particularly fond of assembling intelligent men around him, and of conversing in the freest and most unrestrained manner on all topics of interest, but more especially on those connected with his favourite science. He was always ready to give way to others, and never discovered the least impatience to speak; but when he did speak, the extent and accuracy of his knowledge, the solidity of his judgment, his perfect candour, and his peculiar and extraordinary talent for resolving a question into its elements, and for setting the most difficult and complicated subject in the clearest and most striking point of view, arrested the attention of every one, and made him the delight and idol of all who had the happiness to hear him. Mr Ricardo never entered into an argument, whether in public or private, for the sake of displaying ingenuity, of baffling an opponent, or of gaining a victory; he was an entire stranger to such motives. The discovery of truth was his exclusive object. He was ever open to conviction; and if he was satisfied that he had either advanced or supported an erroneous opinion, he was the first to acknowledge his error, and to caution others against it.

Few men ever possessed in a higher degree than Mr Ricardo the talent of speaking and conversing with clearness and facility on the most abstruse and difficult subjects. In this respect his speeches were greatly superior to his publications. The latter cannot be readily understood and followed without considerable attention; but nothing could exceed the ease and felicity with which he illustrated and explained the most refined and delicate questions of political economy, both in private conversation and in his speeches. Without being forcible, his style of speaking was easy, fluent, and agreeable. It was impossible to take him off his guard. To those who were not familiar with his speculations, some of his positions were apt to appear paradoxical; but the paradox was only in appearance. He never advanced an opinion on which he had not deeply reflected, and without examining it in every point of view; and the readiness with which he met and overthrew the most specious objections that the ablest men in the house could state to his doctrines, is the best proof of their correctness, and of the superiority and acuteness of his understanding. That there were greater orators, and men of more varied and general acquirements, in parliament than Mr Ricardo, we readily allow; but we are bold to say, that in point of deep, clear, and comprehensive intellect, he had no superiors, and very few, if any, equals, either in parliament or the country.

Mr Ricardo was not less generous than intelligent; he was never slow to come forward to the relief of the poor and the distressed; and while he contributed to almost every charitable institution in the metropolis, he supported at his own expense an alms-house for the poor, and two schools for the instruction of the young in the vicinity of his seat in the country.

Besides the publications previously enumerated, Mr Ricardo left several manuscripts. Among others, a "Plan for the Establishment of a National Bank" was found in a finished state, and has since been published. In this pamphlet he has endeavoured to show that the power of issuing paper-money might be safely placed in the hands of commissioners appointed by government; and that, while such a plan would be productive of no inconvenience, it would most probably save the public a considerable sum annually.

Mr Ricardo also left very full Notes on Mr Malthus's

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[1] Mr Ricardo made the first of his prominent appearances on the 24th of May 1819, in the debate on the resolutions proposed by Mr Peel respecting the resumption of cash payments. He did not rise until he was loudly called upon from all sides of the House.

Principles of Political Economy. They contain a vindication of his own doctrines from the objections of Mr Malthus, and an exposition of the mistakes into which he conceives the latter had fallen.

Though not properly belonging to the Whig party, Mr Ricardo voted almost uniformly with them. He was fully impressed with a conviction of the many advantages that would result from giving the people a greater influence over the choice of their representatives in the House of Commons; and was so far a friend to the system of the radical reformers, as to give his cordial support to the plan of voting by ballot, which he considered as the best if not the only means for securing the mass of the electors against improper solicitations, and enabling them to vote in favour of the candidates whom they really approved. He did not, however, agree with the radical reformers in their plan of universal suffrage: he thought the elective franchise should be given to all who possessed a certain amount of property; but he was of opinion, that while it would be a very hazardous experiment, no practical good would result from giving the franchise indiscriminately to all.

When the circumstances under which the greater part of the life of Mr Ricardo was spent are brought under view, and when it is also recollected that he died at the early age of fifty-one, it may be truly said that very few men have ever achieved so much. His industry was quite unrivalled; or if rivalled, it was only by his sagacity, his integrity, and his candour.

"The history of Mr Ricardo," to use the words of his friend Mr Mill, "holds out a bright and inspiring example. Mr Ricardo had everything to do for himself, and he did everything. Let not the generous youth, whose aspirations are higher than his circumstances, despair of attaining either the highest intellectual excellence, or the highest influence on the welfare of his species, when he recollects in what circumstances Mr Ricardo opened, and in what he closed his memorable life. He had his fortune to make, his mind to form; he had even his education to commence and conduct. In a field of the most intense competition he realized a large fortune, with the universal esteem and affection of those who could best judge of the honour and purity of his acts. Amid this scene of active exertion and practical detail, he cultivated and he acquired habits of intense and patient and comprehensive thinking, such as have been rarely equalled and never excelled."

Mr Ricardo left a widow, three sons, and four daughters. One of his daughters died a few years before him, shortly after her marriage. (C. C.)

RICAUT, or RYCAUT, SIR PAUL, an eminent English traveller, of the time of whose birth we find no account; but in 1661 he was appointed secretary to the Earl of Winchelsea, who was sent ambassador extraordinary to Turkey. During his continuance in that station he wrote "The Present State of the Ottoman Empire, in three books, containing the maxims of the Turkish policy, their religion, and military discipline," London, 1670; and he afterwards resided eleven years as consul at Smyrna, where, at the command of Charles II., he composed "The Present State of the Greek and Arminian Churches, *anno Christi* 1678." On his return, Lord Clarendon being appointed lord lieutenant of Ireland, made him his principal secretary for Leinster and Connaught. King James II. knighted him, and made him one of the privy council in Ireland, and judge of the court of admiralty. These appointments he held till the Revolution. He was employed by King William as resident at the Hanse Towns, in Lower Saxony, where he continued for ten years; but being worn out with age and infirmities, he obtained leave to return in 1700, and died the same year. Ricaut continued Knolles's History of the Turks, and Platina's Lives of the Popes; besides which there are some other productions which bear his name.

RICE. "Rice *bras*," says Mr Marsden, "whilst in the husk, is in Indian called *paddee*, and assumes a different name in each of its other various states. We observe no distinction of this kind in Europe, where our grain retains through all its stages, till it becomes flour, its original name of barley, wheat, or oats. The following, besides many others, are names applied to rice in its different stages of growth and preparation: *paddee*, original name of the seed; *oossay*, grain of last season; *bunnee*, the plants before removed to the sawoors; *bras*, or *bray*, rice, the husk of the paddee being taken off; *charroop*, rice cleaned for boiling; *nassee*, boiled rice; *peerang*, yellow rice; *jambar*, a service of rice, &c.

"Among people whose general objects of contemplation are few, those which do of necessity engage their attention are often more nicely discriminated than the same objects among more enlightened people, whose ideas, ranging over the extensive field of art and science, disdain to fix long on obvious and common matters. *Paddee*, in Sumatra and the Malay Islands, is distinguished into two sorts; *laddang* or upland paddee, and *sawoor* or lowland, which are always kept separate, and will not grow reciprocally. Of these, the former bears the higher price, being a whiter, heartier, and better-flavoured grain, and having the advantage in point of keeping. The latter is much more prolific from the seed, and liable to less risk in the culture, but is of a watery substance, produces less increase in boiling, and is subject to a swifter decay. It is, however, in more common use than the former. Besides this general distinction, the paddee of each sort, particularly the laddang, presents a variety of species, which, as far as my information extends, I shall enumerate and endeavour to describe. The common kind of dry ground paddee; colour light brown; the size rather large, and very little crooked at the extremity. Paddee *undallong*; dry ground; short round grain; grows in whorls or bunches round the stock. Paddee *ebbass*; dry ground; large grain; common. Paddee *galloo*; dry ground; light coloured; scarce. Paddee *sennee*; dry ground; deep coloured; small grain; scarce. Paddee *ejoo*; dry ground; light coloured. Paddee *kooning*; dry ground; deep yellow; fine rice; crooked and pointed. Paddee *coocoor ballum*; dry ground; much esteemed; light coloured; small, and very much crooked, resembling a dove's nail, from whence its name. Paddee *pesang*; dry ground; outer coat light brown; inner red; longer, smaller, and less crooked than the *coocoor ballum*. Paddee *santong*; the finest sort that is planted in wet ground; small, straight, and light coloured. In general it may be observed that the larger grained rice is the least esteemed, and the smaller and whiter the most prized. In the Lampoon country they make a distinction of paddee *crawang* and paddee *jerroo*; the former of which is a month earlier in growth than the latter."

The following is the Chinese method of cultivating rice, as it is stated by Sir George Staunton: "Much of the low grounds in the middle and southern provinces of the empire are appropriated to the culture of that grain. It constitutes, in fact, the principal part of the food of all those inhabitants who are not so indigent as to be forced to subsist on other and cheaper kinds of grain. A great proportion of the surface of the country is well adapted for the production of rice, which, from the time the seed is committed to the soil till the plant approaches to maturity, requires to be immersed in a sheet of water. Many and great rivers run through the principal provinces of China, the low grounds bordering on those rivers are annually inundated, by which means is brought upon their surface a rich mud or mucilage that fertilizes the soil, in the same manner as Egypt receives its fecundative quality from the overflowing of the Nile. The periodical rains which fall near the sources of the Yellow and the Kiang rivers, not very far distant from those of the Ganges and the Burumpooter, among ce.

the mountains bounding India to the north and China to the west, often swell those rivers to a prodigious height, though not a drop should have fallen on the plains through which they afterwards flow.

"After the mud has lain some days upon the plains in China, preparations are made for planting them with rice. For this purpose a small piece of ground is enclosed by a bank of clay; the earth is ploughed up; and an upright harrow, with a row of wooden pins in the lower end, is drawn lightly over it by a buffalo. The grain, which had previously been steeped in dung diluted with animal water, is then sown very thickly upon it. A thin sheet of water is immediately brought over it, either by channels leading to the spot from a source above it, or, when below it, by means of a chain-pump, of which the use is as familiar as that of a hoe to every Chinese husbandman. In a few days the remainder of the ground intended for cultivation, if stiff, is ploughed, the lumps broken by hoes, and the surface levelled by the harrow. As soon as the shoots have attained the height of six or seven inches, they are plucked up by the roots, the tops of the blades cut off, and each root is planted separately, sometimes in small furrows turned with the plough, and sometimes in holes made in rows by a drilling stick for that purpose. The roots are about half a foot asunder. Water is brought over them a second time. For the convenience of irrigation, and to regulate its proportion, the rice-fields are subdivided by narrow ridges of clay into small enclosures. Through a channel in each ridge the water is conveyed at will to every subdivision of the field. As the rice approaches to maturity, the water, by evaporation and absorption, disappears entirely; and the crop, when ripe, covers dry ground. The first crop or harvest, in the southern provinces particularly, happens towards the end of May or beginning of June. The instrument for reaping is a small sickle, dentated like a saw, and crooked. Neither carts nor cattle are used to carry the sheaves off from the spot where they were reaped; but they are placed regularly in frames, two of which, suspended at the extremities of a bamboo pole, are carried across the shoulders of a man, to the place intended for disengaging the grain from the stems which had supported it. This operation is performed, not only by a flail, as is customary in Europe, or by cattle treading the corn in the manner of other orientalists, but sometimes also by striking it against a plank set upon its edge, or beating it against the side of a large tub scolloped for that purpose; the back and sides being much higher than the front, to prevent the grain from being dispersed. After being winnowed, it is carried to the granary.

"To remove the skin or husk of rice, a large strong earthen vessel, or hollow stone, in form somewhat like that which is used elsewhere for filtering water, is fixed firmly in the ground; and the grain, placed in it, is struck with a conical stone fixed to the extremity of a lever, and cleared, sometimes indeed imperfectly, from the husk. The stone is worked frequently by a person treading upon the end of the lever. The same object is attained also by passing the grain between two flat stones of a circular form, the upper of which turns round upon the other, but at such a distance from it as not to break the intermediate grain. The operation is performed on a large scale in mills turned by water; the axis of the wheel carrying several arms, which by striking upon the ends of levers, raise them in the same manner as is done by treading on them. Sometimes twenty of these levers are worked at once. The straw from which the grain has been disengaged is cut chiefly into chaff, to serve as provender for the very few cattle employed in the Chinese husbandry.

"The labour of the first crop being finished, the ground is immediately prepared for the reception of fresh seeds. The first operation undertaken is that of pulling up the stubble, collecting it into small heaps, which are burnt, and the ashes scattered upon the field. The former processes are afterwards renewed. The second crop is generally ripe late in October or early in November. The grain is treated as before; but the stubble is no longer burnt. It is turned under with the plough, and left to putrefy in the earth. This, with the slime brought upon the ground by inundation, are the only manures usually employed in the culture of rice."

Richardson.

RICHARDSON, Samuel, a novelist of great celebrity, was born in the year 1689, in Derbyshire, but in what particular place has not been ascertained. His father, the descendant of a reputable family in the county of Surrey, followed the occupation of a joiner. The son was at first intended for the church; but after his father had sustained some heavy losses, he was left, at the age of fifteen or sixteen, to make choice of some employment which did not require so expensive a preparation. He only appears to have received the most ordinary training of a country school. Latin words and phrases are to be found in his works, but there is no reason to believe that he had acquired even an elementary knowledge of that language, nor was he afterwards induced to make the more easy acquisition of French. But he had access to the rich and ample treasures of English literature, and he became deeply read in the book of human nature. He was a bashful boy, and gave an early preference to the society of the other sex. From his childhood he delighted in letter-writing; and to this early taste we may trace the germ of his principal works. "I was not more than thirteen," he informs us, "when three of these young women, unknown to each other, having an high opinion of my taciturnity, revealed to me their love-secrets, in order to induce me to give them copies to write, alter, or correct, for answers to their lovers' letters; nor did any one of them ever know that I was the secretary to the others."

In his choice of an employment he was chiefly guided by his love of reading. In 1706 he was bound apprentice to John Wilde, a printer at Stationers Hall. Although he served a rigid master, he contrived to steal from his hours of rest and relaxation some precious intervals for the improvement of his mind. After the completion of his apprenticeship, he continued for five or six years to work as a compositor and corrector in a printing office, and part of this time as an overseer. Thus he gradually emerged to the situation of a master-printer, having first taken an office in a court in Fleet-street, and afterwards in Salisbury-court. As an apprentice he had been diligent and conscientious, as a master he was assiduous and liberal. In addition to the proper avocations of a printer, he on various occasions undertook to write indices, prefaces, and, as he describes them, honest dedications. The punctuality, together with the integrity and liberality of his dealings, speedily procured him friends, and his business became very prosperous. Through the interest of the Speaker, Mr Onslow, he was employed to print the Journals of the House of Commons, in twenty-six volumes folio. In 1754 he was chosen master of the Stationers' Company. In 1760 he purchased a moiety of the patent of law-printer to his majesty, and in this branch of his business he was conjoined with Miss Catherine Lintot. He was thus enabled to live in comfort, and to make a suitable provision for his family. Like other prosperous citizens, he set a due value on country air, and had first a residence at North-end near Hammersmith, and afterwards at Parsons-green near Fulham, where he spent such intervals of time as he could spare from business, and where he was seldom without visitors.

The first work that recommended him to public notice was "Pamela, or Virtue rewarded," published in the year 1741. The two volumes, of which it originally consisted, appear to have been written in less than three months. Its success was almost unprecedented, for it reached a fifth edition within the space of a year. "The printer in Salisbury-court," says Mrs Barbauld, "was to create a new species of writing; his name was to be familiar in the mouths of the great, the witty, and the gay, and he was destined to give one motive more to the rest of Europe to learn the language of his country." The moral tendency of this novel was considered as so excellent, that it was even recommended from the pulpit, particularly by Dr Slocock of Christ Church in Surrey. This estimate may now excite some degree of surprise; and Dr Watts, to whom the author had sent his two volumes, wrote to him that he understood the ladies could not read them without blushing. Other inconsistencies in the work were powerfully ridiculed by Fielding in his History of Joseph Andrews, whom he introduces to his readers as the brother of Pamela. This was an injury which Richardson, though an amiable and benevolent man, found it very difficult, if not impossible to forgive. In his correspondence with his admiring friends, he predicted that Fielding would speedily sink into oblivion. But, in the present age, for every reader of Pamela and Clarissa there are at least five hundred of Joseph Andrews and Tom Jones.

The brilliant success of this novel prompted some nameless individual to write and publish a continuation of the story, under the title of "Pamela in high Life." Richardson, who might very safely have disregarded such an attempt to invade his province, was thus induced to add a second part, which however made no addition to his reputation. "These volumes," says Mrs Barbauld, "two in number, are, like most second parts, greatly inferior to the first. They are superfluous, for the plan was already completed; and they are dull, for instead of incident and passion, they are filled with heavy sentiment, in diction far from elegant. A great part of it aims to palliate, by counter-criticism, the faults which had been found in the first parts. It is less a continuation, than the author's defence of himself." On the story of Pamela, the famous dramatist Goldoni has written two of his plays, *Pamela Nubile* and *Pamela Maritata*.

In the year 1749, he published the first two volumes of "The History of Clarissa Harlowe." This work, which he extended to eight volumes, is the chief foundation of his celebrity as an original and inventive writer. Notwithstanding its inordinate length, the book long continued to enjoy an almost unrivalled share of public favour, and, whatever may be its defects or redundancies, this favour could only be secured by the author's power over the imagination and moral feelings. The outline of the story is sufficiently simple, nor is the curiosity of the reader excited by intricate plots and marvellous adventures. It is a work, not of action and enterprise, but of character and sentiment. Clarissa was exhibited in a French dress by Prevost; but he has given an abridgement rather than a translation; and, as he has stated, the book required some softening to adapt it to the more delicate taste of his countrymen. A more faithful version was afterwards published by Le Tourneur. It was translated into Dutch by Stinstra, and into German under the auspices of the illustrious Haller.

His next production was "The History of Sir Charles Grandison," published in 1753, in seven volumes. In his previous works he had given ample delineations of female character, and he now endeavoured to exhibit a pattern of a perfect man. Whatever is graceful and engaging in the man of spirit and the fine gentleman, it was his aim to unite with every moral virtue, and with the strict observance of Christian principles. This was certainly a difficult enterprise; and the writer's genius is more successfully displayed in delineating the character of Clementina, than in delineating that of his hero. Of all the representations of madness, says Dr Warton, that of Clementina "is the most deeply interesting. I know not whether even the madness of Lear is wrought up, and expressed by so many little strokes of nature and passion. It is absolute pedantry to prefer the madness of Orestes in Euripides to that of Clementina." But it is the great fault of Richardson, that he never knows when to withdraw his hand from the canvass; and he has diminished the effect of this character by prolonging her appearances beyond the proper crisis for her retirement.

The nervous system of Richardson was naturally weak; and during his latter years his hand shook, and he was subject to frequent fits of giddiness. His disorders having at length terminated in apoplexy, he died on the 4th of July 1761, at the age of seventy-two. He left behind him the character of a virtuous and benevolent man, highly respected in all the relations of private life. His chief weakness seems to have been vanity, which is sufficiently displayed in his private correspondence. His success in literature was so great and so unexpected, and he received so much flattery from his friends, especially from his female friends, that it would have required a very firm texture of mind to resist the access of that passion which so easily converts a wise man into a fool.

Richardson was twice married. His first wife was Martha the daughter of Allington Wilde, a printer of Clerkenwell. She bore him five sons and a daughter, who all died young. His second wife, who survived him for many years, was Elizabeth the sister of Mr Leake, a bookseller of Bath. She became the mother of a son and five daughters. The son died at an early age, but four of the daughters survived him; Mary, married in 1757 to Mr Ditcher, an eminent surgeon of Bath; Martha, married in 1762 to Edward Bridgen, Esq.; Anne, who died unmarried in 1804; and Sarah, married to Mr Crowther, surgeon of Boswell-court.

Besides his three novels in nineteen volumes, he published some other works. 1. The Negociations of Sir Thomas Roe, in his Embassy to the Ottoman Porte, from 1621 to 1628 inclusive. 1740, fol. 2. An edition of Æsop's Fables, with Reflections. 3. Familiar Letters to and from several Persons upon business, and other subjects. He furnished some additions to the sixth edition of De Foe's Tour through Great Britain; and some of his contributions are to be found in periodical works. Long after his death appeared "The Correspondence of Samuel Richardson, author of Pamela, Clarissa, and Sir Charles Grandison; selected from the original manuscripts bequeathed by him to his family. To which are prefixed a biographical account of that author, and observations on his writings, by Anna Lætitia Barbauld." Lond. 1804, 6 vols. 12mo. This publication has no tendency to augment his reputation.

The most eminent writers of our own, and even of foreign countries, have paid their tribute to the talents of Richardson, whose works have been published in almost every language and country of Europe. They have been greatly admired, notwithstanding every dissimilitude of manners, and every disadvantage of translation. Diderot, in his Essay on Dramatic Poetry, speaking of the means employed to move the passions, mentions Richardson as a perfect master of that art. "How striking," says he, "how pathetic are his descriptions! His personages, though silent, are alive before me; and of those who speak, the actions are still more affecting than the words." Rousseau, in his letter to M. d'Alembert, speaking of the novels of Richardson, asserts, "that nothing was ever written equal to, or even approaching them, in any language." Dr Johnson, in his introduction to the ninety-seventh number of the Rambler, which was written by Richardson, observes that the reader was indebted for that day's entertainment to an author "from whom the age has received greater favours, who has enlarged the knowledge of human nature, and taught the passions to move at the command of virtue." In his

Life of Rowe, he says, "The character of Lothario seems to have been expanded by Richardson into that of Lovelace; but he has excelled his original in the moral effect of the fiction. Lothario, with gaiety which cannot be hated, and bravery which cannot be despised, retains too much of the spectator's kindness. It was in the power of Richardson alone to teach us at once esteem and detestation; to make virtuous resentment overpower all the benevolence which wit, and elegance, and courage, naturally excite; and to lose at last the hero in the villain." Dr Young has remarked, that Richardson, with the mere advantages of nature, improved by a very moderate progress in education, struck out at once, and of his own accord, into a new province of writing, in which he succeeded to admiration. And, what is more remarkable, he not only began, but finished, the plan on which he set out, leaving no room for any one after him to render it more complete; and not one of the various writers that have ever since attempted to imitate him, have in any respect equalled, or at all approached near him. This kind of romance is peculiarly his own; and "I consider him," he continues, "as a truly great natural genius; as great and supereminent in his way as Shakspeare and Milton were in theirs."

Richardson, *Jonathan*, a celebrated painter of heads, was born about the year 1665, and against his inclination was placed by his father-in-law apprentice to a scrivener, with whom he lived six years. Having obtained his freedom by the death of his master, he followed the bent of his disposition, and at the age of twenty became the disciple of Riley, with whom he lived four years, whose niece he married, and of whose manner he acquired enough to maintain a solid and lasting reputation, even during the lives of Kneller and Dahl, and to remain at the head of the profession when they no longer continued to exercise it.

There is strength, roundness, and boldness in his colouring; but his men want dignity, and his women grace. The good sense of the nation is characterised in his portraits. We perceive that he lived in an age when neither enthusiasm nor servility was predominant. Yet with a pencil so firm, possessed of a numerous and excellent collection of drawings, full of the theory, and profound in reflections on his art, he drew nothing well below the head, and was void of imagination. His attitudes, draperies, and back-grounds, are totally insipid and unmeaning; so ill did he apply to his own practice the sagacious rules and hints which he bestowed on others. Though he wrote with fire and judgment, his paintings owed little to either. No man dived deeper into the inexhaustible stores of Raphael, or was more smitten with the native lustre of Vandyck. Yet though capable of relishing the elevation of the one and the elegance of the other, he could never contrive to see with their eyes when he was to copy nature himself. One wonders that he could comment on their works so well, and imitate them so little.

He quitted business some years before his death; but his temperance and virtue contributed to protract his life to a great length in the full enjoyment of his understanding, and in the felicity of domestic friendship. He had a paralytic stroke that affected his arm, yet never disabled him from his customary walks and exercise. He had been in St James's Park, and died suddenly at his house in Queen's-square on his return home, on the 28th of May 1745, when he had passed the eightieth year of his age. He left a son and four daughters; one of whom was married to his disciple Mr Hudson, and another to Mr Grigson, an attorney. The taste and learning of the son, and the harmony in which he lived with his father, are visible in the joint works which they composed. In 1719 the father published two discourses: 1. An Essay on the whole Art of Criticism as it relates to Painting; 2. An Argument in behalf of the Science of a Connoisseur. In 1722 came forth "An Account of some of the Statues, Bas-reliefs, Drawings, and Pictures, in Italy, &c. with Remarks by Mr Richardson, senior and junior." The son made the journey; and from his notes, letters, and observations, they both at his return compiled this valuable work. As the father was a formal man, with a slow but loud and sonorous voice, and, in truth, with some affectation in his manner, and as there is much singularity in his style and expression, these peculiarities, for they were scarcely foibles, struck superficial readers, and between the laughers and the envious the book was much ridiculed. Yet both this and the former are full of matter, good sense, and instruction; and the very quaintness of some expressions, and their laboured novelty, shew the difficulty which the author experienced in his attempts to convey mere visible ideas through the medium of language. If these authors were censured when they confined themselves within their own circle, it was not to be expected that they would be treated with milder indulgence when they ventured into a sister region. In 1734, they published a very thick octavo, containing explanatory notes and remarks on Milton's Paradise Lost, with the life of the author, and a discourse on the poem. Again were the good sense, the judicious criticisms, and the sentiments that broke forth in this work, forgotten in the singularities by which it is distinguished. The father having said, in apology for being little conversant in ancient literature, that he had looked into the classics through his son, Hogarth, whom a quibble could furnish with wit, drew the father peeping through the nether end of a telescope, with which his son was perforated, at a Virgil placed on a high shelf. Richardson, indeed, was as incapable of reaching the sublime or harmonious in poetry, as he was in painting, though so capable of illustrating both. Some specimens of verse that he has given us here and there in his works excite no curiosity for more, though he informs us in his Milton, that if painting was his wife, poetry had been his secret concubine.

RICHELET, Cæsar Peter, a French writer, born in 1631, at Chemin in Champagne, was the friend of Patru and Albancourt; and like them applied himself to the study of the French language with success. He compiled a dictionary of that language, full of new and useful remarks; but exceptionable, as containing many satirical reflections and obscenities. The best edition is that of Lyon, 1728, three volumes folio. He also collected a small dictionary of rhymes, and composed some other pieces in the grammatical and critical department. He died in 1698.

RICHELIEU, John Armand du Plessis de, cardinal of Richelieu and Fronsac, bishop of Lucon, &c. was born at Paris in 1585. He was possessed of excellent parts; and at the age of twenty-two he had the address to obtain a dispensation to enjoy the bishopric of Lucon. He applied himself in a particular manner to the function of preaching; and his reputation procured him the office of almoner to the queen Mary de' Medicis. His abilities in the management of affairs advanced him to be secretary of state in 1616; and the king soon gave him the preference to all his other secretaries. The death of the marquis d'Ancre having produced a revolution in state affairs, Richelieu retired to Avignon, where he employed himself in composing books of controversy and piety. The king having recalled him to court, he was made a cardinal in 1622; and, two years after, first minister of state, and grand-master of the navigation. In 1626, the Isle of Rhée was preserved by his care; and in 1628 Rochelle was taken, the haven having been enclosed by the famous dyke which he ordered to be raised. He accompanied the king to the siege of Cazal, and contributed not a little to the raising of it in 1629. He also obliged the Hugucnots to the peace at Alets, which proved the ruin of that party. He took Pamerol, and succoured Cazal, besieged by Spinola. In the mean time the nobles found fault with his conduct, and persuaded the king to discard him. The cardinal, for his part, was unmoved, and by his reasonings overthrew what was thought to be determined against him; so that, instead of being disgraced, he from that moment became more powerful than ever. He punished all his enemies in the same manner as they would have punished him; and the day which produced this event, so glorious to Cardinal de Richelieu, was called the *day of dupes*. This able minister had from thence forward an ascendency over the king's mind; and he now resolved to humble the excessive pride of the house of Austria. For that purpose he concluded a treaty with Gustavus Adolphus king of Sweden, for carrying the war into the heart of Germany. He also entered into a league with the duke of Bavaria; secured Lorraine; raised a part of the princes of the empire against the emperor; treated with the Dutch to continue the war against Spain; favoured the Catalans and Portuguese till they shook off the Spanish yoke; and, in short, took so many different measures, that he accomplished his design; and after having carried on the war with success, was thinking of concluding it by a peace, when he died at Paris on the 4th of December 1642, aged fifty-eight. He was interred in the Sorbonne, where a magnificent mausoleum is erected to his memory. This great politician made the arts and sciences flourish; formed the botanical garden at Paris, called the *king's garden;* founded the French academy; established the royal printing-house; erected the palace afterwards called *Le Palais Royal*, which he presented to the king; and rebuilt the Sorbonne with a magnificence that appears truly royal. Besides his books of controversy and piety, there pass under the name of this minister, a Journal, in 2 vols. 12mo; and a Political Testament, in 12mo; all treating of politics and state affairs.

Richelieu, or *Sorell*, a river of Lower Canada, flowing in a northerly direction from Lake Champlain to the great St Lawrence. It is the principal channel by which the waters of the lake are conveyed to the latter river; and by being made navigable for vessels of large size throughout its whole extent, it would afford a most convenient means of commercial intercourse with the interior of New York, and form a direct chain of communication with the great western republic. This river is remarkable for being much narrower at its embouchure than at the place from which it flows. From its mouth to the basin of Chamblay it is about two hundred and fifty yards wide; thence to the Isle du Portage the breadth is five hundred yards; beyond this it expands to double that size, and continues to enlarge up to St John's, from which there is a ship-navigation to the towns on Lake Champlain. From Chamblay downwards to the St Lawrence the current is regular and gentle; but from Lake Champlain to the basin it is hurried, in some places violent, and in others broken by rapids. The channel is, however, of great value and importance, and the medium of considerable trade.

Richelieu *Islands*, a cluster of islands, about a hundred in number, in the river St Lawrence, situated at the south-west entrance of Lake St Peter. They lie low, and are liable to be overflowed in spring, when the lake is swelled by the melting of snow and ice. Some of them afford good pasturage for cattle, and they all abound with wild fowl.

RICHES, a word used always in the plural number, means wealth, money, possession, or a splendid sumptuous appearance. When used to express the fortune of private persons, whether patrimonial or acquired, it signifies *opulence;* a term which expresses not the enjoyment, but the possession, of numerous superfluities. By the riches of a state or kingdom we mean the produce of industry, of commerce, of different incorporated bodies, of the internal and external administration of the principal members of which the society is composed.

RICHMOND, a city, port of entry, and the metropolis of Virginia, one of the United States of North America. It is situated on the north bank of James River, just below the falls, one hundred and fifty miles from the mouth of the river, and one hundred and twenty-three south-west from Washington. The situation of this city is alike picturesque, salubrious, and favourable for commerce. The public buildings are numerous, and some considerable manufactures are here carried on. The capitol, a handsome structure, occupies a commanding situation on a rising ground. Among the churches, that called the Monumental Church is most beautiful and conspicuous. It is erected on the spot where, in 1811, the theatre of Richmond was burned to the ground during the performance, and above seventy persons perished in the flames. A monument in front commemorates the event, and hence the name of the church. There are a number of other religious houses, a sufficiency of good schools, and a well-regulated penitentiary. Richmond is the natural depot of tobacco, wheat, and hemp, raised in the populous county watered by the river. The falls extend six miles, during which space the James descends eighty feet. A canal passes around these falls, and the river is navigable for batteaux two hundred and twenty miles above them; by this means the city is connected with a very extensive and productive back country. The inland, coasting, and foreign trade is extensive. Manchester, on the opposite side of the river, is connected with it by means of bridges. In 1830 the population amounted to 16,060; in 1839 it may be estimated at about 20,000. Long. 77. 21. W. Lat. 37. 32. N.

Richmond, a town of the county of Surrey, in the hundred of Kingston, nine miles from London, on the right bank of the river Thames, over which is an elegant bridge leading to Twickenham. It was anciently called Sheen, and a palace adjoining was long the residence of our monarchs. The park still belongs to the crown. A hill rises from the town, of great celebrity for the extent and beauty of the prospect which it affords. The brow of the hill has a delightful promenade, and is adorned by residences of great taste and magnificence, and by hotels, where every accommodation that luxury can desire is supplied, though at the most extravagant prices. Other houses of the purest taste are built along the bank, and to the edge of the river. The vicinity to the royal gardens of Kew form an inducement to a residence at this delightful place, which is one of the desirable retreats from the metropolis. It has a neat parish church, or rather chapel to Kingston. The population amounted in 1801 to 4628, in 1811 to 5219, in 1821 to 5994, and in 1831 to 7243.

Richmond, a market and borough town of the north riding of the county of York, 254 miles from London. It stands on the east side of a steep hill rising from the banks of the river Swale, which nearly encircles the town. It is finely situated, and well built. It was fortified in ancient times, and probably more populous than it is at present. It now gives the title of duke to one branch of the illegitimate descendants of Charles II. It returns two members to the House of Commons. The country around it is celebrated for its breed of horses, and annual races are still held near it. There is a good market on Saturday. The population amounted in 1801 to 2861, in 1811 to 3056, in 1821 to 3546, and in 1831 to 3900.

RICKMANSWORTH, a market-town of the county of Hertford. It is in the hundred of Cashio, seventeen miles from London, and stands at the spot where the river Gade falls into the Colne, which latter forms a part of the Grand Junction Canal. It is also near the course of the railway by which London is connected with Birmingham, and is thus highly favoured with respect to the facilities of communication. The church is a fine large fabric of an ancient date. The town has some trade in straw-hats and in making thread-lace. There are several mills in the neighbourhood occupied in making cotton and silk goods, and many in making paper. It has a weekly market on Saturday, though now but little attended. The population amounted in 1801 to 2975, in 1811 to 3230, in 1821 to 3940, and in 1831 to 4574.

RIDEAU, in *Fortification*, a small elevation of earth, extending itself lengthwise on a plain, serving to cover a camp or give an advantage in a post.

Rideau is sometimes also used for a trench, the earth of which is thrown up on its side, to serve as a parapet for covering the men.

RIDICULE, in matters of literature, is that species of writing which excites contempt with laughter.

The *ridiculous*, says Lord Kames, differs from the *risible.* A risible object produces an emotion of laughter merely; a ridiculous object is improper as well as risible, and produces a mixed emotion, which is vented by a laugh of derision or scorn.

Burlesque, though a great engine of ridicule, is not confined to that subject; for it is clearly distinguishable into burlesque that excites laughter merely, and burlesque that provokes derision or ridicule. A grave subject in which there is no impropriety, may be brought down by a certain colouring so as to be risible; which is the case of *Virgil Travestie,* and also the case of the *Secchia Rapita;* the authors laugh first, in order to make their readers laugh. The *Lutrin* is a burlesque poem of the other sort, laying hold of a low and trifling incident, to expose the luxury, indolence, and contentious spirit of a set of monks. Boileau, the author, gives a ridiculous air to the subject, by dressing it in the heroic style, and affecting to consider it as of the utmost dignity and importance. In a composition of this kind, no image professedly ludicrous ought to find quarter, because such images destroy the contrast; and accordingly the author shows always the grave face, and never once betrays a smile.

Though the burlesque that aims at ridicule produces its effects by elevating the style far above the subject, yet it has limits beyond which the elevation ought not to be carried. The poet, consulting the imagination of his readers, ought to confine himself to such images as are lively and readily apprehended; a strained elevation, soaring above an ordinary reach of fancy, makes not a pleasant impression. The reader, fatigued with being always upon the stretch, is soon disgusted; and if he persevere, becomes thoughtless and indifferent. Further, a fiction gives no pleasure unless it be painted in colours so lively as to produce some perception of reality; which never can be done effectually where the images are formed with labour or difficulty. For these reasons, we cannot avoid condemning the *Batrachomyomachia,* said to be the composition of Homer: it is beyond the power of imagination to form a clear and lively image of frogs and mice acting with the dignity of the highest of our species; nor can we form a conception of the reality of such an action, in any manner so distinct as to interest our affections even in the slightest degree.

The Rape of the Lock is of a character clearly distinguishable from those now mentioned; it is not properly a burlesque performance, but what may rather be termed *an heroi-comical poem;* it treats a gay and familiar subject with pleasantry, and with a moderate degree of dignity. The author puts not on a mask like Boileau, nor professes to make us laugh like Tassoni. The Rape of the Lock is a genteel species of writing, less strained than those mentioned; and is pleasant or ludicrous without having ridicule for its chief aim; giving way, however, to ridicule, where it naturally arises from a particular character, such as that of Sir Plume.

Those who have a talent for ridicule, which is seldom united with a taste for delicate and refined beauties, are quick-sighted in improprieties; and these they eagerly grasp, in order to gratify their favourite propensity. Persons galled are provoked to maintain that ridicule is improper for grave subjects. Subjects really grave are by no means fit for ridicule; but then it is urged against them, that, when called in question whether a certain subject be really grave, ridicule is the only means of determining the controversy. Hence a celebrated question, whether ridicule be or be not a test of truth.

On one side it is observed that the objects of ridicule are falsehood, incongruity, impropriety, or turpitude of certain kinds; but as the object of every excited passion must be examined by reason before we can determine whether it be proper or improper, so ridicule must, apparently at least, establish the truth of the improprieties designed to excite the passion of contempt. Hence it comes in aid of argument and reason, when its impressions on the imagination are consistent with the nature of things; but when it strikes the fancy and affections with fictitious images, it becomes the instrument of deceit. But however ridicule may impress the idea of apparent turpitude or falsehood in the imagination, yet still reason remains the supreme judge; and thus ridicule can never be the final test or touchstone of truth and falsehood.

On the other side, it is contended that ridicule is not a subject of reasoning, but of sense or taste. Stating the question, then, in more accurate terms, whether the sense of ridicule be the proper test for distinguishing ridiculous objects from what are not so, they proceed thus. No person doubts that our sense of beauty is the true test of what is beautiful; and our sense of grandeur, of what is great or sublime. Is it more doubtful whether our sense of ridicule be the true test of what is ridiculous? It is not only the true test, but indeed the only test; for this subject comes not, more than beauty or grandeur, under the province of reason. If any subject, by the influence of fashion or custom, have acquired a degree of veneration to which it is not naturally entitled, what are the proper means for wiping off the artificial colouring, and displaying the subject in its true light? A man of true taste sees the subject without the disguise; but if we hesitate, let him apply the test of ridicule, which separates it from its artificial connections, and exposes it naked with all its native improprieties.

RIDING. See Horsemanship.

Riding, in naval affairs, is the state of a ship's being retained in a particular station, by means of one or more cables with their anchors, which are for this purpose sunk into the bottom of the sea, &c. in order to prevent the vessel from being driven at the mercy of the wind or current. A rope is said to *ride,* when one of the turns by which it is wound about the capstern or windlass lies over another, so as to interrupt the operation of heaving.

Riding *Athwart,* the position of a ship which lies across the direction of the wind and tide, when the former is so strong as to prevent her from falling into the current of the latter.

Riding *between the Wind and Tide,* the situation of a vessel at anchor, when the wind and tide act upon her in direct opposition, in such a manner as to destroy the effort of each other upon her hull; so that she is in a manner balanced between their reciprocal force, and rides without the least strain on her cables. When a ship does not labour heavily, or feel a great strain when anchored in an open road or bay, she is said to ride easy. On the contrary, when she pitches violently into the sea, so as to strain her cables, masts, or hull, it is called *riding hard,* and the vessel is termed a *bad roader.*

RIDLEY, Nicholas, bishop of London, and a martyr to the Reformation, was descended of an ancient family, and born in the beginning of the sixteenth century, at Wil-

Ridley.

montswick in Northumberland. From the grammar-school of Newcastle-upon-Tyne he was sent to Pembroke Hall in Cambridge, in the year 1518, and was there supported by his uncle Dr Robert Ridley, fellow of Queen's College. In 1522 he took his first degree in arts; two years after, was elected fellow; and, in 1525, he commenced master of arts. In 1527, having taken orders, he was sent by his uncle, for further improvement, to the Sorbonne at Paris; from thence he went to Louvain, and continued abroad till the year 1529. On his return to Cambridge, he was chosen under-treasurer of the university; and, in 1533, was elected senior proctor. He afterwards proceeded bachelor of divinity, and was chosen orator and a chaplain of the university. At this time he was much admired as a preacher and disputant. He lost his kind uncle in 1536; but was soon after patronised by Dr Cranmer, archbishop of Canterbury, who made him his domestic chaplain, and presented him to the vicarage of Herne in East Kent, where, we are told, he preached the doctrine of the Reformation. In 1540, having commenced doctor of divinity, he was made king's chaplain; and in the same year was elected master of his college in Cambridge. Soon after, Ridley was collated to a prebend in the church of Canterbury; and it was not long before he was accused in the bishop's court, at the instigation of Bishop Gardiner, of preaching against the doctrine of the Six Articles. The matter being referred to Cranmer, Ridley was acquitted. In 1545, he was made a prebendary of Westminster; in 1547 was presented, by the fellows of Pembroke Hall, to the living of Soham, in the diocese of Norwich; and the same year was consecrated bishop of Rochester. In 1550 he was translated to the see of London. During the same year he was one of the commissioners for examining Bishop Gardiner, and concurred in his deprivation. In 1552, returning from Cambridge, he, unfortunately for himself, paid a visit to the Princess, afterwards Queen Mary; to whom, prompted by his zeal for reformation, he expressed himself with too much freedom; for she was scarcely seated on the throne when Ridley was doomed a victim to her revenge. With Cranmer and Latimer he was burnt alive at Oxford, on the 16th of October 1555. Among other works, he wrote, 1. A Treatise concerning Images in Churches; 2. A brief Declaration of the Lord's Supper; 3. Certain godly and comfortable Conferences between Bishop Ridley and Mr Hugh Latimer, during their imprisonment; 4. A Comparison between the comfortable Doctrine of the Gospel and the Traditions of the Popish religion.

Ridley, *Gloster*, was of the same family with the preceding. He was born at sea, in the year 1702, on board the Gloucester East Indiaman, from which circumstance he obtained his Christian name. He was educated at Winchester school, and afterwards obtained a fellowship of New College, Oxford, where he took the degree of LL. B. in 1729. He paid his court to the Muses at an early period, and laid the foundation of those solid and elegant acquisitions which afterwards distinguished him as a divine, historian, and poet. During a vacation in 1728, he joined with four friends in composing a tragedy called "The Fruitless Redress," each undertaking an act, agreeably to a plan which they had previously concerted. It was offered to Mr Wilkes, but never acted, and is still in manuscript. Dr Ridley in his youth was extremely attached to theatrical performances. The Redress, and another tragedy called Jugurtha, were exhibited at Midhurst in Sussex; and the actors were chiefly the gentlemen who assisted him in their composition. We are informed that he played Marc Antony, Jaffier, Horatio, and Moneses, with very great applause, which may be readily inferred from his graceful manner of speaking in the pulpit.

During a great part of his life he had only the small college living of Westow in Norfolk, and that of Poplar in Middlesex, which was the place of his residence. After an interval of some years, his college added to these the donative of Romford in Essex, which left him little or no time for what he considered as the necessary studies of his profession. Yet in this situation he remained in the possession of, and satisfied with domestic felicity, and enjoyed the intimate friendship of some who were equally distinguished for worth and learning.

The eight Sermons which he preached at Lady Moyer's lecture it 1740 and 1741 were given to the public in 1742. In the year 1756 he was invited to go to Ireland as first chaplain to the duke of Bedford, but declined to accept the offer. In the year 1763 he published the Life of Bishop Ridley, in 4to, by subscription, from the profits of which he was enabled to purchase L.800 in the public funds. In the year 1765 he published his Review of Philips's Life of Cardinal Pole. In 1767 the university of Oxford conferred upon him by diploma the degree of D. D. In 1768 he was presented by Archbishop Secker with a rich prebend in the cathedral church of Salisbury; the only reward he received from the great during a long and useful life. He was at last worn out with infirmities, and died in 1774, leaving behind him a wife and four daughters. Dr Ridley survived both his sons, who were young men of considerable abilities. The elder, called James, was author of Tales of the Genii, and some other literary performances; and his brother Thomas was sent as a writer to Madras by the East India Company, but he suddenly died of the small-pox.

Rienzi.

RIENZI, Nicholas Gabrini de, one of the most singular characters of the fourteenth century, was born at Rome, but it is not certainly known in what year. His father, as some affirm, was a vintner, but, according to others, a miller, and his mother was a laundress, yet they found means to give their son a liberal education; and to a fine natural understanding he added uncommon application. He was well acquainted with the laws and customs of nations; and had a vast memory, which enabled him to retain much of Cicero, Valerius Maximus, Livy, the two Senecas, and, in particular, Cæsar's Commentaries, which he constantly perused. This extensive erudition proved the foundation of his future rise. He acquired the reputation of a great antiquary, from the time which he spent among the inscriptions to be found at Rome, and these inspired him with exalted ideas of the liberty, the grandeur, and justice of the old Romans. He even persuaded himself, and found means to persuade others, that he should one day be the restorer of the Roman republic. The credulity of the people was powerfully encouraged and strengthened by his advantageous stature, by the attractions of his countenance, and by that air of consequence which he could assume at pleasure. The joint energy of all these prepossessing qualities made a deep and almost indelible impression on the minds of his hearers.

Nor was his fame merely confined to the vulgar, for he even ingratiated himself into the good opinion of many distinguished personages belonging to the administration. The Romans chose him one of their deputies to Pope Clement VI. then at Avignon. The purport of this mission was to persuade his holiness that his absence from the capital was inimical to its interest. His commanding eloquence and gay conversation charmed the court of Avignon; and Rienzi was thus encouraged to tell the pope, that the great men of Rome were public thieves, robbers, adulterers, and profligates, by whose example the most horrid crimes were sanctioned. This ill-timed freedom of speech made Cardinal Colonna his enemy, though the friend of genuine merit, because he thought that some of his family were included in this flagrant accusation. Rienzi was disgraced, and fell into extreme misery, vexation, and sickness, which, by being united with indigence, brought him to a hospital. But as the cardinal was compassionate, the offender was again brought before the pope, who, being informed that Rienzi was a good man, and the strenuous advocate of equity and justice, gave him higher proofs of his esteem and confidence than before. He was appointed apostolic notary, and sent back to Rome loaded with the effects of papal munificence.

The functions of this office he executed in such a manner as to become the idol of the people, whose affections he laboured to secure by exclaiming against the vices of the great, rendering them as odious as possible; for which imprudent liberties he was dismissed from office. In this situation of his affairs he endeavoured to kindle and keep alive in the minds of the people a zeal for their ancient liberties, displaying emblems of the former grandeur and present decline of the city, accompanied with harangues and many expressive predictions. Such an intrepid, and at the same time extraordinary conduct, made some regard him as a lunatic, while others hailed him as their guardian and deliverer. When he supposed that the numbers attached to his interest were sufficiently strong, he called them together, and gave them a dismal picture of the state of the city, overrun with debaucheries, which their governors had neither capacity to correct nor to amend. He declared that the pope could, even at the rate of fourpence, raise 100,000 florins by fuel, an equal sum by salt, and as much more by the customs and other duties; insinuating that he did not seize on the revenues without the consent of his holiness.

This artful tale so powerfully animated his hearers, that they signified their determination to secure these treasures for whatever purposes might be most convenient, and that to his will they would cheerfully devote themselves. This resolution he caused them confirm by an oath; and it is said that he had the address to procure from the pope's vicar the sanction of his authority. On the 20th of May, being Whitsunday, he averred that he did nothing but in consequence of the particular inspiration of the Holy Ghost, and about nine o'clock he came out of the church with his head bare, attended by the pope's vicar, and about a hundred men in armour. Having proceeded directly to the capitol, he declared from the rostrum, with even more than his wonted boldness and energy, that the hour of their emancipation was at length arrived; that he himself was to be their glorious deliverer, and that he poured contempt on the dangers to which he might be exposed in the service of his holiness, and for the happy deliverance of the people. The laws of the "good establishment" were next ordered to be read; and he rested assured that the Romans would resolve to observe those laws, in consequence of which he pledged himself to re-establish them in a short time in their ancient grandeur and magnificence.

Plenty and security were the blessings promised by the good establishment, together with the humbling of the nobles, who were regarded as common oppressors. Such ideas filled the people with transport, and they became zealously attached to the fanaticism of Rienzi. The multitude declared him to be sovereign of Rome, to whom they granted the power of life and death, of rewards and punishments, of making and repealing laws, of treating with foreign powers, and a full and absolute authority over all the Roman territories.

Having thus arrived at the zenith of his ambition, he concealed his artifice as much as possible, and pretended to be extremely averse to accept of their proffered honours, unless they would make choice of the pope's vicar to be his coadjutor, and find means to procure the sanction of the pope himself. His wish to have the vicar, bishop of Orvieto, as his coadjutor was readily complied with, while all the honours were paid to Rienzi, the duped bishop enjoying but a mere nominal authority. Rienzi was seated in his triumphal chariot, and the people were dismissed, overwhelmed with joy and expectation. This strange election was ratified by the pope, although it was impossible that he could inwardly approve of it; and to procure a title exclusive of the prerogative of his holiness, was the next object of Rienzi's ambition. He sought, therefore, and readily obtained the title of magistrate, which was conferred on him and his coadjutor, with the addition of *deliverers of their country*. The conduct of Rienzi immediately subsequent to this elevation justly procured him esteem and respect, as well from the Romans as from neighbouring states; but as his beginning was mean and obscure, he soon became intoxicated with his sudden, his extraordinary elevation, and the incensed nobles having conspired against him, succeeded in their attempt to drive him from an authority which he had not the prudence or address to retain more than six months. At this critical period, his life was only preserved by flight, and by the disguises to which he afterwards had recourse.

Having made an ineffectual effort at Rome to regain his authority, he proceeded to Prague to Charles king of the Romans. In consequence of this rash step he was sent as a prisoner to Avignon, where he continued for three years. When he procured his enlargement, Pope Innocent IV., who succeeded Clement, well knew that many of the Romans were still attached to Rienzi, and therefore he made choice of him as a fit object for assisting him in his design of humbling the other petty tyrants of Italy. In short, he was set at liberty, and appointed governor and senator of Rome. It was hoped that his chastisement would teach him more moderation in future, and that gratitude would induce him to preserve an inviolable attachment to the holy see during the remainder of his life. He met with considerable opposition in assuming his new authority, but cunning and resolution enabled him to overcome it. But gratifying his passions, which were violent in the extreme, and disgracing his office and character by acts of cruelty, he was murdered on the 8th of October 1354.

Thus died Nicholas Rienzi, one of the most extraordinary characters of the age in which he lived; who, having formed a conspiracy big with extravagance, and carried it into execution nearly in the face of the whole world, with such remarkable success as to become sovereign of Rome; having blessed the Romans with plenty, liberty, and justice; having afforded protection to some princes, and proved a terror to others; having become the arbiter of crowned heads, established the ancient majesty and power of the Roman republic, and filled all Europe with his fame; finally, having procured their sanction whose authority he had usurped in opposition to their interests, he fell at last a sacrifice to the nobles whose ruin he had vowed, and to those vast projects, the execution of which was only prevented by his death.

RIESENGEBIRGE, a range of mountains in the dominions of Prussia, and in part of Austria, which commences on the northward on the borders of Lusatia, and separates Bohemia from Silesia and Moravia, till it terminates by forming a junction with the Carpathian range to the southward. The loftiest part of the range is that which lies between the sources of the rivers Neisse and Bober. The general height does not much exceed 3000 feet, but several of the peaks attain a much greater elevation. Of these the most remarkable are two; the Schneeberg, which is 5300 feet, and the Sturmhaube, which is 5100 feet in height. The summit of the former commands a prospect of more than sixty miles round, including the city of Breslau to the north, and of Prague to the south. The intersecting valleys are many of them picturesque and mostly fertile; but the higher parts are unfavourable to the growth of corn, from the scarcity of which the inhabitants in most winters suffer severely.

RIETI, one of the delegations or provinces into which the papal dominions are divided. It is a wild and mountainous district, containing two cities, sixteen market-towns, with many villages and hamlets, and 65,750 inhabitants. The capital is the city of the same name situated on the river Belino, near its junction with the Turano. It contains ten parish churches, five monasteries, seven nunneries, and 9270 inhabitants, who subsist chiefly by the trade in silk, and by tanning and currying leather. Long. 12. 46. 50. E. Lat. 42. 24. 25. N.

RIGA, a city of the province of Livonia, a part of the Russian empire in Europe. It is the capital of a circle of the same name as well as of the province. The circle extends over 4180 square miles, and contains, in two cities, one market-town, and thirty-nine parishes, about 150,000 inhabitants. The city of Riga, called in the language of Esthonia *Riolin*, and in that of Livonia *Righo*, is situated on the right bank of the river Duna or Dwina, about seven miles from its entrance into the Baltic. As a barrier on the western frontier of Russia, it is strongly fortified, both on the land and the sea side. It is composed of large old houses, and of narrow crooked streets ill paved. The principal public buildings are the palace of the governor, the barracks, and the town-hall, used now as the exchange. It contains 1240 private dwellings, with about 30,000 inhabitants, exclusive of the garrison. The people are mostly of the German race, and their language is far more common than that of Russia or of Livonia. The Germans have four Lutheran and one reformed church; and there are three Greek churches for the Russians and the troops. The city formerly was one of the Hanse Towns, and has now considerable export trade in the raw materials which are produced in the extended districts through which the river passes. At some seasons England draws much corn from this place. It has some considerable establishments for making leather, sail-cloth, linen, and some iron, steel, and other metallic articles. It imports large quantities of fruit, beer, wine, salt, sugar, tea, coffee, spices, and manufactured clothing. It has several institutions for education, and many for the relief of poverty, age, aud sickness. Long. 23. 57. 10. E. Lat. 56. 56. 32. N.

RIGADOON, a gay and brisk dance, borrowed originally from Provence in France, and performed in figure by a man and a woman.

RIGGING *of a Ship*, a general name given to all the ropes employed to support the masts, and to extend or reduce the sails, or arrange them to the disposition of the wind. The former, which are used to sustain the masts, remain usually in a fixed position, and are called *standing rigging;* such are the shrouds, stays, and backstays. The latter, whose office is to manage the sails, by communicating with various blocks or pulleys situated in different parts of the masts, yards, shrouds, &c. are comprehended in the general term of *running rigging.* Such are the braces, sheets, haliards, clue-lines, and brails.

RIGHT, in *Geometry*, signifies the same witn straight; thus, a straight line is called a *right* one.

RIGHT is a title conferred, 1. together with *Reverend*, upon all bishops; 2. together with *Honourable*, upon earls, viscounts, and barons; 3. by courtesy, together with *Honourable*, upon the sons of dukes, marquises, and the eldest sons of earls; 4. together with *Honourable*, upon the speaker of the House of Commons, but upon no other commoner excepting those who are members of her majesty's most honourable privy council, and the three lords mayors of London, York, and Dublin, and the lord provost of Edinburgh, during their office.

RIGHTS, in the common acceptation of the word, are of various kinds; they are *natural* or *adventitious*, *alienable* or *unalienable*, *perfect* or *imperfect*, *particular* or *general.*

Natural rights are those which a man has to his life, limbs, and liberty; to the produce of his personal labour; to the use, in common with others, of air, light, and water. That every man has a natural right or just claim to these things, is evident from their being absolutely necessary to enable him to answer that purpose, whatever it may be, for which he was made a living and a rational being. This shows undeniably that the Author of his nature designed that he should have the use of them, and that the man who should wantonly deprive him of any one of them, would be guilty of a breach of the divine law, as well as act inconsistently with the fitness of things in every sense in which that phrase can possibly be understood.

Adventitious rights are those which a king has over his subjects, a general over his soldiers, a husband to the person and affections of his wife, and which every man has to the greater part of his property. The important question is, how are adventitious rights acquired? In answer to this question, the moralist who deduces the laws of virtue from the will of God, observes, that as God appears from his works to be a benevolent Being who wills the happiness of all his creatures, he must of course will every thing which naturally tends to promote that happiness. But the existence of civil society evidently contributes in a great degree to promote the sum of human happiness; and therefore whatever is necessary for the support of civil society in general, or for the conduct of particular societies already established, must be agreeable to the will of God: but the allegiance of subjects to their sovereign, the obedience of soldiers to their leader, the protection of private property, and the fulfilling of contracts, are all absolutely necessary to the support of society; and hence the rights of kings, generals, husbands, and wives, &c. though adventitious, and immediately derived from human appointments, are not less sacred than natural rights, since they may all be ultimately traced to the same source. The same conclusion may easily be drawn by the philosopher, who rests moral obligation on the fitness of things, or on a moral sense; only it must in each of these cases partake of the instability of its foundation.

Rights, besides being natural or adventitious, are likewise *alienable* or *unalienable.* Every man, when he becomes the member of a civil community, alienates a part of his natural rights. In a state of nature, no man has a superior on earth, and each has a right to defend his life, liberty, and property, by all the means which nature has put in his power. In civil society, however, these rights are all transferred to the laws and the magistrate, except in cases of such extreme urgency as leave not time for legal interposition. This single consideration is sufficient to show that the right to civil liberty is alienable; though, in the vehemence of men's zeal for it, and in the language of some political remonstrances, it has often been pronounced to be an unalienable right. "The true reason," says Paley, "why mankind hold in detestation the memory of those who have sold their liberty to a tyrant is, that, together with their own, they sold commonly or endangered the liberty of others; of which they had certainly no right to dispose." The rights of a prince over his people, and of a husband over his wife, are generally and naturally unalienable.

Another division of rights is into those which are *perfect* and those which are *imperfect.* Perfect rights are such as may be precisely ascertained and asserted by force, or in civil society by the course of law. To imperfect rights neither force nor law is applicable. A man's rights to his life, person, and property, are all perfect; for if any of these be attacked, he may repel the attack by instant violence, punish the aggressor by the course of law, or compel the author of the injury to make restitution or satisfaction. A woman's right to her honour is likewise perfect; for if she cannot otherwise escape, she may kill the ravisher. Every poor man has undoubted right to relief from the rich; but his right is imperfect, for if the relief be not voluntarily given, he cannot compel it either by law or by violence. There is no duty upon which the Christian religion puts a greater value than alms-giving, and every preacher of the gospel has an undoubted right to inculcate the practice of it upon his audience; but even this right is imperfect, for he cannot refuse the communion to a man merely on account of his illiberality to the poor, as he can to another for the neglect of any duty comprehended under the term justice. In elections or appointments to offices, where the qualifications are prescribed, the best-qualified candidate has unquestionably a right to success; yet if he be rejected, he can neither seize the office by force, nor obtain redress at law. His right, therefore, is imperfect.

Here a question naturally offers itself to our consideration: "How comes a person to have a right to a thing, and yet have no right to use the means necessary to obtain it?" The answer is, that in such cases the object or the circumstances of the right are so indeterminate, that the permission of force, even where the right is real and certain, would lead to force in other cases where there exists no right at all. Thus, though the poor man has a right to relief, who shall ascertain the mode, season, and extent of it, or the person by whom it shall be administered? These things must be ascertained before the right to relief can be enforced by law; but to allow them to be ascertained by the poor themselves, would be to expose property to endless claims. In like manner, the comparative qualifications of the candidate must be ascertained, before he can enforce his right to the office; but to allow him to ascertain his qualifications himself, would be to make him judge in his own cause between himself and his neighbour.

Wherever the right is imperfect on one side, the corresponding obligation on the other must be imperfect likewise. The violation of it, however, is often not less criminal in a moral and religious view, than of a perfect obligation. It is well observed by Paley, that greater guilt is incurred by disappointing a worthy candidate of a place upon which perhaps his livelihood depends, and in which he could eminently serve the public, than by filching a book out of a library, or picking a pocket of a handkerchief. The same sentiment has been expressed by Mr Godwin, but in terms much too strong. "My neighbour," says he, "has just as much right to put an end to my existence with dagger or poison, as to deny me that pecuniary assistance without which I must starve, or as to deny me that assistance without which my intellectual attainments or my moral exertions will be materially injured. He has just as much right to amuse himself with burning my house, or torturing my children upon the rack, as to shut himself up in a cell, careless about his fellow men, and to hide 'his talent in a napkin.'" It is certainly true, that the man who should suffer another to starve for want of that relief which he *knew* that he *alone* could afford him, would be guilty of murder, and murder of the cruelest kind; but there is an immense difference between depriving society of one of its members, and withholding from that member what might be necessary to enable him to make the greatest possible intellectual attainments. Newton might have been useful and happy though he had never been acquainted with the elements of mathematics.

Rights are *particular* or *general*. Particular rights are such as belong to certain individuals or orders of men, and not to others. The rights of kings, of masters, of husbands, of wives, and, in short, all the rights which originate in society, are particular. General rights are those which belong to the species collectively. Such are our rights to the vegetable produce of the earth and to the flesh of animals for food. If the vegetable produce of the earth be included under the general rights of mankind, it is plain that he is guilty of wrong who leaves any considerable portion of land waste merely for his own amusement: he is lessening the common stock of provision which Providence intended to distribute among the species. On this principle it would not be easy to vindicate certain regulations respecting game, as well as some other monopolies which are protected by the municipal laws of most countries. Dr Paley, by just reasoning, has established this conclusion, "that nothing ought to be made exclusive property which can be conveniently enjoyed in common." An equal division of land, however, the dream of some visionary reformers, would be injurious to the general rights of mankind, as it may be demonstrated that it would lessen the common stock of provisions, by laying every man under the necessity of being his own weaver, tailor, shoemaker, smith, and carpenter, as well as ploughman, miller, and baker.

Among the general rights of mankind is the right of *necessity*; by which a man may use or destroy his neighbour's property when it is absolutely necessary for his own preservation. It is on this principle that goods are thrown overboard to save the ship, and houses pulled down to stop the progress of a fire. In such cases, however, there must be restitution when it is in our power.

RIGHTS, *Bill of*, a Declaration delivered by the lords and commons to the prince and princess of Orange, 13th February 1688; and afterwards enacted in parliament when they became king and queen. It sets forth, that King James did, by the assistance of divers evil counsellors, endeavour to subvert the laws and liberties of this kingdom, by exercising a power of dispensing with and suspending of laws; by levying money for the use of the crown by pretence of prerogative without consent of parliament; by prosecuting those who petitioned the king, and discouraging petitions; by raising and keeping a standing army in time of peace; by violating the freedom of election of members to serve in parliament; by violent prosecutions in the court of king's bench; and causing partial and corrupt jurors to be returned on trials, excessive bail to be taken, excessive fines to be imposed, and cruel punishments inflicted; all which were declared to be illegal. And the declaration concludes in these remarkable words: "And they do claim, demand, and insist upon, all and singular the premises, as their undoubted rights and liberties." And the act of parliament itself (1 W. and M. stat. ii. cap. 2) recognises "all and singular the rights and liberties, asserted and claimed in the said declaration, to be the true, ancient, indubitable rights of the people of this kingdom."

RIGOLL, or REGALS, a kind of musical instrument, consisting of several sticks bound together, only separated by beads. It is tolerably harmonious, being well struck with a ball at the end of a stick. Such is the account which Grassineau gives of this instrument. Skinner, upon the authority of an old English dictionary, represents it as a clavichord, or claricord; possibly founding his opinion on the nature of the office of the tuner of the regals, who still subsists in the establishment of the king's chapel at St James's, and whose business is to keep the organ of the chapel-royal in tune; and not knowing that such wind-instruments as the organ need frequent tuning, as well as the clavichord and other stringed instruments. Sir Henry Spelman derives the word *rigoll* from the Italian *rigabello*, a musical instrument, anciently used in churches instead of the organ. Walther, in his description of the regal, makes it to be a reed-work in an organ, with metal and also wooden pipes and bellows adapted to it. And he adds, that the name of it is supposed to be owing to its having been presented by the inventor to some king. From an account of the regal used in Germany and other parts of Europe, it appears to consist of pipes and keys on one side, and the bellows and wind-chest on the other. We may add, that Lord Bacon, Nat. Hist. cent. ii. 102, distinguishes between the regal and organ, in a manner which shows them to be instruments of the same class. Upon the whole, there is reason to conclude, that the regal or rigoll was a pneumatic, and not a stringed instrument. Mersenne relates, that the Flemings invented an instrument, *les regales de bois*, consisting of seventeen cylindrical pieces of wood, decreasing gradually in length, so as to produce a succession of tones and semitones in the diatonic series, which had keys, and was played on as a spinnet; the hint of which, he says, was taken from an instrument, in use among the Turks, consisting of twelve wooden cylinders of different lengths, strung together, which being suspended and struck with a stick having a ball at the end, produced music.

RIGOR, in *Medicine*, a convulsive shuddering from severe cold, an ague fit, or other disorder.

RIMA-SZOMBACH, a large market-town in the circle of Houth, and province of the Hither Theiss, in Hungary. It is situated on the river Rima, over which is a fine bridge. It is a well-built place, having a Catholic, a Lutheran, and a Calvinistic church, and a house of assembly for the meeting of the provincial states. It contains 4050 inhabitants, who are actively employed in making linen goods, in tanning leather, and other trades.

RIMINI, a city in the papal dominions, in the delegation of Forli. It is situated at the mouth of the river Marechia, over which is a bridge said to have been built by Augustus. The city was once on the sea-shore, but the water having receded, the canal to the ancient harbour is now a part of a garden. It is surrounded with walls. It is the seat of a bishop; and, besides the cathedral, it contains several churches, and many convents, in which are paintings of the highest repute. It likewise contains several fine palaces, a public library, a town-house, and a market-place, adorned with some fine statuary. Among the antiquities are an amphitheatre, and some triumphal arches. There is a Lombard and several charitable institutions. The inhabitants amount to 17,460. They partly live on their incomes, but some are employed in making leather, in the fisheries, and in preparing sulphur. Long. 12. 27. 31. E. Lat. 44. 3. 43. N.

RING, an ornament of gold and silver, of a circular figure, and usually worn on the finger. The antiquity of rings is known from Scripture and profane authors. Judah left his ring or signet with Tamar. When Pharaoh committed the government of all Egypt to Joseph, he took his ring from his finger, and gave it to Joseph. After the victory which the Israelites obtained over the Midianites, they offered to the Lord the rings, the bracelets, and the golden necklaces, and the ear-rings, that they had taken from the enemy. The Israelitish women wore rings, not only on their fingers, but also in their nostrils and their ears. St James distinguishes a man of wealth and dignity by the ring of gold that he wore on his finger. At the return of the prodigal son, his father orders him to be dressed in a new suit of clothes, and to have a ring put upon his finger. The ring was used chiefly to seal with. The patents and orders of princes were sealed with their rings or signets; and it was this that secured to them their authority and respect. The Episcopal Ring, which makes a part of the pontifical apparatus, and is esteemed a pledge of the spiritual marriage between the bishop and his church, was used at a remote period. The fourth council of Toledo, held in 633, appoints that a bishop condemned by one council, and found afterwards innocent by a second, shall be restored, by giving him the ring, staff, &c. From bishops, the custom of the ring has passed to cardinals, who are to pay a very great sum *pro jure annuli cardinalitii*.

RINGWOOD, a market-town of Hampshire, in the division of the New Forest, ninety miles from London. It is situated on the river Avon, is well built, has a handsome church, and a good market on Wednesday. It has been long celebrated for the excellence of the strong beer which is brewed there. The population amounted in 1801 to 3222, in 1811 to 3269, in 1821 to 3471, and in 1831 to 3434.

RIO GRANDE, a large river of Western Africa, which falls into the Atlantic a considerable distance to the south of the Gambia. It appears to be now ascertained, that the three great rivers of the western coast, the Senegal, the Gambia, and the Rio Grande, have all their sources very close to each other, in a range of mountains a short distance to the north-west of Teembo, in Foota Jallo. M. Mollien's account represents the Gambia, called the Ba Diman, and the Rio Grande, called the Comba, as springing from the same basin, amid high mountains. The source of the latter stream is in latitude 10. 37. north, and longitude 11. 17. west. The correctness of this traveller's statements is confirmed by M. Caillé, who crossed his route. M. Mollien, in describing the origin of the rivers, says, that on leaving the village called Toulon, he was led to the summit of one of the mountains which bear the appellation of Badet. Below him appeared two thickets, the one concealing the sources of the Rio Grande, and the other those of the Gambia. The valley in which they are situated forms a kind of funnel, having no other outlets than the two defiles by which the rivers issue. On quitting this basin these rivers pursue their course towards opposite points. The current of the Rio Grande is at first slow and turbid, but it soon clears; and beyond the valley its direction, hitherto north-north-east, changes to the west. After receiving the Tomine or Dongo, it assumes the appellation of Kaboo, a name which also distinguishes the country between the Rio Grande, the Gambia, and the Geba river. The territories bordering on the upper part of its course are inhabited by Foulahs, and the kingdom of Foota Jallo extends along the right bank. Further down, its shores are peopled by the Biafaras, Balantes, Papels, and other tribes, and occupied by the kingdoms of Ghinala and Biguba. Near its embouchure it divides into a number of branches, forming alluvial islands, which, with others farther out at sea, compose the Archipelago of the Bissagos. The whole length of its course may be about 500 miles. It falls into the Atlantic fifty leagues to the south of the Gambia.

Rio Grande do Norte, a province of Brazil, is bounded on the south by Paraiba, on the north and east by the Atlantic Ocean, and on the west by Seara. Situated between the parallels of 4. 10. and 5. 45. of south latitude, the climate is of course very hot. At Cape St Roque, which forms the angle of this province, in longitude 36. 15. west, latitude 5. 7. south, the coast of Brazil terminates towards the north-east; and the Atlantic Ocean, which has so long been its boundary on the east, begins to wash its northern shores. It presents about one hundred miles of sea-coast. The general features of the province may be laid down as displaying a tolerable fertility to the southward of Natal, the capital, and as presenting a barren aspect to the northward of it, except on the banks, and in the immediate neighbourhood of the Rio Grande, or Potengi, the great river of the province. This stream rises in a ridge in the western limits of Rio Grande, and traverses its whole extent in a direction from south-west to north-east. The bar of the Potengi is narrow, but sufficiently deep for vessels of moderate tonnage. The river is very safe within the bar; the water being deep and quite tranquil. The province is irrigated by other streams, on whose banks the most fertile land is to be found. The village and valley of Papari, lying to the north of the Rio Grande, are described as presenting a most inviting aspect. The whole of the valley is cultivated, and when every other part of the surrounding country is parched with drought, and the high sandy lands are rendered quite barren, this place retains its freshest verdure. Although at the distance of three or four leagues from the sea, the salt-water lake of Groahyras communicates with it, so that the inhabitants have the fish brought to their own doors. Between three and four leagues farther is the Indian village of St Joze, situated on a dry sandy soil. A

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few leagues beyond this place the road passes over a succession of dismal sand-hills. These are perpetually changing their situations and forms; and the high winds raise the sand in clouds, which render the road dangerous when they prevail. The sand is white and very fine, so that horses sink up to the knees at every step; and it is so light as to prevent almost all vegetation.

Natal, the capital (so named because the church was consecrated on Christmas-day), sometimes called Cidade dos Reys, or City of the Kings, is situated on the right margin of the Rio Grande, about two miles above its mouth. So highly was the position of Natal at one time valued, that during the Dutch war its fortress was deemed the strongest place in Brazil. At present it contains some good streets, squares, and churches, a governor's palace, a town-hall, prison, and other public buildings. The harbour of Natal is spacious, and a flourishing trade is carried on. The population amounts to about 19,000.

To the north of Natal lies the town of Estremoz, about ten miles to the north-west, and at the same distance from the sea. In the western part of the province are several towns, of which the most considerable is that formerly called Assu, but now dignified with the name of Villa Nova da Princesa. It is situated on the left bank of the river of the same name, otherwise called the Parinhas, twenty-five miles from its mouth. Its position is nearly in the centre of Rio Grande; and the road leading from Natal to it having been traversed by Mr Koster, a brief abstract of his description will serve to convey an idea of the character of the province in this quarter. The tract of country through which the road lies, is a plain traversed by a river remarkable for its serpentine evolutions. Here is a place called Lagoa Seca, or dry lake; a place which is laid under water by the rains, but which supplies the capital with farinha during the drought. Between eight and ten leagues from Natal is Pai Paulo, a place situated on the borders of the Sertam, a long barren plain of five days' journey. This scene is desolate and dreary in the extreme. On approaching Assu, however, lands covered with wood make their appearance; and fazendas and other indications of human neighbourhood rise around. The town of Assu is situated upon the northern bank of the smaller branch of the river Assu, which here runs for a short distance in two channels. This place, chiefly built in the form of a square, contains several churches, and other public buildings. There are numerous salt-works in the vicinity, which bring some trade to the place, and large barks in the proper season ascend the river to the town. At the distance of about a league from Assu is the lake of Piato, three leagues in length by one in breadth, which is filled by the river in the rainy season, and is never quite dry. In summer its sides afford a rich soil for the cultivation of rice, maize, the cane, melons, and cotton. Between this place and the frontier of the province of Seara, a distance of four days' journey, the country consists for the most part of plains, with trees thinly scattered, and patches of wood. Several salt-marshes intervene, and these, during the rainy season, form lakes. The Arraial of St Luzia stands on the left bank of the river Appody, about twenty miles from the sea. Large canoes advance up the river to this place, which carries on a trade in salt. From this situation downwards are found the famous salterns of Massoro, the salt of which is as white as snow. The Appody has a course of a hundred and thirty miles, running almost the whole way through a flat country, interspersed with lakes, which it fills by its floods. This river forms the boundary line between Rio Grande do Norte and Seara. The soil of many parts of this province is favourable to the growth of sugar-cane, and some trade is carried on in sugar, which, together with salt, seems to be the staple of commerce in this quarter of Brazil. The population of the whole province is not supposed to exceed 80,000 inhabitants.

Rio
Grande do
Sul.

Rio Grande do Sul, formerly the most southern province in the empire of Brazil, but, according to recent accounts, now an independent republic of South America. It declared its independence in 1836, and resolved on introducing a constitution similar to that of the United States of North America. In April and May 1838 two severe conflicts took place between the troops of the emperor of Brazil and the insurgents, in both of which the former were defeated with great slaughter. Whether this country may ultimately succeed in maintaining its position among the republican states of South America, appears very doubtful. Rio Grande do Sul is bounded on the north by St Catharina and St Paulo; on the west by the river Uruguay, which separates it from the republic of the same name; on the south by the river Plata; and on the east by the Atlantic Ocean. It is upwards of five hundred miles in length by four hundred in breadth, lying between latitude 28° and 35° south, and enjoys a temperate and salubrious climate. This extensive country chiefly consists of large plains, covered with immense herds of cattle and other animals. Some mountain-ridges traverse it in various directions, but none of them is of any great height. Here several large rivers have their origin, of which the Uruguay, the Jacuhy or Rio Pardo, and the Camapuam, are the most important. Its great extent of level and alluvial coast exhibits some lakes of vast dimensions. The Lagoa dos Patos is the largest lake in Brazil, being one hundred and fifty miles in length from north-east to south-west, and about forty miles in breadth. It is said to derive its name from a species of fowl which frequents its waters in great numbers. This lake is the recipient of almost all the streams which irrigate the northern and eastern portions of the country. It is very shallow, and its water continues fresh as far as the island dos Marinheiros, near the port of St Pedro. Although encumbered with sand-banks, and subject to violent squalls of wind, it may be navigated without much risk. The peninsula lying between the lake and the ocean is low and level, and almost in a direct line on the eastern side, but forms various points and bays on the opposite side. The western shore of the lake is bold but not rugged, and is cut by several rivers, of which the Camapuam and Jacuhy, already mentioned, are most deserving of notice. The sources of the former are in a chain of low hills called the great Cochilha, which traverses the western limits of the country. It flows with a rapid and disturbed current, interrupted by continued cataracts for nearly a hundred miles, receiving fourteen streams from the south and fifteen from the north, and falls into the lake about the middle of its western side, by five different channels, formed by four small islands. The Jacuhy, sometimes called the Rio Pardo, which is one of its tributaries, is a river of still greater value. It rises in the province of St Paulo, and after traversing the southern declivity of the general ridge for a few leagues, it turns eastward, describing innumerable windings for a course of thirty leagues, during which it collects the water of a number of smaller rivers, many of them being navigable. It then suddenly bends towards the south, and after running fifteen miles in this direction, enters the western side of the lake about four leagues below its northern extremity. It is a fine, broad and deep river, with lofty and diversified banks, and is full of little islands. To the south-west of the Lagoa dos Patos lies another sheet of water, called Lake Mirim, or Mirin. It is ninety miles in length by about twenty in breadth, and discharges itself into the Lagoa dos Patos by means of a channel called the river of St Gonzales. Lake Mirim is very shallow, and in the rainy season it widely extends its borders. The Gonzales is fifty miles in length: it is wide and handsome, and navigable for small vessels, which by this channel pass into Lake Mirim, and thence by means of rivers penetrate into the fertile interior, and distribute their cargos to the large towns

Rio Grande do Sul.

on the coast. There are other large lakes running parallel with the shore, but these are the most important.

On the northern bank of the Jacuhy, twenty-five miles from its mouth, stands the town of Portalegre, the capital of the country. It is situated on a declivity, and commands a fine view of the river and the surrounding country. The houses are well built, the streets well laid out, and altogether it is a very neat and flourishing place. The government-house and public offices are placed on a hill. It has several churches, schools, what appear to be the rudiments of a university, a dock-yard, and other public establishments and institutions. In 1812 Mr Luccock thus spoke of it: "As a capital, its influence is wide; as a seat of commerce, it commands a large tract of country, and many navigable rivers." It has subsequently made very great advancement. Englishmen have long been established here; and not only commerce, but agriculture, has been much benefited by their exertions. One great bar to improvement is, that much of the interior is still in the hands of the native tribes, whose animosity to white people is of the bitterest description. Portalegre contains above 12,000 inhabitants.

Being situated at the head of the great lake, it has constant intercourse with St Pedro do Sul, which lies at the foot of it. Up to the year 1763 this town was the capital of the province, and was usually called Rio Grande, from its harbour, which forms the entrance to the Lagoa dos Patos, and is, with the same impropriety as the bay of Rio de Janeiro, termed a river. The town was begun a league to the south-west of where it now stands, in the situation called Estreito, near the head of the bay or harbour. It stood on a bank about twenty feet in height, and was surrounded with a parapet of sods, as a barrier against the encroaching sands.[1] Yet by a slow but sure progress they appear to have gained ground, so as almost to have overwhelmed the town, and occasioned its removal to the present site. It is now situated on a level plain, a little above high-water mark; but, like its predecessor, it suffers much from the accumulation of sand. Its public buildings comprise a cathedral, the plainness of which externally and internally does not prevent it from being a handsome edifice. It has several public buildings, and is defended by a fort. Its commercial importance appears to be considerable. Many towns along the coast mainly depend upon this part of the continent for their supply of food. Immense quantities of wheat, hides, tallow, dried beef, cheese, and other articles are shipped from this port, and commerce is rapidly increasing. We have no means of ascertaining the amount of its population; but it is certainly not less than that of the capital, for it was the great mart of Southern Brazil while the country formed an integrant part of the empire. Near this town is the fertile island of Marinheiros, which contains some of the highest land and the best cultivated spots in the neighbourhood.

This country, we have said, is chiefly distinguished for cattle-breeding. The proprietors of land are divided into two classess, viz. fazendeiros or farmers, and lavradores or husbandmen. The latter, who breed only what is necessary for their own consumption, possess generally about two square leagues of land; the former will farm from eight to ten leagues, but some of these fazendas are reported to extend to a hundred square leagues, or nearly 600,000 acres. To each three square leagues are allotted four or five thousand head of cattle, six men, and a hundred horses. The proportion of horses will appear a very large one; but it is to be kept in view that, in this pastoral country, they cost nothing in keeping, and even short journeys of half a mile are made on horseback. About one hundred cows are allowed for the supply of milk, butter, cheese, and veal, to a farm of the average size. Hogs, although abundant, are but little valued: sheep might be multiplied to any extent, in consequence of their producing generally two lambs at a birth, but do not appear to attract much attention. Droves of horses and mules are bred to a great extent; the latter are, however, found to be much more profitable than the former, a mule being double the value of a horse. Horses are trained for the exercises of the field, in a manner peculiarly well adapted to fortify them against fear. They are much used in capturing cattle, which, as is the universal custom in South America, is effected by the lasso. Cattle form the grand staple of Rio Grande, and the beef, hides, and tallow which they yield are the chief articles of export. An extensive tract, famous for its fine cattle, is comprehended under the name of Charqueados, derived from the "charqued" beef, which is prepared in this district for exportation. When the cattle are killed and skinned, the flesh is taken off from the sides in one broad piece, something like a flitch of bacon; it is then slightly sprinkled with salt, and dried in the sun. In that state it forms the common food of the peasantry. Some idea of the immense quantity thus prepared may be formed from the fact, that in one year a single individual slaughtered 54,000 head of cattle, and charqued the flesh.

The history of this portion of South America presents little but a gloomy picture of Spanish aggression and Portuguese retaliation. Lying on the confines of Brazil, where the latter bordered on the possessions of Spain, it was convenient for hostile inroad on the part of the latter power; and it was unfortunate for these colonies that the animosities of the mother countries in Europe were communicated across the Atlantic, and perpetually embroiled their settlements, so that the bloody and ever-losing game of war played between the powers was maintained in both hemispheres at once. Into details of mutual hostilities we shall not enter; it is sufficient to state that this country was finally incorporated with the empire of Brazil, and so continued, till its recent assertion of independence. The population of Rio Grande do Sul is estimated at 160,000.

RIO DE JANEIRO, an important province of Brazil, is bounded on the north by Espiritu Santo, from which it is separated by the river Capabuan, and by Minas Geraes, from which it is divided by the rivers Preto and Paraiba, and in part by the Serra da Manliqueira; on the west it borders on San Paulo; and the Atlantic Ocean washes it on the south and east. It embraces half of the old capitania of St Vincente, together with a part of territory which formerly belonged to Espiritu Santo. Its length from east to west is estimated at sixty leagues; and its medium breadth is about twenty-three leagues. This province is distinguished for its romantic beauty and great fertility, notwithstanding its being very mountainous. From south-west to north-east runs the Serra dos Orgoas, or Organ Mountains, and this chain divides it into two nearly equal portions: the northern half is called Serra Accina, or Mountains Above;

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[1] Mr Luccock mentions some circumstances very interesting in a geological point of view; and as his remarks convey a correct idea of the nature of the coast in this quarter, we shall quote them. He informs us that by a careful examination of the coast, it will convincingly appear that a very considerable portion of it has been formed by sand driven up by the ocean. "The two lakes which form the chief features of this part of the country have probably been created by the rivers which flow into them repelling the sand accumulated at their mouths by the occasional impetuosity of their currents, until the bar was formed in the dead water produced by the stream and the ocean. Here the bank would gradually rise above the high-water mark, and compel the river to bend its course; and by constant acquisition would grow broader and longer, and at length form an estuary within it." In this manner he thinks the Jacuhy, Camapuam, and other rivers, were compelled by accumulation of sand to take a southern course, and thus produced the great lake. In confirmation of this view, he states that the bar of the Rio Grande is still proceeding southward.

Rio de Janeiro.

the southern, Beira-Mar, or Sea-coast. These again are subdivided, the former into the districts of Paraiba Nova and Canto Gallo, the latter into Rio Janeiro, Ilha Grande, Cape Frio, and Goytacazes. The Organ Mountains derive their extraordinary appellation from the appearance of their pyramidal heads of granite, which bristle up along the horizon, and bear a fanciful resemblance to organ-pipes in a vast cathedral. The whole province is well watered by a number of streams, the most considerable being the Paraiba. This river originates in a small lake in the southern part of the Serra da Bocania, a continuation of the Organ Mountains. It flows first into the province of San Paulo; but after a long and winding course it re-enters the province in which it rose, and disembogues in its eastern part. The Rio de Janeiro is a misnomer, from De Sousa, the discoverer of this part of the country, having mistaken the salt bay or gulf, so called, for the mouth of a river. Many streams discharge themselves into this bay towards its upper end, several of them being navigable to some distance. Among these may be mentioned the Iraja, which issues from a small lake, and affords navigation with the tide to its port of the same name; the Miriti, which traverses a marshy country, but whose banks have a very rich soil, and produce abundance of sugar, milho, and mandioc; the Iguassu, which is navigable for four leagues, and has for a tributary the Iguare, a stream affording navigation for a mile to the port of the same name; the Maraby, which flows from the Serra of Boavista, and is navigable to the port of Couto, three leagues above its mouth; the Inhumirim, a fine river, the banks of which, as well as those of its confluents, are well cultivated; it is navigable for three leagues to the flourishing port of Estrella; the Iguapezu or Macacu, one of the largest streams which fall into the bay, being navigable for fifteen leagues, during which it receives several tributaries from the mountains; the Suruhy, Magéassu, and Iguapimirim, which descend from the mountains. These and several other streams fall into the bay of Rio, and by their means different parts of the country to the northward of the capital may be visited with considerable facility. Near the right bank of the river Iguapimirim is the parish of Ajuda, the soil of which is remarkably productive, and is planted with mandioc, rice, and coffee. Towns are in general situated on the banks of these streams, forming ports from which the products of the surrounding territory are embarked for the capital, the grand emporium of commerce. Lakes are very numerous in the province of Rio; the most remarkable are the Jacaré-Pagua, and the Roderigo de Freytas.

The principal bays by which the coast is indented are the bay of Rio de Janeiro, and Augra dos Reys or King's Bay. The bay of Rio is stated to be no less than thirty-two miles in circumference, and on its shores are numerous smaller inlets, which may be termed sub-bays. All travellers agree in praising the surpassing grandeur and beauty of this majestic inlet of the sea. "Nothing that I have ever seen," says Mrs Graham, "is comparable in beauty to this bay. Naples, the Frith of Forth, Bombay Harbour, and Trincomalee, each of which I thought perfect in its beauty, all must yield to this, which surpasses each in its different way." This capacious basin is embosomed among elevated mountains, having conically shaped summits, and, being well wooded, are of romantic and picturesque beauty. Some of these advance a considerable distance into the bay, whilst others retire as far inland, leaving between them deep recesses and glens. The entrance of the bay is narrow, being only three quarters of a mile in breadth; and its granite barriers are so bold, causing it to resemble a gap or chasm in the mountain ridge, that, doubtless, it was often passed by early navigators without their apprehending the existence of such an immense salt-water lake within. Being completely land-locked, and protected from gales on every side, it is perfectly secure, even for boats, at all seasons of the year; from which circumstance, as well as from many other advantages which it possesses, it has been pronounced the finest harbour in the world. It is so well defended by strong forts that it seems completely closed against a hostile force. The bay is studded with about a hundred islands, on many of which are forts. That of Ilha dos Cobras, or Snake Island, is of great strength, and constitutes one of the most commanding points for the defence of the city. In short, the Brazilians and early subjugators of the country have carefully availed themselves of every advantage presented by nature for rendering their capital unassailable by a maritime force. On either side the shores of the bay, lined at the water's edge with cottages and hamlets of fishermen, sweep widely round; while behind, hills in the richest state of cultivation, studded with farm-houses and villas, and crowned with churches and monasteries, all of purest white, rise abruptly on every side, till, a few miles inland, they terminate in the bold, beautiful, and picturesque ranges of the Organ Mountains.

With the exception of the capital, there are few places in the province of Rio which require particular notice. Canto Gallo is the capital of a district of amazing fertility, and carries on considerable trade with Rio in the productions of the soil. Porto d'Estrella and Mage are the names of other towns which also carry on a great deal of traffic with the capital. The productions of this province comprise almost every thing for which Brazil is celebrated; diamonds and precious stones, sugar, coffee, cotton, and, in short, all fruits peculiar to the tropics, are here produced in the richest abundance, and of the most excellent quality.

City of Rio. The city of St Sebastian, now universally called Rio de Janeiro, the capital of the Brazilian empire, is situated on the south-western side of the bay or harbour just described, about four miles from its entrance. It occupies the north-east part of a tongue of land of an irregularly quadrangular shape, and extending on an inclined plane, a short distance into the bay. The town itself, which also exhibits the form of a parallelogram, and rises between four fortified eminences, which flank it at each corner, presents a north-east aspect of the bay, whose waters wash three sides of the square promontory on which it stands. The site selected for their town by the early settlers is considered the best that could have been chosen, out of many excellent ones that everywhere present themselves. The most easterly point is the Punta do Calabouço; the most northerly is the Armazem do Sal, opposite to which is the small island of Ilha das Cobras. The most ancient and important part of the city is built between these two points along the shore, lying from north-west to south-east; and a beautiful quay, constructed of solid blocks of chiselled granite, forms an elegant façade to it. The houses of Rio are neatly and substantially built, generally of granite, and two stories high, with little wooden balconies in front, the windows and doors being cased with hewn blocks of this stone, which the quarries at the end of every street supply in abundance, and of the finest quality. The lower stories are commonly occupied by shops and warehouses, and the upper ones by the family apartments. The whole town is disposed in squares, the streets crossing each other at right angles, and, although narrow, they are well paved, and lined at each side by flagged trottoirs. The style of architecture of the old town is in general mean, resembling that of the old part of Lisbon; but the new town is in a much more handsome style. Although this town has always ranked as the most important in Brazil, or as second only to Bahia at the time when the latter was the seat of government; yet it was only after the imperial residence and the court were fixed here that it assumed the character of a European city. Great improvements took place after that event. The new town has almost wholly sprung up since it occurred. This part of Rio is connected with the south-western quarter, or Bairro de Mato-porcos, by the bridge of St Diogo, thrown over a salt-water inlet. Between the old and new town is situated a large plain, nearly surrounded by an amphitheatre of mountains, clothed at their bases with the richest verdure, and terminating by belts of forest-trees of immense growth, and of every variety. One of these elevations is called the Corcovado, or Broken Back, an appellation which it acquired from its extraordinary and fantastical shape. The plain thus environed is enclosed with houses so as to form an enormous quadrangle, perhaps the largest square in the world. Here are erected the senate-house, the museum, the camera or town-hall, and other public buildings. One of the most striking features of the Brazilian capital is the number of its churches and monasteries, which not only abound in the city, but are seen crowning almost all the surrounding eminences.

Near the centre of the quay, which has already been mentioned, there is a large square, surrounded on three of its sides with buildings, but having its fourth open to the bay. In this square the palace or imperial residence is situated; but although extensive in its dimensions, and commodious and even splendid in its internal arrangements, there is nothing magnificent or striking in its architecture. The public library occupies a suite of rooms in this quarter. It contains sixty or seventy thousand volumes in all languages, ancient and modern, and is considered a very admirable establishment. It is particularly distinguished for its collection of Bibles, said to be one of the most extensive in the world. On the quay, in front of the square, is a very beautiful fountain for supplying water to this part of the city, and to the shipping in the harbour. It is fed by a splendid stone aqueduct leading from the Corcovado Mountain, not more striking for the magnificent singularity of its appearance than for its importance and utility. This great work, which is called Arcos de Cariaco, extends across a deep valley, resting on a double tier of lofty arches placed one above the other to the height of eighty palms, and the water is conducted to the reservoir by a succession of stone troughs, laid on the top of this bridge, under an arched covering of brick-work. Each tier comprises forty-two arches, the upper one extending one hundred and forty fathoms. The whole of this splendid superstructure is highly ornamental to the city, as well as of the greatest utility to it. The following is the provision made for education: a military academy; a naval academy; a surgical and medical academy; an academy of the fine arts, in connection with which we may mention a national museum; and, lastly, two ecclesiastical seminaries, where the ancient and modern languages are taught, as well as divinity and the sciences. There are attached to it about twelve professors, for whose salaries eleven millions of reis are annually allowed by government. Besides these, there are several schools on Lancaster's principle, and a primary school in almost every street of the city. In short, there seems to be ample provision made for the education of the people in Rio, and it is perfectly free to all classes, in which respect half-civilized Brazil is in advance of Great Britain herself. In periodicals, gazettes, and newspapers, the city is by no means deficient, and book-printing is carried on, although not extensively. Government has a printing establishment. There is a public walk and a botanic garden in the city, and another much more extensive at some distance from it. There is a bishop of Rio, who has under him the usual train of ecclesiastical functionaries. The Roman Catholic religion is that patronized by the state, but Protestants are permitted to exercise their own peculiar form of worship.

Rio is the grand emporium of Brazilian commerce; but we need not enter into particulars in this place, as an account of the exports and imports will be found in the article BRAZIL, to which the reader is referred. Its coasting trade is immense, centring in itself that of all southern Brazil. The goods which it receives from foreign countries it distributes all over this vast region, obtaining the productions of each district in return. The manufactures of this city are unimportant. The shops are generally large and commodious, and well supplied with English goods, and other kinds of merchandise. Chinese goods may also be purchased here very reasonably. There is a number of English and North American merchants in the city, who monopolize no inconsiderable portion of the export trade.

The climate of Rio is considered as favourable to health, comfort, and even longevity, as that of any other place between the tropics. The sun is nearly vertical for a few weeks in December, when the heat is oppressive; but a refreshing sea-breeze sets in every morning, and modifies the temperature. During the summer months, which may be reckoned as extending from October to April, heavy rains fall; but, on the whole, few places possess a more beautiful climate than this celebrated city. At certain seasons it may be unhealthy to strangers, but the danger is averted by adopting the Brazilian mode of living, and by avoiding the night dews, exposure to the sun, and all excesses in eating and drinking. It is among the happy immunities of the country, that it is exempt from the accidents which occur in a similar latitude on the opposite side of the continent. Earthquakes are here unknown. The population consists of a singular mixture of colours and nations. About two thirds are negroes, mulattoes, and other people of the darker shades. Among the whites are seen English, French, Germans, Italians, Dutch, and North Americans. Much disparity exists amongst the statements of writers regarding the exact number of the inhabitants. It is supposed to be about 200,000, of whom a very great number are slaves. The city lies in lat. 22. 53. S. and long. 43. 12. W.

The bay of Rio was discovered on the 1st of January 1531, by Martin Alphonso de Sousa, a Portuguese navigator. The natives had given to this tranquil basin the significant appellation of Nitherohy, that is, hidden water; but he, supposing it the estuary of some great river like the Orinoco, called it the Rio de Janeiro, after the day on which it had been discovered. It remained many years unnoticed or unoccupied by the Portuguese, but in the mean time was taken possession of by France, and became an asylum for the persecuted Huguenots. These were subsequently expelled by the Portuguese, who, in 1567, founded the city of Rio. In 1676 it was erected into a bishopric, and its riches soon rendered it an object of cupidity to other European powers. But the few attempts made to wrest it from Portugal were unsuccessful. It steadily advanced in riches and importance, so that in the year 1763, Dom Joseph was induced to transfer hither the vice-regal residence from Bahia, hitherto the capital of the province of Brazil. In 1808 it became the residence of the Portuguese court, and in 1822 was constituted the capital of the independent empire of Brazil. In 1831 it was the theatre of a revolution, in which 6000 armed citizens were joined by the troops of the line in their opposition to the government, and in consequence of which Dom Pedro abdicated the throne in favour of his son Pedro II.

According to the census of 1823, the last that has been made public, the population of the whole province of Rio de Janeiro was 589,650.

RIOM, an arrondissement of the department of Puy de Dome, in France, extending over 804 square miles. It comprehends thirteen cantons, divided into 130 communes, and in 1836 contained 151,456 inhabitants. The capital is the city of the same name, situated on the river Limagne. It is well built, with broad streets, and is surrounded by five promenades. It is the seat of a bishop, and had, in 1836, 11,473 inhabitants, who make linen cloth, cotton goods, serges, and cassimeres, glass, brandy, and leather; and trade in wine, brandy, nut-oil, and flax-seed, by the river. Long. 3. 1. 45. E. Lat. 45. 54. 30. N.

RIOSECO, a partido, in the province of Valladolid, in Spain, the capital of which, of the same name, but with the prefix sometimes of *Medina del*, is a large city. There is a canal from it which unites the canal of Campo with that of Castille. It contains three churches, five monasteries, two hospitals, 1200 houses, and betwixt 8000 and 9000 inhabitants, who manufacture serges and some other woollen goods, and ribbons and other silk goods. There are two fairs held annually, which were places of vast resort, but had declined, till of late years they have revived, and are again become of great importance to the place. There is also a town of the same name in the district of Reynosa and province of Toro, in a mountainous part of the country.

RIOU'S ISLAND, or ROOAHOOGA, in the Pacific Ocean, about twenty-four miles in circumference, discovered in 1792 by Lieutenant Hergest. It is barren and rocky. Long. 139. 9. W. Lat. 8. 54. S.

RIPEN, or more properly RIBE, is a sea-port town and capital of the district of Ribe, in the province of North Jutland, Denmark, and is situated on the river Nipsaae, which here falls into the North Sea. The harbour is difficult of access, and admits only of small vessels. There is a castle, two colleges, and a public library; but the principal building is the cathedral, which is a handsome structure, and contains many of the tombs of the kings of Denmark. The bishopric is the most ancient, not only of Denmark, but also of Sweden and Norway. The town carries on a considerable trade in linen; and it also exports corn, horses, and cattle. The population in the year 1834 amounted to 2365.

RIPHŒAN MOUNTAINS are a chain of high mountains in Russia, to the north-east of the river Oby, where there are said to be the finest sables of the whole empire.

RIPLEY, a market-town of the west riding of the county of York, 215 miles from London and four from Knaresborough, in the wapentake of Claro. It is situated on the river Nyd, over which is a stone bridge. It was formerly a place of some importance, having a large castle, the ruins of which still exist. The church is an ancient building, with many monuments. It is remarkable from the extensive cultivation of liquorice. The market is on Friday, but has been but little attended of late years. The population amounted in 1801 to 892, in 1811 to 880, in 1821 to 1282, and in 1831 to 1219; but in the parish are included other two townships.

RIPON, a city of the west riding of Yorkshire, 222 miles from London. It is situated between two small streams, the Ure and the Skell. A new diocese has been erected, and the first bishop of Ripon, Dr Longley, was consecrated in 1836. The cathedral, formerly the collegiate church, has a dean, a subdean, four prebendaries, and two vicars. It is a fine old building, recently placed in good order. It was once adorned with two steeples, one of which was blown down, and the other has been removed. The market-place is one of the finest in the north of England, and is well attended on Thursdays. Ripon was once celebrated for making spurs, but that trade has vanished. Cotton-mills have been erected, which afford more employment. The population amounted in 1801 to 3211, in 1811 to 3633, in 1821 to 4563, and in 1831 to 5080. Near to it is Studley Royal, the magnificent seat and grounds of Mrs Lawrence.

RISIBLE, any thing capable of exciting laughter. *Ludicrous* is a general term, signifying, as may appear from its derivation, what is playsome, sportive, or jocular. *Ludicrous* therefore seems the genus, of which *risible* is a species, limited to what makes us laugh.

However easy it may be, concerning any particular object, to say whether it be risible or not, it seems difficult, if at all practicable, to establish any general character, by which objects of that kind may be distinguished from others. Nor is that a singular case; for, upon a review, we find the same difficulty in most of the articles already handled. There is nothing more easy, viewing a particular object, than to pronounce that it is beautiful or ugly, grand or little; but were we to attempt general rules for ranging objects under different classes according to these qualities, we should be much gravelled. A separate cause increases the difficulty of distinguishing risible objects by a general character: all men are not equally affected by risible objects, nor the same man at all times; for in high spirits a thing will make him laugh aloud, which will scarcely provoke a smile in a grave mood. Risible objects, however, are circumscribed within certain limits. No object is risible but what appears slight, little, or trivial; for we laugh at nothing that is of importance to our own interest or to that of others. Real distress raises pity, and therefore cannot be risible; but a slight or imaginary distress, which moves not pity, is risible. The adventure of the fulling-mills in Don Quixote is extremely risible; so is the scene where Sancho, in a dark night, tumbling into a pit, and attaching himself to the side by hand and foot, hangs there in terrible dismay till the morning, when he discovers himself to be within a foot of the bottom. A nose remarkably long or short is risible; but to want it altogether, so far from provoking laughter, raises horror in the spectator. With respect to works both of nature and art, none of them is risible but such as are out of rule; some remarkable defect or excess, a very long visage, for example, or a very short one. Hence nothing just, proper, decent, beautiful, proportioned, or grand, is risible.

Even from this slight sketch it will be readily conjectured, that the emotion raised by a risible object is of a nature so singular as scarcely to find place while the mind is occupied with any other passion or emotion; and the conjecture is verified by experience; for we scarcely ever find that emotion blended with any other. One emotion we must except; and that is, contempt raised by certain improprieties: every improper act inspires us with some degree of contempt for the author; and if an improper act be at the same time so risible as to provoke laughter, of which blunders and absurdities are noted instances, the two emotions of contempt and of laughter unite intimately in the mind, and produce externally what is termed a *laugh of derision* or *of scorn*. Hence objects that cause laughter may be distinguished into two kinds: they are either *risible* or *ridiculous*. A risible object is mirthful only; a ridiculous object is both mirthful and contemptible. The first raises an emotion of laughter that is altogether pleasant: the pleasant emotion of laughter raised by the other is blended with the painful emotion of contempt, and the mixed emotion is termed *the emotion of ridicule*. The pain which a ridiculous object gives me is resented and punished by a laugh of derision. A risible object, on the other hand, gives me no pain; it is rendered altogether pleasant by a certain titillation, which is expressed externally by mirthful laughter.

RITE, among divines, denotes the particular manner of celebrating divine service.

RITORNELLO, or REPEAT, in *Music*, the burden of a song, or the repetition of the first or other verses of a song at the end of each couplet.

RITUAL, a book directing the order and manner to be observed in performing divine service in a particular church, diocese, or the like. The ancient heathens had also their rituals, which contained their rites and ceremonies to be observed in building a city, consecrating a temple or altar, in sacrificing and deifying, in dividing the curiæ, tribes, centuries, and, in general, in all their religious ceremonies. There are several passages in Cato's books *De Re Rustica*, which may give us some idea of the rituals of the ancients.

RIVA, a city of the Austrian province of Trieste, in the circle of Roveredo. It is placed on the lake of Garda, in a beautiful situation, and has a good haven, from which a considerable trade is carried on between Italy and Germany. Here many vessels are built. The inhabitants amount to 3350, and some of them are employed in making hardware. It is said that a million dozen of Jews' harps are made annually in this place, and distributed over all Europe.

RIVER.

Definition.

A RIVER is a current of fresh water, flowing in a BED or CHANNEL from its source to the sea.

The term is appropriated to a *considerable* collection of waters, formed by the conflux of two or more BROOKS, which deliver into its channel the united streams of several RIVULETS, which have collected the supplies of many RILLS trickling down from numberless springs, and the torrents which carry off from the sloping grounds the surplus of every shower.

Utility of rivers.

Rivers form one of the chief features of the surface of this globe, serving as voiders of all that is immediately redundant in our rains and springs, and also as boundaries and barriers, and even as highways, and in many countries as plentiful storehouses. They also fertilize our soil by laying upon our warm fields the richest mould, brought from the high mountains, where it would have remained useless for want of genial heat.

Origin of their names.

Being such interesting objects of attention, every branch acquires a proper name, and the whole acquires a sort of personal identity, of which it is frequently difficult to find the principle; for the name of the great body of waters which discharges itself into the sea is traced backwards to one of the sources, while all the contributing streams are lost, although their waters form the chief part of the collection. And sometimes the feeder in which the name is preserved is smaller than others which are united to the current, and which like a rich but ignoble alliance lose their name in that of the more illustrious family. Some rivers indeed are respectable even at their birth, coming at once in force from some great lake. Such is the Rio de la Plata, the river St Lawrence, and the mighty streams which issue in all directions from the Baical Lake. But, like the sons of Adam, they are all of equal descent, and should take their name from one of the feeders of these lakes. This is indeed the case with a few, such as the Rhone, the Rhine, the Nile. These, after having mixed their waters with those of the lake, resume their appearance and their name at its outlet.

Origin and progress similar to the life of man.

But in general their origin and progress, and even the features of their character, bear some resemblance (as has been prettily observed by Pliny) to the life of man. The river springs from the earth, but its origin is in heaven. Its beginnings are insignificant, and its infancy is frivolous; it plays among the flowers of a meadow; it waters a garden, or turns a little mill. Gathering strength in its youth, it becomes wild and impetuous. Impatient of the restraints which it still meets with in the hollows among the mountains, it is restless and fretful; quick in its turnings, and unsteady in its course. Now it is a roaring cataract, tearing up and overturning whatever opposes its progress, and it shoots headlong down from a rock; then it becomes a sullen and gloomy pool, buried in the bottom of a glen. Recovering breath by repose, it again dashes along, till, tired of the uproar and mischief, it quits all that it has swept along, and leaves the opening of the valley strewed with the rejected waste. Now, quitting its retirement, it comes abroad into the world, journeying with more prudence and discretion, through cultivated fields, yielding to circumstances, and winding round what would trouble it to overwhelm or remove. It passes through the populous cities and all the busy haunts of man, tendering its services on every side, and becomes the support and ornament of the country. Now increased by numerous alliances, and advanced in its course of existence, it becomes grave and stately in its motions, loves peace and quiet; and in majestic silence rolls on its mighty waters, till it is laid to rest in the vast abyss.

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rivers.

The philosopher, the real lover of wisdom, sees much to admire in the economy and mechanism of running waters; and there are few operations of nature which give him more opportunities of remarking the nice adjustment of the most simple means for attaining many purposes of most extensive beneficence. All mankind seems to have felt this. The heart of man is ever open (unless perverted by the habits of selfish indulgence and arrogant self-conceit) to impressions of gratitude and love. He who ascribes the religious principle (debased though it be by the humbling abuses of superstition) to the workings of fear alone, may betray the slavish meanness of his own mind, but gives a very unfair and a false picture of the hearts of his neighbours. Lucretius was but half a philosopher when he penned his often quoted apophthegm. Indeed his own invocation shows how much the animal was blended with the sage.

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We apprehend, that whoever will read with an honest and candid mind, unbiassed by licentious wishes, the accounts of the ancient superstitions, will acknowledge that the amiable emotions of the human soul have had their share in creating the numerous divinities whose worship filled up their kalendars. The sun and the host of heaven have in all ages and nations been the objects of a sincere worship. Next to them, the rivers seem to have attracted the grateful acknowledgments of the inhabitants of the adjacent countries. They have everywhere been considered as a sort of tutelar divinities; and each little district, every retired valley, had its river-god, who was preferred to all others with a partial fondness. The expostulation of Naaman the Syrian, who was offended with the prophet for enjoining him to wash in the river Jordan, was the natural effusion of this attachment. "What!" said he, "are not Abana and Pharpar, rivers of Damascus, more excellent than all the waters of Judea? Might I not wash in them and be clean? So he went away wroth."

In those countries particularly, where the rural labours and the hopes of the shepherd and the husbandman were not so immediately connected with the approach and recess of the sun, and depended rather on what happened in a far distant country by the falls of periodical rains or the melting of collected snows, the Nile, the Ganges, the Indus, the river of Pegu, were the sensible agents of nature in procuring to the inhabitants of their fertile banks all their abundance, and they became the objects of grateful veneration. Their sources were sought out with anxious care even by conquering princes; and when found, were universally worshipped with the most affectionate devotion. These remarkable rivers, so eminently and so palpably beneficent, preserve to this day, amidst every change of habit, and every increase of civilization and improvement, the fond adoration of the inhabitants of those fruitful countries through which they hold their stately course, and their waters are still held sacred. No progress of artificial refinement, not all the corruption of luxurious sensuality, has been able to eradicate this plant of native growth from the heart of man. The sentiment is congenial to his nature, and therefore it is universal; and we could almost appeal to the feelings of every reader, whether he does not perceive it in his own breast. Perhaps we may be mistaken in our opinion in the case of the corrupted inhabitants of the populous and busy cities, who are habituated to the fond contemplation of their own individual exertions as the sources of all their hopes. Give the shoemaker but leather and a few tools, and he defies the powers of nature to disappoint him; but the simpler inhabitants of the country, the most worthy and the most respectable part of every nation, after equal, perhaps greater exertion, both of skill and of industry, are more accustomed to resign themselves to the great ministers of Providence, and to look up to heaven for the "early and the latter rains," without which all their labours are fruitless.

> ———— Extrema per illos
> Numenque excedens terris vestigia fecit.

And among the husbandmen and the shepherds of all nations and ages, we find the same fond attachment to their springs and rivulets.

> Fortunate senex, hic, inter flumina nota
> Et fontes sacros, frigus captabis opacum,

was the mournful ejaculation of poor Melibœus. We hardly know a river of any note in our own country whose source is not looked on with some respect.

We repeat our assertion, that this worship was the offspring of affection and gratitude, and that it is giving a very unfair and false picture of the human mind to ascribe these superstitions to the working of fear alone. These would have represented the river-gods as seated on ruins, brandishing rooted-up trees, with angry looks, pouring out their sweeping torrents. But no such thing. The lively imagination of the Greeks felt, and expressed with an energy unknown to all other nations, every emotion of the human soul. They figured the Naiads as beautiful nymphs, patterns of gentleness and of elegance. These they represented as partially attached to the children of men; and their interference in human affairs is always in acts of kind assistance and protection. They resemble, in this respect, the rural deities of the northern nations, the fairies, but without their caprices and resentments. And if we attend to the descriptions and representations of their RIVER-GODS, beings armed with power, an attribute which slavish fear never fails to couple with cruelty and vengeance, we shall find the same expression of affectionate trust and confidence in their kind dispositions. They are generally called by the respectable but endearing name of *father*. "Da Tyberi pater," says Virgil. Mr Bruce says that the Nile at its source is called the *abay*, or "father." We observe this word, or its radix, blended with many names of rivers of the east; and think it probable that when our traveller got this name from the inhabitants of the neighbourhood, they applied to the stream what is meant to express the tutelar or presiding spirit. The river-gods are always represented as venerable old men, to indicate their being coeval with the world. But it is always a *cruda viridisque senectus*, and they are never represented as oppressed with age and decrepitude. Their beards are long and flowing, their looks placid, their attitude easy, reclined on a bank, covered, as they are crowned, with never-fading sedges and bulrushes, and leaning on their urns, from which they pour out their plentiful and fertilizing streams. Mr Bruce's description of the sources of the Nile, and of the respect paid to the sacred waters, has not a frowning feature; and the hospitable old man, with his fair daughter Irepone, and the gentle priesthood which peopled the little village of Geesh, form a contrast with the neighbouring Galla (among whom a military leader was called the *lamb*, because he did not murder pregnant women), which very clearly paints the inspiring principle of this superstition. Pliny says (lib. viii. 8) that at the source of the Clitumnus there is an ancient temple highly respected. The presence and the power of the divinity are expressed by the fates which stand in the vestibule. Around this temple are several little chapels, each of which covers a sacred fountain; for the Clitumnus is the father of several little rivers which unite their streams with him. At some distance below the temple is a bridge which divides the sacred waters from those which are open to common use. No one must presume to set his foot in the streams above this bridge; and to step over any of them is an indignity which renders a person infamous. They can only be visited in a consecrated boat. Below the bridge we are permitted to bathe, and the place is incessantly occupied by the neighbouring villagers. See also Vibius Sequester Oberlini, p. 101–103, and 221–223; also Sueton. *Caligula*, c. 43; Virg. *Georg*. ii. 146.

What is the cause of all this? The Clitumnus, near its source, flows through the richest pastures, through which it was carefully distributed by numberless drains; and these nourished cattle of such spotless whiteness and extraordinary beauty that they were sought for with eagerness over all Italy, as the most acceptable victims in their sacrifices. Is not this superstition then an effusion of gratitude?

Such are the dictates of kind-hearted nature in our breasts, before it has been vitiated by vanity and self-conceit, and we should not be ashamed of feeling the impression. We hardly think of making any apology for dwelling a little on this incidental circumstance of the superstitious veneration paid to rivers. We cannot think that our readers will be displeased at having agreeable ideas excited in their minds, being always of opinion that the torch of true philosophy will not only enlighten the understanding, but also warm and cherish the affections of the heart.

With respect to the origin of rivers, we have very little to offer in this place. It is obvious to every person, that besides the torrents which carry down into the rivers what part of the rains and melted snows is not absorbed by the soil or taken up by the plants which cover the earth, they are fed either immediately or remotely by the springs. A few remarkable streams rush at once out of the earth in force, and must be considered as the continuation of subterraneous rivers, whose origin we are therefore to seek out; and we do not know any circumstance in which their first beginnings differ from those of other rivers, which are formed by the union of little streams and rills, each of which has its own source in a spring or fountain. This question, therefore, what is the process of nature, and what are the supplies which fill our springs? will be treated of under the word SPRING.

Origin of rivers.

Whatever be the source of rivers, it is to be met with in almost every part of the globe. The crust of earth with which the rocky framing of this globe is covered is generally stratified. Some of these strata are extremely pervious to water, having but small attraction for its particles, and being very porous. Such is the quality of gravelly strata in an eminent degree. Other strata are much more firm, or attract water more strongly, and refuse it passage. This is the case with firm rock and with clay. When a stratum of the first kind has one of the other immediately under it, the water remains in the upper stratum, and bursts out wherever the sloping sides of the hills cut off the strata, and this will be the form of a trickling spring, because the water in the porous stratum is greatly obstructed in its passage towards the outlet. As this irregular formation of the earth is very general, we must have springs, and of course rivers or rivulets, in every corner where there are high grounds.

Rivers flow from the higher to the low grounds. It is

They flow from the higher to the lower grounds.

the arrangement of this elevation which distributes them over the surface of the earth. This appears to be accomplished with considerable regularity; and, except the great desert of Kobi on the confines of Chinese Tartary, we do not remember any very extensive tract of ground that is deprived of those channels for voiding the superfluous waters; and even there they are far from being redundant.

Course of the rivers of Europe,

The courses of rivers give us the best general method for judging of the elevation of a country. Thus it appears that Savoy and Switzerland are the highest grounds of Europe, from whence the ground slopes in every direction. From the Alps proceed the Danube and the Rhine, whose courses mark the two great valleys, into which many lateral streams descend. The Po also and the Rhone come from the same head, and with a steeper and shorter course find their way to the sea through valleys of less breadth and length. On the west side of the valleys of the Rhine and the Rhone the ground rises pretty fast, so that few tributary streams come into them from that side; and from this gentle elevation France slopes to the westward. If a line, nearly straight, but bending a little to the northward, be drawn from the head of Savoy and Switzerland all the way to Solikamskoy in Siberia, it will nearly pass through the most elevated part of Europe; for in this tract most of the rivers have their rise. On the left go off the various feeders of the Elbe, the Oder, the Wesel, the Niemen, the Duna, the Neva, the Dwina, the Petzora. On the right, after passing the feeders of the Danube, we see the sources of the Sereth and Pruth, the Dniester, the Bog, the Dnieper, the Don, and the mighty Volga. The elevation, however, is extremely moderate; and it appears from the levels taken with the barometer by the Abbé Chappe d'Auteroche, that the head of the Volga is not more than 470 feet above the surface of the ocean. And we may observe here, by the by, that its mouth, where it discharges its waters into the Caspian Sea, is undoubtedly lower by many feet than the surface of the ocean. (See PNEUMATICS.) Spain and Finland, with Lapland, Norway, and Sweden, form two detached parts, which have little symmetry with the rest of Europe.

of Asia,

A chain of mountains begins in Nova Zembla, and stretches due south to near the Caspian Sea, dividing Europe from Asia. About three or four degrees north of the Caspian Sea it bends to the south-east, traverses Western Tartary, and passing between the Tengis and Zaizan lakes, it then branches to the east and south. The eastern branch runs to the shores of Korea and Kamtschatka. The southern branch traverses Turkestan and Thibet, separating them from India, and at the head of the kingdom of Ava joins an arm stretching from the great eastern branch, and here forms the centre of a very singular radiation. Chains of mountains issue from it in every direction. Three or four of them keep very close together, dividing the continent into narrow slips, which have each a great river flowing in the middle, and reaching to the extreme points of Malacca, Cambodia, and Cochin-china. From the same central point proceeds another great ridge due east, and passes a little north of Canton in China. We called this a singular centre; for though it sends off so many branches, it is by no means the most elevated part of the continent. In the triangle which is included between the first southern ridge (which comes from between the lakes Tengis and Zaizan), the great eastern ridge, and its branch which almost unites with the southern ridge, lie the Boutan and part of Thibet; and the many little rivers which occupy its surface flow southward and eastward, uniting a little to the north of the centre often mentioned, and then pass through a gorge eastward into China. The higher grounds (if we except the ridges of mountains which are boundaries) of the continent seem to be in the country of the Calmucs, about 96° east from London, and latitude 43° or 45° north. It is represented as a fine though sandy country, having many little rivers which lose themselves in the sand, or end in little salt lakes. This elevation stretches north-east to a great distance; and in this tract we find the heads of the Irtish, Selenga, and Tunguskaia (the great feeders of the Oby), the Olenitz, the Lena, the Yana, and some other rivers, which all go off to the north. On the other side we have the great river Amur, and many smaller rivers, whose names are not familiar. The Hoangho, the great river of China, rises on the south side of the great eastern ridge we have so often mentioned. This elevation, which is a continuation of the former, is somewhat of the same complexion, being very sandy, and at present is a desert of prodigious extent. A great ridge of mountains begins at the south-east corner of the Euxine Sea, and proceeds eastward, ranging along the south side of the Caspian, and, still advancing, unites with the mountains first mentioned in Thibet, sending off some branches to the south, which divide Persia, India, and Thibet. From the south side of this ridge flow the Euphrates, Tigris, Indus, and Ganges, and from the north the ancient Oxus and many unknown streams.

of Africa,

Of the rivers of Africa we still know but little. The Nile indeed is perhaps better known than any river out of Europe; and of its source and progress we have given a full account in a separate article. See NILE.

By the register of the weather kept by Mr Bruce at Gondar in 1770 and 1771, it appears that the greatest rains fall about the beginning of July. He says that at an average each month after June it doubles its rains. The calish or canal is opened at Cairo about the 9th of August, when the river has risen fourteen peeks (each twenty-one inches), and the waters begin to decrease about the 10th of September. Hence we may form a conjecture concerning the time which the latter employs in coming from Abyssinia. Mr Bruce supposes it nine days, which would require a velocity of not less than fourteen feet in a second; a thing past belief, and inconsistent with all our notions. The general slope of the river is greatly diminished by several great cataracts; and Mr Bruce expressly says that he might have come down from Sennaar to the cataracts of Syene in a boat, and that it is navigable for boats far above Sennaar. He came from Syene to Cairo by water. We apprehend that no boat would venture down a stream moving even six feet in a second, and none could row up if the velocity was three feet. As the waters begin to decrease about the 10th of September, we must conclude that the water then flowing past Cairo had left Abyssinia when the rains had greatly abated. Judging in this way, we must still allow the stream a velocity of more than six feet. Had the first swell at Cairo been noticed in 1770 or 1771, we might have guessed better. The year that Thevenot was in Egypt, the first swell of eight peeks was observed on the 28th of January. The calish was opened for fourteen peeks on the 14th of August, and the waters began to decrease on the 23d of September, having risen to twenty-one and two-third peeks. We may suppose a similar progress at Cairo corresponding to Mr Bruce's observations at Gondar, and date every thing five days earlier.

The frame-work (so to call it) of America is better known, and is singular.

and of America.

A chain of mountains begins, or at least is found, in longitude 110° west of London, and latitude 40° north, on the northern confines of the kingdom of Mexico, and, stretching southward through that kingdom, forms the ridge of the neck of land which separates North from South America, and keeping almost close to the shore, ranges along the whole western coast of South America, terminating at Cape Horn. In its course it sends off branches, which after separating from it for a few leagues, rejoin it again, enclosing valleys of great extent from north to south, and of prodi-

History.

gious elevation. In one of these, under the equatorial sun, stands the city of Quito, in the midst of extensive fields of barley, oats, wheat, and gardens containing apples, pears, and gooseberries, and, in short, all the grains and fruits of the cooler parts of Europe; and although the vine is also there in perfection, the olive is wanting. Not a dozen miles from it, in the low countries, the sugar-cane, the indigo, and all the fruits of the torrid zone, find their congenial heat, and the inhabitants swelter under a burning sun. At a small distance on the other hand tower aloft the pinnacles of Pichincha, Corambourou, and Chimboraçao, crowned with never-melting snows.

The individual mountains of this stupendous range cut off therefore all communication between the Pacific Ocean and the inland continent; and no rivers are to be found on the west coast of South America which have any considerable length of course or body of waters. The country is drained, like Africa, in the opposite direction. Not 100 miles from the city of Lima, the capital of Peru, which lies almost on the sea-shore, and just at the foot of the high Cordilleras, arises out of a small lake the Maragnon or Amazons river, which, after running northward for about 100 miles, takes an easterly direction, and crosses nearly the broadest part of South America, and falls into the great western ocean at Para, after a course of not less than 4095 miles. In the first half of its descent it receives a few middle-sized rivers from the north, and from the south it receives the great river Combos, springing from another little lake not fifty miles distant from the head of the Maragnon, and enclosing between them a wide extent of country. It then receives the Yuta, the Yuerva, the Cuchivara, and Parana Mire, each of which is equal to the Rhine; and then the Madeira, which has flowed above 1300 miles. At their junction the breadth is so great that neither shore can be seen by a person standing up in a canoe; so that the united stream must be about six miles broad. In this form it rolls along through a flat country, covered with impenetrable forests, and most of it as yet untrodden by human feet. Mr Condamine, who came down the stream, says that all is silent as the desert, and the wild beasts and numberless birds crowd round the boat, eyeing it as some animal of which they did not seem afraid. The bed was cut deep through an equal and yielding soil, which seemed rich in every part, if he could judge by the vegetation, which was rank in the extreme. What an addition to the possible population of this globe! A narrow slip along each bank of this mighty river would equal in surface the whole of Europe, and would probably exceed it in general fertility; and although the velocity in the main stream was considerable, he observed that it was extremely moderate, nay almost still, at the sides; so that in those parts where the country was inhabited, the Indians paddled up the river with perfect ease. Boats could go from Para to near the mouth of the Madeira in thirty-eight days, which is nearly 1200 miles.

Not far from the head of the Maragnon, the Cordilleras send off a branch to the north-east, which reaches and ranges along the shore of the Mexican Gulf; and the Rio Grande de Sta Martha occupies the angle between the ridges.

Another ridge ranges with interruption along the east coast of Terra Firma, so that the whole waters of this country are collected into the Oroonoko. In like manner, the north and east of Brazil are hemmed in by mountainous ridges, through which there is no considerable passage; and the ground sloping backwards, all the waters of this immense tract are collected from both sides by many considerable rivers into the great river Paraguay, or Rio de la Plata, which runs down the middle of the country for more than 1400 miles, and falls into the sea through a vast mouth, in latitude 35°.

Thus the whole of South America seems as if it had been formerly surrounded by a mound, and been a great basin. The ground in the middle, where the Parana, the Madeira, and the Plata, take their rise, is an immense marsh, uninhabitable on account of its exhalations, and quite impervious in its present state.

The manner in which the continent of North America is watered, or rather drained, has also some peculiarities. By looking at the map, one will observe, first of all, a general division of the whole of the best-known part into two, by the valleys in which the beds of the rivers St Lawrence and Mississippi are situated. The head of this is occupied by a singular series of fresh-water seas or lakes, viz. the Lakes Superior and Michigan, which empty themselves into Lake Huron by two cataracts. This again runs into Lake Erie by the river Detroit, and the Erie pours its water into the Ontario by the famous Fall of Niagara, and from the Ontario proceeds the great river St Lawrence.

The ground to the south-west of the Lakes Superior and Erie is somewhat lower, and the middle of the valley is occupied by the Mississippi and the Missouri, which receive on both sides a number of smaller streams, and, having joined, proceed to the south under the name Mississippi. In latitude 37° this river receives into its bed the Ohio, a river of equal magnitude, and the Cherokee river, which drains all the country lying at the back of the United States, separated from them by the ranges of the Appalachian Mountains. The Mississippi is now one of the chief rivers on the globe, and proceeds due south till it falls into the Mexican Bay through several shifting mouths, which greatly resemble those of the Danube and the Nile, having run above 1200 miles.

The elevated country between this bed of the Mississippi and St Lawrence and the Atlantic Ocean is drained on the east side by a great number of rivers, some of which are very considerable, and of long course; because instead of being nearly at right angles to the coast, as in other countries, they are in a great measure parallel to it. This is more remarkably the case with Hudson's river, the Delaware, Potomac, and Rappahannoc. Indeed the whole of North America seems to consist of ribs or beams laid nearly parallel to each other from north to south, and the rivers occupy the interstices. All those which empty themselves into the bay of Mexico are parallel and almost perfectly straight, unlike what are seen in other parts of the world. The westernmost of them all, the North river, as it is named by the Spaniards, is nearly as long as the Mississippi.

For the length of the courses, and some peculiarities of the principal rivers, see Physical Geography.

PART I.—THEORY OF THE MOTION OF RIVERS AND CANALS.

Importance of the doctrine of the motion of rivers and canals.

The importance of this subject needs no commentary. Every nation, every country, every city is interested in it. Our wants, our comforts, and our pleasures require a knowledge of it. We must conduct the water of rivers to the centre of our dwellings; we must secure ourselves against their ravages; we must employ them to drive those machines which, by compensating for our personal weakness, make a few able to perform the work of thousands; we employ them to water and fertilize our fields, to decorate our mansions, to cleanse and embellish our cities, to preserve or extend our demesnes, to transport from county to county every thing which necessity, convenience, or luxury, has rendered precious to man: for these purposes we must confine and govern the mighty rivers, we must preserve or change the beds of the smaller streams, draw off from them what shall water our fields, drive our machines, or supply our houses. We must keep up their waters for the purposes of navigation, or supply their places by canals; we must drain our fens, and defend them when drained; we must understand their motions, and their mode of secret, slow, but unceasing action, that our bridges, our wharfs, our dikes, may not become heaps of ruins. Ignorant how to proceed in these daily recurring cases, how often do we see projects of high expectation and heavy expense fail of their object, leaving the state burdened with works not only useless, but frequently hurtful?

This has long been a most interesting subject of study in Italy, where the fertility of their fields is not more indebted to their rich soil and happy climate, than to their numerous derivations from the rivers which traverse them; and in Holland and Flanders, where their very existence requires unceasing attention to the waters, which are every moment ready to swallow up the inhabitants, and where the inhabitants, having once subdued this formidable enemy, have made those very waters their indefatigable drudges, transporting through every corner of the country the materials of an extensive commerce.

Such having been our incessant occupations with moving waters, we should expect, that while the operative artists are continually furnishing facts and experiments, the man of speculative and scientific curiosity, excited by the importance of the subject, would ere now have made considerable progress in the science; and that the professional engineer would be daily acting from established principle, and be seldom disappointed in his expectations. Unfortunately, the reverse of this is nearly the true state of the case: each engineer is obliged to collect the greatest part of his knowledge from his own experience, and by many dear-bought lessons, to direct his future operations, in which he still proceeds with anxiety and hesitation; for we have not yet acquired principles of theory, and experiments have not yet been collected and published by which an empirical practice might be safely formed. Many experiments of inestimable value are daily made; but they remain with their authors, who seldom have either leisure, ability, or generosity, to add them to the public stock.

This science as yet in its infancy.

The motion of waters has been really so little investigated as yet, that hydraulics may still be called a new study. We have merely skimmed over a few common notions concerning the motions of water; and the mathematicians of the first order seem to have contented themselves with such views as allowed them to entertain themselves with elegant applications of calculus. This, however, has not been their fault. They rarely had opportunity of doing more, for want of a knowledge of facts. They have made excellent use of the few which have been given them; but it required much labour, great variety of opportunity, and great expense, to learn the multiplicity of things which are combined even in the simplest cases of water in motion. These are seldom the lot of the mathematician; and he is without blame when he enjoys the pleasures within his reach, and cultivates the science of geometry in its most abstracted form. Here he makes a progress which is the boast of human reason, being almost insured from error by the intellectual simplicity of his subject. But when we turn our attention to material objects, and, without knowing either the size and shape of the elementary particles, or the laws which nature has prescribed for their action, presume to foresee their effects, calculate their exertions, direct their actions, what must be their consequence? Nature shows her independence with respect to our notions, and, always faithful to the laws which are enjoined, and of which we are ignorant, she never fails to thwart our views, to disconcert our projects, and render useless all our efforts.

To wish to know the nature of the elements is vain, and our gross organs are insufficient for the study. To suppose what we do not know, and to fancy shapes and sizes at will, is to raise phantoms, and will produce a system, but will not prove a foundation for any science. But to interrogate Nature herself, study the laws which she so faithfully observes, catch her, as we say, in the fact, and thus wrest from her the secret; this is the only way to become her master, and it is the only procedure consistent with good sense. And we see that soon after Kepler detected the laws of the planetary motions, when Galileo discovered the uniform acceleration of gravity, when Paschal discovered the pressure of the atmosphere, and Newton discovered the laws of attraction and the track of a ray of light; astronomy, mechanics, hydrostatics, chemistry, optics, quickly became bodies of sound doctrine, and the deductions from their respective theories were found fair representations of the phenomena of nature. Whenever a man has discovered a law of nature, he has laid the foundation of a science, and he has given us a new mean of subjecting to our service some element hitherto independent; and so long as groups of natural operations follow a route which appears to us whimsical, and will not admit our calculations, we may be assured that we are ignorant of the principle which connects them all, and regulates their procedure.

Proper mode of investigation.

Our ignorance of the general laws of this motion,

This is remarkably the case with several phenomena in the motions of fluids, and particularly in the motion of water in a bed or conduit of any kind. Although the first geniuses of Europe have for this century past turned much of their attention to this subject, we are almost ignorant of the *general laws* which may be observed in their motions. We have been able to select very few points of resemblance, and every case remains nearly an individual. About one hundred and fifty years ago we discovered, by experience only, the quantity and velocity of water issuing from a small orifice, and, after much labour, have extended this to any orifice; and this is almost the whole of our confidential knowledge. But as to the uniform course of the streams which water the face of the earth, and the maxims which will certainly regulate this agreeably to our wishes, we are in a manner totally ignorant. Who can pretend to say what is the velocity of a river of which you tell him the breadth, the depth, and the declivity? Who can say what swell will be produced in different parts of its course, if a dam or weir of given dimensions be made in it, or a bridge be thrown across it; or how much its waters will be raised by turning another stream into it, or sunk by taking off a branch to drive a mill? Who can say with confidence what must be the dimensions or slope of this branch, in order to furnish the water that is wanted, or the dimensions and slope of a canal which shall effectually drain a fenny district? Who can say what form will cause or will prevent the undermining of banks, the forming of elbows, the pooling of the bed, or the deposition of sands? Yet these are the most important questions.

and the causes of it.

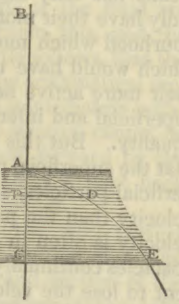
The causes of this ignorance are the want or uncertainty of our principles; the falsity of our only theory, which is belied by experience; and the small number of proper observations or experiments, and difficulty of making such as shall be serviceable. We have, it is true, made a few experiments on the efflux of water from small orifices, and from them we have deduced a sort of theory, dependent on the fall of heavy bodies and the laws of hydrostatic pressure. Hydrostatics is indeed founded on very simple principles, which give a very good account of the laws of the quiescent equilibrium of fluids, in consequence of gravity and perfect fluidity. But by what train of reasoning can we connect these with the phenomena of the uniform motion of the waters of a river or open stream, which can derive its motion only from the slope of its surface, and the modifications of this motion or its velocity only from the width and depth of the stream? These are the only circumstances which can distinguish a portion of a river from a vessel of the same size and shape, in which, however, the water is at rest. In both, gravity is the sole cause of pressure and motion; but there must be some circumstance peculiar to running waters which modifies the exertion of this active principle, and which, when discovered, must be the basis of hydraulics, and must oblige us to reject every theory founded on fancied hypothesis, and which can only lead to absurd conclusions; and surely absurd consequences, when legitimately drawn, are complete evidence of improper principles.

Pri ple on ich the s- tem f hyd ulics dep d.

When it was discovered experimentally, that the velocities of water issuing from orifices at various depths under the surface were as the square roots of those depths, and the fact was verified by repeated experiments, this principle was immediately, and without modification, applied to every motion of water. Mariotte, Varignon, and Guglielmini, made it the basis of complete systems of hydraulics, which prevail to this day, after having received various amendments and modifications. The same reasoning obtains through them all, though frequently obscured by other circumstances, which are more perspicuously expressed by Guglielmini in his Fundamental Theorems.

He considers every point P (fig. 1) in a mass of fluid as an orifice in the side of a vessel, and conceives the particle as having a tendency to move with the same velocity with which it would issue from the orifice. Therefore, if a vertical line APC be drawn through that point, and if this be made the axis of a parabola ADE, of which A at the surface of the fluid is the vertex, and AB (four times the height through which a heavy body would fall in a second) is the parameter, the velocity of this particle will be represented by the ordinate PD of this parabola; that is, PD is the space which it would uniformly describe in a second.

Fig. 1.

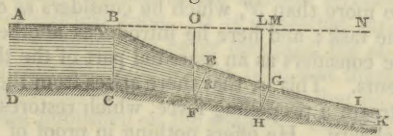


Theo de- rived om it.

From this principle is derived the following theory of running waters.

Let DC (fig. 2) be the horizontal bottom of a reservoir, to which is joined a sloping channel CK of uniform breadth, and let AB be the surface of the standing water in the reservoir. Suppose the vertical plane BC pierced with an infinity of holes, through each of which the water issues. The velocity of each filament will be that which is acquired by falling from the surface AB.[1] The filament C, issuing with this velocity, will then glide down the inclined plane like any other heavy body; and (by the common doctrine of the motion down an inclined plane) when it has arrived at F, it will have the same velocity which it would have acquired by falling through the height OF, the point O being in the horizontal plane AB produced. The same may be said of its velocity when it arrives at H or K. The filament immediately above C will also issue with a velocity which is in the subduplicate ratio of its depth, and will then glide down above the first filament. The same may be affirmed of all the filaments, and of the superficial filament, which will occupy the surface of the descending stream.

Fig. 2.



he con quence awn om thi eory.

From this account of the genesis of a running stream of water, we may fairly draw the following consequences.

1. The velocity of any particle R, in any part of the stream, is that acquired by falling from the horizontal plane AN.

2. The velocity at the bottom of the stream is everywhere greater than anywhere above it, and is least of all at the surface.

3. The velocity of the stream increases continually as the stream recedes from its source.

4. The depths EF, GH, &c. in different parts of the stream, will be nearly in the inverse subduplicate ratio of the depths under the surface AN: for since the same quantity of water is running through every section EF and GH, and the channel is supposed of uniform breadth, the depth of each section must be inversely as the velocity of the water passing through it. This velocity is indeed different in different filaments of the section; but the mean velocity in each section is in the subduplicate ratio of the depth of the filament under the surface AB. Therefore the stream becomes more shallow as it recedes from the source; and in consequence of this the difference between LH and MG continually diminishes, and the velocities at the bottom and surface of the stream continually approach to equality, and at a great distance from the source they differ insensibly.

5. If the breadth of the stream be contracted in any part, the depth of the running water will be increased in that part, because the same quantity must still pass through; but the velocity at the bottom will remain the same, and that at the surface will be less than it was before; and the area of the section will be increased on the whole.

6. Should a sluice be put across the stream, dipping a little into the water, the water must immediately rise on the upper side of the sluice till it rises above the level of the reservoir; and the smallest immersion of the sluice will produce this effect. For, by lowering the sluice, the area of the section is diminished, and the velocity cannot be increased till the water heap up to a greater height than the surface of the reservoir; and this acquires a pressure which will produce a greater velocity of efflux through the orifice left below the sluice.

7. An additional quantity of water coming into this channel will increase the depth of the stream, and the quantity of water which it conveys; but it will not increase the velocity of the bottom filaments unless it comes from a higher source.

These consequences all contrary to experience.

All these consequences are contrary to experience, and show the imperfection at least of the explanation.

The third consequence is of all the most contrary to experience. If any one will but take the trouble of following a single brook from its source to the sea, he will find it most rapid in its beginnings among the mountains, gradually slackening its pace as it winds among the hills and gentler declivities, and at last creeping slowly along through the flat grounds, till it is checked and brought to rest by the tides of the ocean.

Nor is the second consequence more agreeable to observation. It is universally found that the velocity of the surface in the middle of the stream is the greatest of all, and that it gradually diminishes from thence to the bottom and sides.

And the first consequence, if true, would render the running waters on the surface of this earth the instruments of immediate ruin and devastation. If the waters of our rivers, in the cultivated parts of a country, which are two, three, and four hundred feet lower than their sources, ran with the velocity due to that height, they would in a few minutes lay the earth bare to the very bones.

The velocities of our rivers, brooks, and rills, being so greatly inferior to what this theory assigns to them, the other consequences are equally contrary to experience. When a stream has its section diminished by narrowing the channel, the current increases in depth, and this is always accompanied by an increase of velocity through the whole of the section, and most of all at the surface; and the area of the section does not increase, but diminishes, all the phenomena thus contradicting in every circumstance the deduction from the theory; and when the section has been diminished by a sluice let down into the stream, the water gradually heaps up on the upper side of the sluice, and, by its pressure, produces an acceleration of the stream below the sluice, in the same way as if it were the beginning of a stream, as explained in the theory. The velocity now is composed of the velocity preserved from the source and the velocity produced by this subordinate accumulation; and this accumulation and velocity continually increase till they become such that the whole supply is again discharged through this contracted section: any additional water not only increases the quantity carried along the stream, but also increases the velocity, and therefore the section does not increase in the proportion of the quantity.

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[1] See Guglielmini's Hydraulics, 21.

The theory, however, has been generally followed by the writers on the subject,

It is surprising that a theory really founded on a conceit, and which in every one of the most familiar and obvious circumstances is contradicted by facts, should have met with so much attention. That Varignon should immediately catch at this notion of Guglielmini, and make it the subject of many elaborate analytical memoirs, is not to be wondered at. This author only wanted *donner prise au calcul;* and it was a usual joke among the academicians of Paris, when any new theorem was invented, *donnons le à Varignon à généraliser.* But his numerous theorems and corollaries were adopted by all, and still make the substance of the present systems of hydraulics. Gravesande, Muschenbroeck, and all the elementary treatises of natural philosophy, deliver no other doctrines; and Belidor, who has been considered as the first of all the scientific engineers, details the same theory in his great work the *Architecture Hydraulique.*

though some of the more ingenious saw its defects, and attempted to supply them.

Guglielmini was, however, not altogether the dupe of his own ingenuity. He was not only a pretty good mathematician, but an assiduous and sagacious observer. He had applied his theory to some important cases which occurred in the exercise of his profession as inspector of the rivers and canals in the Milanese, and to the course of the Danube; and could not but perceive that great corrections were necessary for making the theory quadrate in some tolerable manner with observation; and he immediately saw that the motion was greatly obstructed by inequalities of the canal, which gave to the contiguous filaments of the stream transverse motions, which thwarted and confused the regular progress of the rest of the stream, and thus checked its general progress. These obstructions, he observed, were most effectual in the beginning of its course, while yet a small rill, running among stones, and in a very unequal bed. The whole stream being small, the inequalities bore a great proportion to it, and thus the general effect was great. He also saw that the same causes (these transverse motions produced by the unequal bottom) chiefly affect the contiguous filaments, and were the reasons why the velocity at the sides and bottom was so much diminished as to be less than the superficial velocity, and that even this might come to be diminished by the same cause. For he observed, that the general stream of a river is frequently composed of a sort of boiling or tumbling motion, by which masses of water are brought up to the surface and again descend. Every person must recollect such appearances in the freshes of a muddy river; and in this way Guglielmini was enabled to account in some measure for the disagreement of his theory with observation.

Mariotte had observed the same obstruction even in the smoothest glass pipes. Here it could not be ascribed to the checks occasioned by transverse motions. He therefore ascribed it to friction, which he supposed to diminish the motion of fluid bodies in the same manner as of solids; and he thence concludes, that the filaments which immediately rub on the sides of the tube have their velocity gradually diminished, and that the filaments immediately adjoining to these, being thus obliged to pass over them or outstrip them, rub upon them and have their own velocity diminished in like manner, but in a smaller degree; and that the succeeding filaments towards the axis of the tube suffer similar but smaller diminutions. By this means the whole stream may come to have a smaller velocity; and at any rate, the medium velocity by which the quantity discharged is determined, is smaller than it would have been independent of friction.

Guglielmini adopted this opinion of Mariotte, and, in his next work on the Motion of Rivers, considered this as the *chief* cause of the retardation; and he added a third circumstance, which he considered as of no less consequence, the viscidity or tenacity of water. He observes that syrup, oil, and other fluids, where this viscidity is more remarkable, have their motions prodigiously retarded by it, and supposes that water differs from them only in the degree in which it possesses this quality; and he says, that by this means not only the particles which are moving more rapidly have their motions diminished by those in their neighbourhood which move slower, but that the filaments also which would have moved more slowly are accelerated by their more active neighbours, and that in this manner the superficial and inferior velocities are brought nearer to an equality. But this will never account for the universal fact that the superficial particles are the swiftest of all. The superficial particles, says he, acquire by this means a greater velocity than the parabolic law allows them; the medium velocity is often in the middle of the depth; the numerous obstacles continually multiplied and repeated, cause the current to lose the velocity acquired by the fall; the slope of the bottom then diminishes, and often becomes very small, so that the force remaining is hardly able to overcome the obstacles which are still repeated, and the river is reduced almost to a state of stagnation. He observes that the Rheno, a river of the Milanese, has near its mouth a slope of no more than 5″, which he considers as quite inadequate to the task; and here he introduces another principle, which he considers as an essential part of the theory of open currents. This is, that there arises from the very depth of the stream a propelling force, which restores a part of the lost velocity. He offers nothing in proof of this principle, but uses it to account for and explain the motion of water in horizontal canals. The principle has been adopted by the numerous Italian writers on hydraulics, and, by various contrivances, interwoven with the parabolic theory, as it is called, of Guglielmini. Our readers may see it in various modifications in the *Idrostatica e Idraulica* of P. Lecchi, and in the *Sperienze Idrauliche* of Michelotti. It is by no means distinct either in its origin or in the manner of its application to the explanation of phenomena, and seems only to serve for giving something like consistency to the vague and obscure discussions which have been published on this subject in Italy. We have already remarked, that in that country the subject is particularly interesting, and has been much investigated. But the writers of England, France, and Germany, have not paid so much attention to it, and have more generally occupied themselves with the motion of water in close conduits, which seem to admit of a more precise application of mathematical reasoning.

Some of them have considered with more attention the effects of friction and viscidity. Sir Isaac Newton, with his usual penetration, had seen distinctly the manner in which it behoved these circumstances to operate. In his researches into the mechanism of the celestial motions, he had occasion to examine the famous hypothesis of Descartes, that the planets were carried round the sun by fluid vortices, and saw that there would be no end to uncertainty and dispute till the *modus operandi* of these vortices were mechanically considered. He therefore employed himself in the investigation of the manner in which the acknowledged powers of natural bodies, acting according to the received laws of mechanics, could produce and preserve these vortices, and restore that motion which was expended in carrying the planets round the sun. In the second book of the Principles of Natural Philosophy, he gives a series of beautiful propositions, viz. 51, 52, &c. with their corollaries, showing how the rotation of a cylinder or sphere round its axis in the midst of a fluid will excite a vortical motion in this fluid; and he ascertains with mathematical precision the motion of every filament of this vortex.

He sets out from the supposition that this motion is excited in the surrounding stratum of fluid in consequence of a want of perfect lubricity, and assumes as an hypothesis, that the initial resistance (or diminution of the motion of the cylinder) which arises from this want of lubricity, is proportional to the velocity with which the surface of the cylinder is separated from the contiguous surface of the surrounding fluid, and that the whole resistance is proportional to the velocity with which the parts of the fluid are mutually separated from each other. From this, and the equality of action and re-action, it evidently follows, that the velocity of any stratum of the vortex is the arithmetical medium between the velocities of the strata immediately within and without it. For the intermediate stratum cannot be in equilibrio, unless it is as much pressed forward by the superior motion of the stratum within it, as it is kept back by the slower motion of the stratum without it.

This beautiful investigation applies in the most perfect manner to every change produced in the motion of a fluid filament, in consequence of the viscidity and friction of the adjoining filaments; and a filament proceeding along a tube at some small distance from the sides has, in like manner, a velocity which is the medium between those of the filaments immediately surrounding it. It is therefore a problem of no very difficult solution to assign the law by which the velocity will gradually diminish as the filament recedes from the axis of a cylindrical tube. It is somewhat surprising that so neat a problem has never occupied the attention of the mathematicians during the time that these subjects were so assiduously studied; but so it is, that nothing precise has been published on the subject. The only approach to a discussion of this kind, is a Memoir of Mr Pitot, read to the academy of Paris in 1726, where he considers the velocity of efflux though a pipe. Here, by attending to the comparative superiority of the *quantity of motion* in large pipes, he affirms, that the total diminutions arising from friction will be (*cæteris paribus*) in the inverse ratio of the diameters. This was thankfully received by other writers, and is now a part of our hydraulic theories. It has not, however, been attended to by those who write on the motion of rivers, though it is evident that it is applicable to these with equal propriety; and had it been introduced, it would at once have solved all their difficulties, and particularly would have shown how an almost imperceptible declivity would produce the gentle motion of a great river, without having recourse to the unintelligible principle of Guglielmini.

Mr Couplet made some experiments on the motion of the water in the great main pipes of Versailles, in order to obtain some notions of the retardations occasioned by friction. They were found prodigious; but were so irregular, and unsusceptible of reduction to any general principle (and the experiments were indeed so few that they were unfit for this reduction), that he could establish no theory. What Mr Belidor established on them, and makes a sort of system to direct future engineers, is quite unworthy of attention.

Scarcely at all improved since his time.

Upon the whole, this branch of hydraulics, although of much greater practical importance than the conduct of water in pipes, has never yet obtained more than a vague, and, we may call it, slovenly attention from the mathematicians; and we ascribe it to their not having taken the pains to settle its first principles with the same precision as had been done in the other branch. They were, from the beginning, satisfied with a sort of applicability of mathematical principles, without ever making the application. Were it not that some would accuse us of national partiality, we would ascribe it to this, that Newton had not pointed out the way in this as in the other branch; for any intelligent reader of the performances on the motions of fluids in close vessels, will see that not a principle, nay hardly a step of investigation, has been added to those which were used or pointed out by Sir Isaac Newton. He has nowhere touched this question, the motion of water in an open canal. In his theories of the tides, and of the propagation of waves, he had an excellent opportunity for giving at once the fundamental principles of motion in a free fluid whose surface was not horizontal. But, by means of some of those happy and shrewd guesses, in which, as Daniel Bernoulli says, he excelled all men, he saw the undoubted consequences of some palpable phenomenon which would answer all his present purposes, and therefore entered no farther into the investigation.

The original theory of Guglielmini, or the principle adopted by him, that each particle of the vertical section of a running stream has a tendency to move as if it were issuing from an orifice at that depth under the surface, is false; and that it really does so in the face of a dam when the floodgate is taken away, is no less so; and if it did, the subsequent motions would hardly have any resemblance to those which he assigns them. Were this the case, the exterior form of the cascade would be something like what is sketched in fig. 3, with an abrupt angle at B, and a concave surface BEG. This will be evident to every one who combines the greater velocity of the lower filaments with the slower motion of those which must slide down above them. But this greater advance of the lower filaments cannot take place without an expenditure of the water under the surface AB. The surface therefore sinks, and B instantly ceases to retain its place in the horizontal plane. The water does not successively flow forward from A to B, and then tumble over the precipice; but immediately opening the floodgate, the water wastes from the space immediately behind it, and the whole puts on the form represented in fig. 4, consisting of the curve A *b* P *c* EG, convex from A to *c*, and concave from thence forward. The superficial water begins to accelerate all the way from A; and the particles may be supposed (for the present) to have acquired the velocity corresponding to their depth under the horizontal surface. This must be understood as nothing more than a vague sketch of the motions. It requires a very critical and intricate investigation to determine either the form of the upper curve or the motions of the different filaments. The place A, where the curvature begins, is of equally difficult determination, and is various according to the differences of depth and of inclination of the succeeding canal.

Fig. 3.

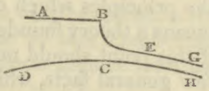
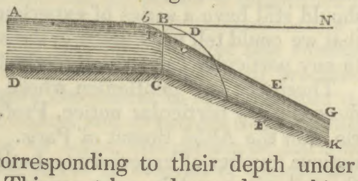


Fig. 4.



We have thus given an historical sketch of the progress

Uncertainty of the theories when applied to practice exemplified.

which had been made in this part of hydraulics, that our readers might form some opinion of the many dissertations which have been written on the motion of rivers, and of the state of the arts depending on it. Much of the business of the civil engineer is intimately connected with it; and we may therefore believe, that since there was so little principle in the theories, there could be but very little certainty in the practical operations. The fact has been, that no engineer could pretend to say, with any precision, what would be the effect of his operations. One whose business had given him many opportunities, and who had kept accurate and judicious registers of his own works, could pronounce, with some probability, how much water would be brought off by a drain of certain dimensions and a given slope, when the circumstances of the case happened to tally with some former work in which he had succeeded or failed; but out of the pale of his own experience he could only make a sagacious guess. A remarkable instance of this occurred some time ago. A small aqueduct was carried into Paris. It had been conducted on a plan presented to the academy, who had corrected it, and gave a report of what its performance would be. When executed in the most accurate manner, it was deficient in the proportion of five to nine. When the celebrated Desaguliers was employed by the city of Edinburgh to superintend the bringing in the water for the supply of the city, he gave a report on the plan which was to be followed. It was executed to his complete satisfaction; and the quantity of water delivered was about one sixth of the quantity which he promised, and about one eleventh of the quantity which the no less celebrated Maclaurin calculated from the same plan.

Necessity of multiplying experiments.

Such being the state of our theoretical knowledge (if it can be called by this name), naturalists began to be persuaded that it was but losing time to make use of a theory so incongruous with observation, and that the only safe method of proceeding was to multiply experiments in every variety of circumstances, and to make a series of experiments in every important case, which should comprehend all the practical modifications of that case. Perhaps circumstances of resemblance might occur, which would enable us to connect many of them together, and at last discover the principles which occasioned this connection; by which means a theory founded on science might be obtained. And if this point should not be gained, we might perhaps find a few general facts, which are modified in all these particular cases, in such a manner that we can still trace the general facts, and see the part of the particular case which depends on it. This would be the acquisition of what may be called an empirical theory, by which every phenomenon would be explained, in so far as the explanation of a phenomenon is nothing more than the pointing out the general fact or law under which it is comprehended; and this theory would answer every practical purpose, because we should confidently foresee what consequences would result from such and such premises; or if we should fail even in this, we should still have a series of experiments so comprehensive, that we could tell what place in the series would correspond to any particular case which might be proposed.

Labours of Michelotti and Bossut in this way.

There are two gentlemen whose labours in this respect deserve very particular notice, Professor Michelotti of Turin, and the Abbé Bossut of Paris. The first made a prodigious number of experiments, both on the motion of water through pipes and in open canals. They were performed at the expense of the sovereign, and no expense was spared. A tower was built of the finest masonry, to serve as a vessel from which the water was to issue through holes of various sizes, under pressures of from five to twenty-two feet. The water was received into basins constructed of masonry and nicely lined with stucco, from whence it was conveyed in canals of brickwork lined with stucco, and of various forms and declivities. The experiments on the expense of water through pipes are, of all that have yet been made, the most numerous and exact, and may be appealed to on every occasion. Those made in open canals are still more numerous, and are no doubt equally accurate; but they have not been so contrived as to be so extensively useful, being in general very unlike the important cases which will occur in practice; and they seem to have been contrived chiefly with the view of establishing or overturning certain points of hydraulic doctrine which were probably prevalent at the time among the practical hydraulists.

The experiments of Bossut are also of both kinds; and though on a much smaller scale than those of Michelotti, seem to deserve equal confidence. As far as they follow the same tract, they perfectly coincide in their results, which should procure confidence in the other; and they are made in situations much more analogous to the usual practical cases. This readers them doubly valuable. They are to be found in his two volumes entitled *Hydrodynamique.* He has opened this path of procedure in a manner so new and so judicious, that he has in some measure the merit of such as shall follow him in the same path.

and the progressive experiments of De Buat.

This has been most candidly and liberally allowed him by the Chevalier de Buat, who has taken up the matter where the Abbe Bossut left it, and has prosecuted his experiments with great assiduity, and, we must now add, with singular success. By a very judicious consideration of the subject, he hit on a particular view of it, which saved him the trouble of a minute consideration of the small internal motions, and enabled him to proceed from a very general and evident proposition, which may be received as the key to a complete system of practical hydraulics. We shall follow this ingenious author in what we have further to say on the subject; and we doubt not but that our readers will think we do a service to the public by making these discussions of the Chevalier de Buat more generally known in this country. It must not however be expected that we shall give more than a synoptical view of them, connected by such familiar reasoning as may be either comprehended or confided in by persons not deeply versed in mathematical science.

Sect. I.—*Theory of Rivers.*

His leading proposition.

It is certain that the motion of open streams must, in some respects, resemble that of bodies sliding down inclined planes perfectly polished; and that they would accelerate continually, were they not obstructed; but they are obstructed, and frequently move uniformly. This can only arise from an equilibrium between the forces which promote their descent and those which oppose it. Mr Buat, therefore, assumes the leading proposition, that,

When water flows uniformly on any channel or bed, the accelerating force which obliges it to move is equal to the sum of all the resistances which it meets with, whether arising from its own viscidity, or from the friction of its bed.

This law is as old as the formation of rivers, and should be the key of hydraulic science. Its evidence is clear; and it is, at any rate, the basis of all uniform motion. And since it is so, there must be some considerable analogy between the motion in pipes and in open channels. Both owe their origin to an inequality of pressure, both would accelerate continually if nothing hindered, and both are reduced to uniformity by the viscidity of the fluid and the friction of the channel.

The subject of the following discussion proposed.

It will therefore be convenient to examine the phenomena of water moving in pipes by the action of its weight only along the sloping channel. But, previously to this, we must take some notice of the obstruction to the entry of water into a channel of any kind, arising from the deflection of the many different filaments which press into the channel from the reservoir from every side. We shall then be able to separate this diminution of motion from the sum total that is observed, and ascertain what part remains as produced by the subsequent obstructions.

We shall then consider the principle of uniform motion, the equilibrium between the power and the resistance. The power is the relative height of the column of fluid which tends to move along the inclined plane of its bed; the resistance is the friction of the bed, the viscidity of the fluid, and its adhesion to the sides. Here is necessarily combined a number of circumstances which must be gradually detached, that we may see the effect of each, viz. the extent of the bed, its perimeter, and its slope. By examining the effects produced by variations of each of these separately, we discover what share each has in the general effect; and having thus analysed the complicated phenomena, we shall be able to combine those its elements, and frame a formula which shall comprehend every circumstance, from the greatest velocity to the extinction of all motion, and from the extent of a river to the narrow dimensions of a quill. We shall compare this formula with a series of experiments in all this variety of circumstances, partly made by Mr Buat, and partly collected from other authors; and we shall leave the reader to judge of the agreement.

Confident that this agreement will be found most satisfactory, we shall then proceed to consider very cursorily the chief varieties which nature or art may introduce into these beds, the different velocities of the same stream, the intensity of the resistance produced by the inertia of the materials of the channel, and the force of the current by which it continually acts on this channel, tending to change either its dimensions or its form. We shall endeavour to trace the origin of these great rivers which spread like the branches of a vigorous tree, and occupy the surface even of a vast continent. We shall follow them in their course, unfold all their windings, study their train and regimen, and point out the law of its stability; and we shall investigate the causes of their deviations and wanderings.

The study of these natural laws pleases the mind: but it answers a still greater purpose; it enables us to assist nature, and to hasten her operations, which our wants and our impatience often find too slow. It enables us to command the elements, and to force them to administer to our wants and our pleasures.

We shall therefore, in the next place, apply the knowledge which we may acquire to the solution of the most important hydraulic questions which occur in the practice of the civil engineer.

We shall consider the effects produced by a permanent addition to any river or stream by the union of another, and the opposite effect produced by any draught or offset, showing the elevation or depression produced up the stream, and the change made in the depth and velocity below the addition or offset.

We shall pay a similar attention to the temporary swells produced by freshes.

We shall ascertain the effects of straightening the course of a stream, which, by increasing its slope, must increase its velocity, and therefore sink the waters above the place where the curvature was removed, and diminish the tendency to overflow, while the same immediate consequence must expose the places farther down to the risk of floods, from which they would otherwise have been free.

The effects of dams or weirs, and of bars, must then be considered; the gorge or swell which they produce up the stream must be determined for every distance from the weir or bar. This will furnish us with rules for rendering navigable or floatable such waters as have too little depth or too great slope. And it will appear that immense advantages may be thus derived, with a moderate expense, even from trifling brooks, if we will relinquish all prejudices, and not imagine that such conveyance is impossible because it cannot be carried on by such boats and small craft as we have been accustomed to look at.

The effects of canals of derivation, the rules or maxims of draining, and the general maxims of embankment, come in the next place; and our discussions will conclude with remarks on the most proper forms for the entry to canals, locks, docks, harbours, and mouths of rivers, the best shape for the startlings of bridges and of boats for inland navigation, and such like subordinate but interesting particulars, which will be suggested by the general thread of discussion.

Natural velocity, expense, and discharge, through small orifices.

It is considered as physically demonstrated (see HYDRODYNAMICS), that water issuing from a small orifice in the bottom or side of a very large vessel, almost instantly acquires and maintains the velocity which a heavy body would acquire by falling to the orifice from the horizontal surface of the stagnant water. This we shall call its NATURAL VELOCITY. Therefore, if we multiply the area of the orifice by this velocity, the product will be the bulk or quantity of the water which is discharged. This we may call the NATURAL EXPENSE of water, or the NATURAL DISCHARGE.

Let O represent the area or section of the orifice expressed in some known measure, and h its depth under the surface. Let g express the velocity acquired by a heavy body during a second by falling. Let V be the medium velocity of the water's motion, Q the quantity of water discharged during a second, and N the natural expense.

We know that V is equal to $\sqrt{2g} \times \sqrt{h}$. Therefore $N = O \sqrt{2g} \sqrt{h}$.

If these dimensions be all taken in English feet, we have $\sqrt{2g}$ very nearly equal to 8; and therefore $V = 8 \sqrt{h}$, and $N = O\, 8 \sqrt{h}$.

But in our present business it is much more convenient to measure every thing by inches. Therefore, since a body acquires the velocity of 32 feet 2 inches in a second, we have $2g = 64$ feet 4 inches, or 772 inches, and $\sqrt{2g} = 27{\cdot}78$ inches, nearly $27\frac{3}{4}$ inches.

Therefore $V = \sqrt{772} \sqrt{h}, = 27{\cdot}78 \sqrt{h}$, and $N = O \sqrt{772} \sqrt{h}, = O\, 27{\cdot}78 \sqrt{h}$.

But it is also well known, that if we were to calculate the expense or discharge for every orifice by this simple rule, we should in every instance find it much greater than nature really gives us.

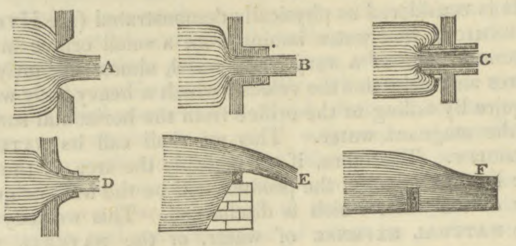
Contraction.

When water issues through a hole in a thin plate, the lateral columns, pressing into the hole from all sides, cause the issuing filaments to converge to the axis of the jet, and contract its dimensions at a little distance from the hole. And it is in this place of greatest contraction that the water acquires that velocity which we observe in our experiments, and which we assume as equal to that acquired by falling from the surface. Therefore, that our computed discharge may best agree with observation, it must be calculated on the supposition that the orifice is diminished to the size of this smallest section. But the contraction is subject to variations, and the dimensions of this smallest section are at all times difficult to ascertain with precision. It is therefore much more convenient to compute from the real dimensions of the orifice, and to correct this computed discharge, by means of an actual comparison of the computed and effective discharges in a series of experiments made in situations resembling those cases which most frequently occur in practice. This correction, or its cause, in the mechanism of those internal motions, is generally called CONTRACTION by the writers on hydraulics; and it is not confined to a hole in a thin plate: it happens in some degree in all cases where fluids are made to pass through narrow places. It happens in the entry into all pipes, canals, and sluices; nay even into the passage of water over the edge of a board, such as is usually set up on the head of a

Theory.

dam or weir, and even when this is immersed in water on both sides, as in a bar or keep, frequently employed for raising the waters of the level streams in Flanders in order to render them navigable. We mentioned an observation[1] of Mr Buat to this effect, when he saw a gooseberry rise up from the bottom of the canal along the face of the bar, and then rapidly fly over its top. We have attempted to represent this motion of the filaments in these different situations.

Fig. 5.



Motion of filaments in various particular situations,

A shows the motion through a thin plate.

B shows the motion when a tube of about two diameters long is added, and when the water flows with a full mouth. This does not always happen in so short a pipe (and never in one that is shorter), but the water frequently detaches itself from the sides of the pipe, and flows with a contracted jet.

C shows the motion when the pipe projects into the inside of the vessel. In this case it is difficult to make it flow full.

D represents a mouth-piece fitted to the hole, and formed agreeably to that shape which a jet would assume of itself. In this case all contraction is avoided, because the mouth of this pipe may be considered as the real orifice, and nothing now diminishes the discharge but a trifling friction of the sides.

E shows the motion of water over a dam or weir, where the fall is free or unobstructed; the surface of the lower stream being lower than the edge or sole of the waste-board.

F is a similar representation of the motion of water over what we would call a *bar* or *keep*.

and the effects of contraction determined.

It was one great aim of the experiments of Michelotti and Bossut to determine the effects of contraction in these cases. Michelotti, after carefully observing the form and dimensions of the natural jet, made various mouth-pieces resembling it, till he obtained one which produced the smallest diminution of the computed discharge, or till the discharge computed for the area of its smaller end approached the nearest to the effective discharge. And he at last obtained one which gave a discharge of 983, when the natural discharge would have been 1000. This piece was formed by the revolution of a trochoid round the axis of the jet, and the dimensions were as follow:

Diameter of the outer orifice = 36
Diameter of the inner orifice = 46
Length of the axis = 96

The results of the experiments of the Abbé Bossut and of Michelotti scarcely differ, and they are expressed in the following table:

N or the natural expense	$10000 = 0{\cdot}27{\cdot}78\sqrt{h}$
Q for the thin plate, fig. A, almost at the surface	$6526 = 0{\cdot}18{\cdot}13\sqrt{h}$
Q for ditto at the depth of 8 feet	$6195 = 0{\cdot}17{\cdot}21\sqrt{h}$
Q for ditto at the depth of 16 feet	$6173 = 0{\cdot}17{\cdot}15\sqrt{h}$
Q for a tube 2 diameters long, fig. B	$8125 = 0{\cdot}22{\cdot}57\sqrt{h}$
Q for ditto projecting inwards and flowing full	$6814 = 0{\cdot}18{\cdot}93\sqrt{h}$
Q for ditto with a contracted jet, fig. C	$5137 = 0{\cdot}14{\cdot}27\sqrt{h}$
Q for the mouth-piece, fig. D	$9831 = 0{\cdot}27{\cdot}31\sqrt{h}$
Q for a weir, fig. E	$9536 = 0{\cdot}26{\cdot}49\sqrt{h}$
Q for a bar, fig. F	$9730 = 0{\cdot}27{\cdot}03\sqrt{h}$

Theor

The numbers in the last column of this little table are the cubical inches of water discharged in a second when the height *h* is one inch.

It must be observed, that the discharges assigned here for the weir and bar relate only to the contractions occasioned by the passage over the edge of the board. The weir may also suffer a diminution by the contractions at its two ends, if it should be narrower than the stream, which is generally the case, because the two ends are commonly of square masonry or wood-work. The contraction there is nearly the same with that at the edge of a thin plate. But this could not be introduced into this table, because its effect on the expense is the same in quantity whatever is the length of the waste-board of the weir.

Diminution of d charge through sluice, &

In like manner, the diminution of discharge through a sluice could not be expressed here. When a sluice is drawn up, but its lower edge still remains under water, the discharge is contracted both above and at the sides, and the diminution of discharge by each is in proportion to its extent. It is not easy to reduce either of these contractions to computation, but they may be very easily observed. We frequently can observe the water, at coming out of a sluice into a mill-course, quit the edge of the aperture, and show a part of the bottom quite dry. This is always the case when the velocity of efflux is considerable. When it is very moderate, this place is occupied by an eddy water almost stagnant. When the head of water is eight or ten inches, and runs off freely, the space left between it and the sides is about one and a half inch. If the sides of the entry have a slope, this void space can never appear; but there is always this tendency to convergence, which diminishes the quantity of the discharge.

It will frequently abridge computation very much to consider the water discharged in these different situations as moving with a common velocity, which we conceive as produced not by a fall from the surface of the fluid (which is exact only when the expense is equal to the natural expense), but by a fall *h* accommodated to the discharge: or it is convenient to know the height which would produce that very velocity which the water issues with in these situations.

And also, when the water is observed to be actually moving with a velocity V, and we know whether it is coming through a thin plate, through a tube, over a dam, &c. it is necessary to know the pressure or HEAD OF WATER *h* which has actually produced this velocity. It is convenient therefore to have the following numbers in readiness.

h for the natural expense	$= \frac{V^2}{772}$
h for a thin plate at the depth of 8 feet	$= \frac{V^2}{296}$
h for a tube 2 diam. long	$= \frac{V^2}{509}$
h for a dam or weir	$= \frac{V^2}{702}$
h for a bar	$= \frac{V^2}{731}$

It was necessary to premise these facts in hydraulics,

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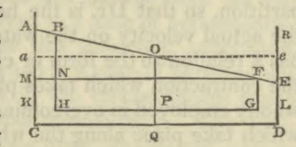
[1] See RESISTANCE OF FLUIDS, p. 180.

T ory.

that we may be able in every case to distinguish between the force expended in the entry of the water into the conduit or canal, and the force employed in overcoming the resistances along the canal, and in preserving or accelerating its motion in it.

Th no- tion f ri- ver le- pen on the ope of t sur- face

Fig. 6.



The motion of running water is produced by two causes: 1. The action of gravity; and, 2. the mobility of the particles, which makes them assume a level in confined vessels, or determines them to move to that side where there is a defect of pressure. When the surface is level, every particle is at rest, being equally pressed in all directions; but if the surface is not level, not only does a particle on the very surface tend by its own weight towards the lower side, as a body would slide along an inclined plane, but there is a force, external to itself, arising from a superiority of pressure on the upper end of the surface, which pushes this superficial particle towards the lower end; and this is not peculiar to the superficial particles, but affects every particle within the mass of water. In the vessel ACDE (fig. 6), containing water with an inclined surface AE, if we suppose all frozen but the extreme columns AKHB, FGLE, and a connecting portion HKCDLG, it is evident, from hydrostatical laws, that the water on this connecting part will be pushed in the direction CD; and if the frozen mass BHGF were moveable, it would also be pushed along. Giving it fluidity will make no change in this respect; and it is indifferent what is the situation and shape of the connecting column or columns. The propelling force (MNF being horizontal) is the weight of the column AMNB. The same thing will obtain wherever we select the vertical columns. There will always be a force tending to push every particle of water in the direction of the declivity. The consequence will be, that the water will sink at one end and rise at the other, and its surface will rest in the horizontal position *a* O *e*, cutting the former in its middle O. This cannot be, unless there be not only a motion of perpendicular descent and ascent of the vertical columns, but also a real motion of translation from K towards L. It perhaps exceeds our mathematical skill to tell what will be the motion of each particle. Newton did not attempt it in his investigation of the motion of waves, nor is it at all necessary here. We may, however, acquire a very distinct notion of its general effect. Let OPQ be a vertical plane passing through the middle point O. It is evident that every particle in PQ, such as P, is pressed in the direction QD, with a force equal to the weight of a single row of particles whose length is the difference between the columns BH and FG. The force acting on the particle Q is, in like manner, the weight of a row of particles = AC — ED. Now if OQ, OA, OE, be divided in the same ratio, so that all the figures ACDE, BHGF, &c. may be similar, we see that the force arising solely from the declivity, and acting on each particle on the plane OQ, is proportional to its depth under the surface, and that the row of particles ACQDE, BHPGF, &c. which is to be moved by it, is in the same proportion. Hence it unquestionably follows, that the accelerating force on each particle of the row is the same in all. Therefore the whole plane OQ tends to advance forward together with the same velocity; and in the instant immediately succeeding, all these particles would be found again in a vertical plane indefinitely nearer to OQ; and if we sum up the forces, we shall find them the same as if OQ were the opening of a sluice, having the water on the side of D standing level with O, and the water on the other side standing at the height AC. This result is extremely different from that of the hasty theory of Guglielmini. He considers each particle in OQ as urged by an accelerating force proportional to its depth, it is true; but he makes it *equal* to the weight of the row OP, and never recollects that the greatest part of it is balanced by an opposite pressure, nor perceives that the force which is not balanced must be distributed among a row of particles which varies in the same proportion with itself. When these two circumstances are neglected, the result will be incompatible with observation. When the balanced forces are taken into the account of pressure, it is evident that the surface may be supposed horizontal, and that motion should obtain in this case as well as in the case of a sloping surface; and indeed this is Guglielmini's professed theory, and what he highly values himself upon. He announces this discovery of a new principle, which he calls the energy of deep waters, as an important addition to hydraulics. It is owing to this, says he, that the great rivers are not stagnant at their mouths, where they have no perceptible declivity of surface, but, on the contrary, have greater energy and velocity than farther up, where they are shallower. This principle is the basis of his improved theory of rivers, and is insisted on at great length by all the subsequent writers. Buffon, in his theory of the earth, makes much use of it. We cannot but wonder that it has been allowed a place in the theory of rivers given in the great *Encyclopédie* of Paris, and in an article having the signature (O) of D'Alembert. We have been very anxious to show the falsity of this principle, because we consider it as a mere subterfuge of Guglielmini, by which he was able to patch up the mathematical theory which he had so hastily taken from Newton or Galileo; and we think that we have secured our readers from being misled by it, when we show that this energy must be equally operative when the surface is on a dead level. The absurdity of this is evident. We shall see by and by, that deep waters, when in actual motion, have an energy not to be found in shallow running waters, by which they are enabled to continue that motion; but this is not a moving principle; and it will be fully explained, as an immediate result of principles, not vaguely conceived and indistinctly expressed, like this of Guglielmini, but easily understood, and appreciable with the greatest precision. It is an energy common to all great bodies. Although they lose as much momentum in surmounting any obstacle as small ones, they lose but a small portion of their velocity. At present, employed only in considering the progressive motion of an open stream, whose surface is not level, it is quite enough that we see that such a motion must obtain, and that we see that there are propelling forces; that those forces arise *solely* from the want of a level surface, or from the slope of the surface; and that, with respect to any one particle, the force acting on it is proportional to the difference of level between each of the two columns (one on each side of the particle) which produce it. Were the surface level, there would be no motion; if it is not level, there will be motion; and this motion will be proportional to the want of level or the declivity of the surface: it is of no consequence whether the bottom be level or not, or what is its shape.

Theory.

Hence we draw a fundamental principle, that the *motion of rivers depends entirely on the slope of the surface.*

The SLOPE or declivity of any inclined plane is not properly expressed by the difference of height alone of its extremities; we must also consider its length; and the measure of the slope must be such that it may be the same while the declivity is the same. It must therefore be the same over the whole of any one inclined plane. We shall answer these conditions exactly, if we take for the measure of a slope the fraction which expresses the elevation of one extremity above the other divided by the length of the plane. Thus $\frac{AM}{AF}$ will express the declivity of the plane AF.

Theory.

When it is uniform the resistance is equal to the accelerating force.

If the water met with no resistance from the bed in which it runs, if it had no adhesion to its sides and bottom, and if its fluidity were perfect, its gravity would accelerate its course continually, and the earth and its inhabitants would be deprived of all the advantages which they derive from its numberless streams. They would run off so quickly, that our fields, dried up as soon as watered, would be barren and useless. No soil could resist the impetuosity of the torrents; and their accelerating force would render them a destroying scourge, were it not that, by kind Providence, the resistance of the bed, and the viscidity of the fluid, become a check which reins them in and sets bounds to their rapidity. In this manner the friction on the sides, which, by the viscidity of the water, is communicated to the whole mass, and the very adhesion of the particles to each other, and to the sides of the channel, are the causes which make the resistances bear a relation to the velocity; so that the resistances, augmenting with the velocities, come at last to balance the accelerating force. Then the velocity now acquired is preserved, and the motion becomes uniform, without being able to acquire new increase, unless some change succeeds either in the slope or in the capacity of the channel. Hence arises the second maxim in the motion of rivers, that *when a stream moves uniformly, the resistance is equal to the accelerating force.*

As in the efflux of water through orifices, we pass over the very beginnings of the accelerated motion, which is a matter of speculative curiosity, and consider the motion in a state of permanency, depending on the head of water, the area of the orifice, the velocity, and the expense; so in the theory of the uniform motion of rivers, we consider the slope, the transverse section or area of the stream, the uniform velocity, and the expense. It will be convenient to affix precise meanings to the terms which we shall employ.

Terms precisely explained.

The SECTION of a stream is the area of a plane perpendicular to the direction of the general motion.

The resistances arise ultimately from the action of the water on the internal surface of the channel, and must be proportional (*cæteris paribus*) to the extent of the action. Therefore, if we unfold the whole edge of this section, which is rubbed as it were by the passing water, we shall have a measure of the extent of this action. In a pipe, circular or prismatical, the whole circumference is acted on; but in a river or canal ACDR (fig. 6) the horizontal line *a*O*e*, which makes the upper boundary of the section *a*CD*e*, is free from all action. The action is confined to the three lines *a*C, CD, D*e*. We shall call this line *a*CD*e* the BORDER of the section.

The MEAN VELOCITY is that with which the whole section, moving equally, would generate a solid equal to the expense of the stream. This velocity is to be found perhaps but in one filament of the stream, and we do not know in which filament it is to be found.

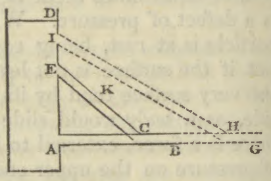
Since we are attempting to establish an empirical theory of the motion of rivers, founded entirely on experiments, and palpable deductions from them, and since it is extremely difficult to make experiments on open streams which shall have a precision sufficient for such an important purpose, it would be a most desirable thing to demonstrate an exact analogy between the mutual balancing of the acceleration and resistance in pipes and in rivers; for in those we can not only make experiments with all the desired accuracy, and admitting precise measures, but we can make them in a number of cases that are almost impracticable in rivers. We can increase the slope of a pipe from nothing to the vertical position, and we can employ every desired degree of pressure, so as to ascertain its effect on the velocity in degrees which open streams will not admit of. The Chevalier de Buat has most happily succeeded in this demonstration; and it is here that his good fortune and his penetration have done so much service to practical science.

Theo

The acc leratio and re ance of ter in a horizon tube,

Let AB (fig. 7) be a horizontal tube, through which the water is impelled by the pressure or HEAD DA. This head is the moving power; and it may be conceived as consisting of two parts, performing two distinct offices. One of them is employed in impressing on the water that velocity with which it *actually moves* in the tube. Were there no obstructions to this motion, no greater head would be wanted; but there are obstructions, arising from friction, adhesion, and viscidity. This requires force. Let this be the office of the rest of the head of water in the reservoir. There is but one allotment, appropriation, or repartition of the whole head which will answer. Suppose E to be the point of partition, so that DE is the head necessary for impressing the actual velocity on the water (a head or pressure which has a relation to the form or circumstance of the entry, and the contraction which takes place there). The rest EA is wholly employed in overcoming the simultaneous resistances which take place along the whole tube AB, and is in equilibrio with this resistance. Therefore, if we apply at E a tube EC, of the same length and diameter with AB, and having the same degree of polish or roughness; and if this tube be inclined in such a manner that the axis of its extremity may coincide with the axis of AB in the point C; we affirm that the velocity will be the same in both pipes, and that they will have the same expense; for the moving force in the sloping pipe EC is composed of the whole weight of the column DE and the relative weight of the column EC; but this relative weight, by which alone it descends along the inclined pipe EC, is precisely equal to the weight of a vertical column EA of the same diameter. Everything therefore is equal in the two pipes, viz. the lengths, the diameters, the moving forces, and the resistances; therefore the velocities and discharges will also be equal.

Fig. 7.



This is not only the case on the whole, but also in every part of it. The relative weight of any part of it EK is precisely in equilibrio with the resistances along that part of the pipe; for it has the same proportion to the whole relative weight that the resistance has to the whole resistance. Therefore (*and this is the most important circumstance, and the basis of the whole theory*) the pipe EC may be cut shorter, or may be lengthened to infinity, without making any change in the velocity or expense, so long as the propelling head DE remains the same.

Leaving the whole head DA as it is, if we lengthen the horizontal pipe AB to G, it is evident that we increase the resistance without any addition of force to overcome it. The velocity must therefore be diminished; and it will now be a velocity which is produced by a smaller head than DE: therefore, if we were to put in a pipe of equal length at E, terminating in the horizontal line AG, the water will not run equally in both pipes. In order that it may, we must discover the diminished velocity with which the water now actually runs along AG, and we must make a head DI capable of impressing this velocity at the entry of the pipe, and then insert at I a pipe IH of the same length with AG. The expense and velocity of both pipes will now be the same.[1]

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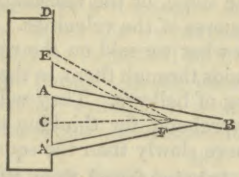
[1] We recommend it to the reader to make this distribution or allotment of the different portions of the pressure very familiar to his mind. It is of the most extensive influence in every question of hydraulics, and will on every occasion give him distinct conceptions of the internal procedure. Obvious as the thought seems to be, it has escaped the attention of all the writers on the subject.

or i n in- clin pipe.

What has now been said of a horizontal pipe AB would have been equally true of any inclined pipe AB A′B (fig. 8). Drawing the horizontal line CB, we see that DC is the whole head or propelling pressure for either pipe AB or A′B; and if DE is the head necessary for the actual velocity, EC is the head necessary for balancing the resistances; and the pipe EF, of the same length with AB, and terminating in the same horizontal line, will have the same velocity: and its inclination being thus determined, it will have the same velocity and expense whatever be its length.

Fig. 8.



Ana gy betv n thes pipes and vers dem stra- ted De Bua

Thus we see that the motion in any pipe, horizontal or sloping, may be referred to or substituted for the motion in another inclined pipe, whose head of water, above the place of entry, is that productive of the actual velocity of the water in the pipe. Now, in this case, the accelerating force is equal to the resistance: we may therefore consider this last pipe as a river, of which the bed and the slope are uniform or constant, and the current in a state of permanency; and we now may clearly draw this important conclusion, that pipes and open streams, when in a state of permanency, perfectly resemble each other in the circumstances which are the immediate causes of this permanency. The equilibrium between the accelerating force obtains not only in general, but takes place through the whole length of the pipe or stream, and is predicable of every individual transverse section of either. To make this more palpably evident, if possible, let us consider a sloping cylindrical pipe, the current of which is in a state of permanency. We can conceive it as consisting of two half cylinders, an upper and a lower. These are running together at an equal pace; and the filaments of each immediately contiguous to the separating plane and to each other are not rubbing on each other, nor affecting each other's motions in the smallest degree. It is true that the upper half is pressing on the lower, but in a direction perpendicular to the motion, and therefore not affecting the velocity; and we shall see presently, that although the lower side of the pipe bears somewhat more pressure than the other, the resistances are not changed. Indeed this odds of pressure is accompanied with a difference of motion, which need not be considered at present; and we may suppose the pipe so small or so far below the surface that this shall be insensible. Now let us suppose, that in an instant the upper half cylinder is annihilated: we then have an open stream; and every circumstance of accelerating force and of resistance remains precisely as it was. The motion must therefore continue as it did; and in this state the only accelerating force is the slope of the surface. The demonstration therefore is complete.

Conse quenc

From these observations and reasonings we draw a general and important conclusion, "that the same pipe will be susceptible of different velocities, which it will preserve uniform to any distance, according as it has different inclinations; and each inclination of a pipe of given diameter has a certain velocity peculiar to itself, which will be maintained uniform to any distance whatever; and this velocity increases continually, according to some law, to be discovered by theory or experiment, as the position of the pipe changes from being horizontal till it becomes vertical; in which position it has the greatest uniform velocity possible relative to its inclination, or depending on inclination alone."

Let this velocity be called the TRAIN, or the RATE, of each pipe.

Measure of the resistance to the motion with a given velocity.

It is evident that this principle is of the utmost consequence in the theory of hydraulics; for by experiment we can find the train of any pipe. It is in train when an increase of length makes no change in the velocity. If lengthening the pipe increases the velocity, the slope of the pipe is too great, and *vice versa*. And having discovered the train of a pipe, and observed its velocity, and computed the head productive of this velocity with the contraction at the entry, the remainder of the head, that is, the slope (for this is equivalent to EA), is the measure of the resistance. Thus we obtain the measure of the resistance to the motion with a given velocity in a pipe of given diameter. If we change only the velocity, we get the measure of the new resistance relative to the velocity; and thus discover the law of relation between the resistance and velocity. Then, changing only the diameter of the pipe, we get the measure of the resistance relative to the diameter. This is the aim of a prodigious number of experiments made and collected by De Buat, and which we shall not repeat, but only give the results of the different parts of his investigation.

Results of De Buat's investigation on this subject.

We may express the slope of a pipe by the symbol $\frac{1}{s}$, 1 being an inch, for instance, and s being the slant length of a pipe which is one inch more elevated at one end than at the other. Thus a river which has a declivity of an inch and a half in 120 fathoms or 8640 inches, has its slope $= \frac{1\frac{1}{2}}{8640}$, or $\frac{1}{5760}$. But in order to obtain the hydraulic slope of a conduit-pipe, the height of the reservoir and place of discharge being given, we must subtract from the difference of elevation the height or head of water necessary for propelling the water into any pipe with the velocity V, which it is supposed actually to have. This is $\frac{V^2}{509}$. The remainder d is to be considered as the height of the declivity, which is to be distributed equally over the whole length l of the pipe, and the slope is then $\frac{d}{l} = \frac{1}{s}$.

There is another important view to be taken of the slope, which the reader should make very familiar to his thoughts. It expresses the proportion between the weight of the whole column which is in motion and the weight which is employed in overcoming the resistance; and the resistance to the motion of any column of water is equal to the weight of that column multiplied by the fraction $\frac{1}{s}$, which expresses its slope.

Of the resistances which bring the motions to a state of uniformity.

We now come to consider more particularly the resistances which in this manner bring the motion to a state of uniformity. If we consider the resistances which arise from a cause analogous to friction, we see that they must depend entirely on the inertia of the water. What we call the resistance is the diminution of a motion which *would* have obtained but for these resistances; and the best way we have of measuring them is by the force which we must employ in order to keep up or restore this motion. We estimate this motion by a progressive velocity, which we mea-

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Lecchi, in his Hydraulics, published in 1766, ascribes something like it to Daniel Bernoulli; but Bernoulli, in the passage quoted, only speaks of the partition of pressure in the instant of opening an orifice. Part of it, says he, is employed in accelerating the quiescent water, and producing the velocity of efflux, and the remainder produces the pressure (now diminished) on the sides of the vessel. Bernoulli, Bossut, and all the good writers, make this distribution in express terms in their explanation of the motion of water through successive orifices; and it is surprising that no one before the Chevalier de Buat saw that the resistance arising from friction required a similar partition of the pressure; but though we should call this good fortune, we must ascribe to his great sagacity and justness of conception the beautiful use that he has made of it: *suum cuique.*

Theory.

sure by the expense of water in a given time. We judge the velocity to diminish when the quantity discharged diminishes; yet it may be otherwise, and probably is otherwise. The absolute velocity of many, if not all, of the particles, may even be increased; but many of the motions being transverse to the general direction, the quantity of motion in this direction may be less, while the sum of the absolute motions of all the particles may be greater. When we increase the general velocity, it is not unreasonable to suppose that the impulses on all the inequalities are increased in this proportion; and the number of particles thus impelling and deflected at the same time will increase in the same proportion. The whole quantity, therefore, of these useless and lost motions will increase in the duplicate ratio of the velocities, and the force necessary for keeping up the motion will do so also; that is, the resistances should increase as the squares of the velocities.

Or if we consider the resistances as arising merely from the curvature of the imperceptible internal motions occasioned by the inequalities of the sides of the pipe, and as measured by the forces necessary for producing these curvilineal motions; then, because the curves will be the same whatever are the velocities, the deflecting forces will be as the squares of the velocities; but these deflecting forces are pressures, propagated from the parts urged or pressed by the external force, and are proportional to these external pressures by the principles of hydrostatics. Therefore the pressures or forces necessary for keeping up the velocities are as the squares of these velocities; and they are our only measures of the resistances which must be considered as following the same ratio. Whatever view therefore we take of the nature of these resistances, we are led to consider them as proportional to the squares of the velocities.

We may therefore express the resistances by the symbol $\frac{V^2}{m}$, m being some number to be discovered by experiment. Thus, in a particular pipe, the diminution of the motion or the resistance may be the 1000th part of the square of the velocity, and $R = \frac{V^2}{1000}$.

Now if g be the accelerating power of gravity on any particle, $\frac{g}{s}$ will be its accelerating power by which it would urge it down the pipe whose slope is $\frac{1}{s}$. Therefore, by the principle of uniform motion, the equality of the accelerating force, and the resistance, we shall have $\frac{V^2}{m} = \frac{g}{s}$, and $V\sqrt{s} = \sqrt{mg}$; that is, the product of the velocity, and the reciprocal of the square root of the slope, or the quotient of the velocity divided by the square root of the slope, is a constant quantity $\sqrt{mg}$ for any given pipe; and the primary formula for all the uniform velocities of one pipe is $V = \frac{\sqrt{mg}}{\sqrt{s}}$.

Experiments and reasoning of DeBuat, respecting these resistances, &c.

Mr Buat therefore examined this by experiment, but found, that even with respect to a pipe or channel which was uniform throughout, this was not true. We could give at once the final formula which he found to express the velocity in every case whatever; but this would be too empirical. The chief steps of his very sagacious investigation are instructive. We shall therefore mention them briefly, at least as far as they tend to give us any collateral information; and let it always be noted, that the instruction which they convey is not abstract speculation, but experimental truths, which must ever remain as an addition to our stock of knowledge, although Mr Buat's deductions from them should prove false.

He found, in the first place, that in the same channel the product of V and $\sqrt{s}$ increased as $\sqrt{s}$ increased; that is, the velocities increased faster than the square roots of the slope, or the resistances did not increase as fast as the squares of the velocities. We beg leave to refer our readers to what we said on the resistance of pipes to the motion of fluids through them, in the article PNEUMATICS, when speaking of bellows. They will there see very valid reasons, we apprehend, for thinking that the resistances must increase more slowly than the squares of the velocities.

It being found, then, that $V\sqrt{s}$ is not equal to a constant quantity $\sqrt{mg}$, it becomes necessary to investigate some quantity depending on $\sqrt{s}$, or, as it is called, some function of $\sqrt{s}$ which shall render $\sqrt{mg}$ a constant quantity. Let X be this function of $\sqrt{s}$, so that we shall always have VX equal to the constant quantity $\sqrt{mg}$, or $\frac{\sqrt{mg}}{X}$ equal to the actual velocity V of a pipe or channel which is in train.

Mr Buat, after many trials and reflections, the chief of which will be mentioned by and by, found a value of X which corresponded with a vast variety of slopes and velocities, from motions almost imperceptible, in a bed nearly horizontal, to the greatest velocities which could be produced by gravity alone in a vertical pipe; and when he compared them together, he found a very discernible relation between the resistances and the magnitude of the section; that is, that in two channels which had the same slope, and the same propelling force, the velocity was greatest in the channel which had the greatest section relative to its border. This may reasonably be expected. The resistances arise from the mutual action of the water and this border. The water immediately contiguous to it is retarded, and this retards the next, and so on. It is to be expected, therefore, that if the border, and the velocity, and the slope, be the same, the diminution of this velocity will be so much the less as it is to be shared among a greater number of particles; that is, as the area of the section is greater in proportion to the extent of its border. The diminution of the general or medium velocity must be less in a cylindrical pipe than in a square one of the same area, because the border of the section is less.

It appears evident, that the resistance of each particle is in the direct proportion of the whole resistance, and the inverse proportion of the number of particles which receive equal shares of it. It is therefore directly as the border, and inversely as the section. Therefore, in the expression $\frac{V^2}{m}$ which we have given for the resistance, the quantity m cannot be constant, except in the same channel; and in different channels it must vary along with the relation of the section to its border, because the resistances diminish in proportion as this relation increases.

Without attempting to discover this relation by theoretical examination of the particular motions of the various filaments, Mr Buat endeavoured to discover it by a comparison of experiments. But this required some manner of stating this proportion between the augmentation of the section and the augmentation of its border.

His statement is this: he reduces every section to a rectangular parallelogram of the same area, and having its base equal to the border unfolded into a straight line. The product of this base by the height of the rectangle will be equal to the area of the section. Therefore this height will be a representative of this valuable ratio of the section to its border (we do not mean that there is any ratio between a surface and a line: but the ratio of section to section is different from that of border to border; and it is the ratio of these ratios which is thus expressed by the height of this

T ory.

rectangle). If S be the section, and B the border, $\frac{S}{B}$ is evidently a line equal to the height of this rectangle. Every section being in this manner reduced to a rectangle, the perpendicular height of it may be called the HYDRAULIC MEAN DEPTH of the section, and may be expressed by the symbol d. Buat calls it the mean radius. If the channel be a cylindrical pipe, or an open half cylinder, it is evident that d is half the radius. If the section is a rectangle, whose width is w and height h, the mean depth is $\frac{w\,h}{w+2h}$, &c. In general, if q represent the proportion of the breadth of a rectangular canal to its depth, that is, if q be made $= \frac{w}{h}$, we shall have $d = \frac{w}{q+2}$, or $d = \frac{q\,h}{q+2}$.

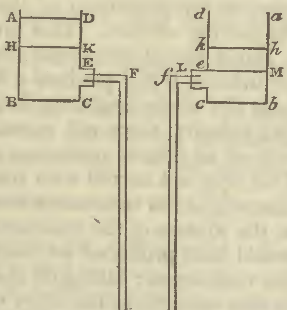
Now, since the resistances must augment as the proportion of the border to the section augments, m in the formulas $\frac{V^2}{w} = \frac{g}{s}$ and $V\sqrt{s} = \sqrt{mg}$ must follow the proportions of d, and the quantity $\sqrt{mg}$ must be proportional to $\sqrt{d}$, for different channels, and $\frac{\sqrt{mg}}{\sqrt{d}}$ should be a constant quantity in every case.

A sp ious objec on

Our author was aware, however, of a very specious objection to the close dependence of the resistance on the extent of the border, and that it might be said that a double border did not occasion a double resistance, unless the pressure on all the parts was the same. For it may be naturally, and it is generally, supposed, that the resistance will be greater when the pressure is greater. The friction, or resistance analogous to friction, may therefore be greater on an inch of the bottom than on an inch of the sides; but M. d'Alembert and many others have demonstrated, that the paths of the filaments will be the same whatever be the pressures. This might serve to justify our ingenious author; but he was determined to rest every thing on experiment. He therefore made an experiment on the oscillation of water in syphons, which we have repeated in the following form, which is affected by the same circumstances, and is susceptible of much greater precision, and of more extensive and important application.

obvia by an ex ri- ment the os la- tion water syph

Fig. 9.



The two vessels ABCD, *abcd* were connected by the syphon EFG*gfe*, which turned round in the short tubes E and *e*, without allowing any water to escape; the axis of these tubes being in one straight line. The vessels were about ten inches deep, and the branches FG, *fg* of the syphon were about five feet long. The vessels were set on two tables of equal height, and (the hole *e* being stopped) the vessel ABCD, and the whole syphon, were filled with water, and water was poured into the vessel *abcd* till it stood at a certain height LM. The syphon was then turned into a horizontal position, and the plug drawn out of *e*, and the time carefully noted which the water employed in rising to the level HK *kh* in both vessels. The whole apparatus was now inclined so that the water ran back into ABCD. The syphon was now put in a vertical position, and the experiment was repeated. No sensible or regular difference was observed in the time. Yet in this experiment the pressure on the part G*g* of the syphon was more than six times greater than before. As it was thought that the friction on this small part (only six inches) was too small a portion of the whole obstruction, various additional obstructions were put into this part of the syphon, and it was even lengthened to nine feet; but still no remarkable difference was observed. It was even thought that the times were less when the syphon was vertical.

Theory.

The resistance depends chiefly on the relation between the section and its border.

Thus M. de Buat's opinion is completely justified; and he may be allowed to assert, that the resistance depends chiefly on the relation between the section and its border; and that $\frac{\sqrt{mg}}{\sqrt{d}}$ should be a constant quantity.

To ascertain this point was the object of the next series of experiments; to see whether this quantity was really constant, and, if not, to discover the law of its variation, and the physical circumstances which accompanied the variations, and may therefore be considered as their causes. A careful comparison of a very great number of experiments, made with the same slope, and with very different channels and velocities, showed that $\sqrt{mg}$ did not follow the proportion of $\sqrt{d}$, nor of any power of $\sqrt{d}$. This quantity $\sqrt{mg}$ increased by smaller degrees in proportion as $\sqrt{d}$ was greater. In very great beds $\sqrt{mg}$ was nearly proportional to $\sqrt{d}$; but in smaller channels, the velocities diminished much more than $\sqrt{d}$ did. Casting about for some way of accommodation, M. Buat considered, that some approximation at least would be had by taking off from $\sqrt{d}$ some constant small quantity. This is evident: for such a diminution will have but a trifling effect when $\sqrt{d}$ is great, and its effect will increase rapidly when $\sqrt{d}$ is very small. He therefore tried various values for this subtraction, and compared the results with the former experiments; and he found, that if in every case $\sqrt{d}$ be diminished by one tenth of an inch, the calculated discharges would agree very exactly with the experiment. Therefore, instead of $\sqrt{d}$, he makes use of $\sqrt{d} - 0{\cdot}1$, and finds this quantity always proportional to $\sqrt{mg}$, or finds that $\frac{\sqrt{mg}}{\sqrt{d} - 0{\cdot}1}$ is a constant quantity, or very nearly so. It varied from 297 to 287 in all sections, from that of a very small pipe to that of a little canal. In the large sections of canals and rivers it diminished still more, but never was less than 256.

The result agreeable to our distinctest notions of the action of water and its bed,

This result is very agreeable to the most distinct notions that we can form of the mutual actions of the water and its bed. We see that when the motion of water is obstructed by a solid body, which deflects the passing filaments, the disturbance does not extend to any considerable distance on the two sides of the body. In like manner, the small disturbances, and imperceptible curvilineal motions, which are occasioned by the infinitesimal inequalities of the channel, must extend to a very small distance indeed from the sides and bottom of the channel. We know, too, that the mutual adhesion or attraction of water for the solid bodies which are moistened by it extends to a very small distance, which is probably the same, or nearly so, in all cases. M. Buat observed, that a surface of twenty-three square inches, applied to the surface of stagnant water, lifted 1601 grains; another of $5\frac{1}{2}$ square inches lifted 365; this was at the rate of sixty-five grains per inch nearly, making a column of about one sixth of an inch high. Now this effect is very much analogous to a real contraction of the capacity of the channel. The water may be conceived as nearly stagnant to this small distance from the border of the section. Or, to speak more accurately, the diminution of the progressive velocity occasioned by the friction and adhesion of the sides decreases very rapidly as we recede from the sides, and ceases to be sensible at a very small distance.

and confirmed by experiment.

The writer of this article[1] verified the observation by a very simple and instructive experiment. He was making experiments on the production of vortices, in the manner suggested by Sir Isaac Newton, by whirling a very accurate and smoothly polished cylinder in water; and he found that the rapid motion of the surrounding water was confined to an exceedingly small distance from the cylinder, and it was not till after many revolutions that it was sensible even at the distance of half an inch. We may, by the way, suggest this as the best form of experiments for examining the resistances of pipes. The motion excited by the whirling cylinder in the stagnant water is equal and opposite to the motion lost by water passing along a surface equal to that of the cylinder with the same velocity. Be this as it may, we are justified in considering, with M. Buat, the section of the stream as thus diminished by cutting off a narrow border all round the touching parts, and supposing that the motion and discharge is the same as if the square root of the mean depth of the section were diminished by a small quantity, nearly constant. We see, too, that the effect of this must be insensible in great canals and rivers; so that, fortunately, its quantity is best ascertained by experiments made with small pipes. This is attended with another conveniency, in the opinion of M. Buat, namely, that the effect of viscidity is most sensible in great masses of water in slow motion, and is almost insensible in small pipes, so as not to disturb these experiments. We may therefore assume 297 as the general value of $\frac{\sqrt{mg}}{\sqrt{d}-0{\cdot}1}$.[2]

Since we have $\frac{\sqrt{mg}}{\sqrt{d}-0{\cdot}1}=297$, we have also $m=\frac{297^2}{g}(\sqrt{d}-0{\cdot}1)^2, =\frac{88209}{362}(\sqrt{d}-0{\cdot}1)^2, =243{\cdot}7\,(\sqrt{d}-0{\cdot}1)^2$. This we may express by $n\,(\sqrt{d}-0{\cdot}1)^2$. And thus, when we have expressed the quantity of friction by $\frac{V^2}{m}$, the quantity m is variable, and its general value is $\frac{V^2}{n(\sqrt{d}-0{\cdot}1)^2}$, in which n is an invariable abstract number equal to 243·7, given by the nature of the resistance which water sustains from its bed, and which indicates its intensity.

And, lastly, since $m=n\,(\sqrt{d}-0{\cdot}1)^2$, we have $\sqrt{mg}=\sqrt{ng}\,(\sqrt{d}-0{\cdot}1)$, and the expression of the velocity V, which water acquires and maintains along any channel whatever, now becomes $V=\frac{\sqrt{ng}\,(\sqrt{d}-0{\cdot}1)}{X}$, or $\frac{297(\sqrt{d}-0{\cdot}1)}{X}$, in which X is also a variable quantity, depending on the slope of the surface or channel, and expressing the accelerating force which, in the case of water in train, is in equilibrio with the resistances expressed by the numerator of the fraction.

Law of acceleration investigated.

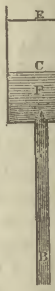
Having so happily succeeded in ascertaining the variations of resistance, let us accompany M. Buat in his investigation of the law of acceleration, expressed by the value of X.

Experience, in perfect agreement with any distinct opinions that we can form on this subject, had already shown him that the resistances increased in a slower ratio than that of the squares of the velocities, or that the velocities increased slower than $\sqrt{s}$. Therefore, in the formula $V=\frac{\sqrt{ng}\,(\sqrt{d}-0{\cdot}1)}{X}$, which, for one channel, we may express thus, $V=\frac{A}{X}$, we must admit that X is sensibly equal to $\sqrt{s}$ when the slope is very small or s very great. But, that we may accurately express the velocity in proportion as the slope augments, we must have X less than $\sqrt{s}$; and, moreover, $\frac{\sqrt{s}}{X}$ must increase as $\sqrt{s}$ diminishes. These conditions are necessary that our values of V, deduced from the formula $V=\frac{A}{X}$, may agree with the experiment.

In order to comprehend every degree of slope, we must particularly attend to the motion through pipes, because open canals will not furnish us with instances of exact TRAINS with great slopes and velocities. We can make pipes vertical. In this case $\frac{1}{s}$ is $\frac{1}{1}$, and the velocity is the greatest possible for a train by the action of gravity: but we can give greater velocities than this by increasing the head of water beyond what produces the velocity of the train.

Let AB (fig. 10) be a vertical tube, and let CA be the head competent to the velocity in the tube, which we suppose to be in train. The slope is 1, and the full weight of the column in motion is the precise measure of the resistance. The value of $\frac{1}{s}$, considered as a slope, is now a maximum; but, considered as expressing the proportion of the weight of the column in motion to the weight which is in equilibrio with the resistance, it may not be a maximum; it may surpass unity, and s may be less than 1. For if the vessel be filled to E, the head of water is increased, and will produce a greater velocity, and this will produce a greater resistance. The velocity being now greater, the head EF which imparts it must be greater than CA. But it will not be equal to EA, because the uniform velocities *are found* to increase faster than the square roots of the pressures. This is the general fact. Therefore F is above A, and the weight of the column FB, now employed to overcome the resistance, is greater than the weight of the column AB in motion. In such cases, therefore, $\frac{1}{s}$, greater than unity, is a sort of fictitious slope, and only represents the proportion of the resistance to the weight of the moving column. This proportion may surpass unity.

Fig. 10.



But it cannot be infinite: for, supposing the head of water infinite, if this produce a finite velocity, and we deduct from the whole height the height corresponding to this finite velocity, there will remain an infinite head, the measure of an infinite resistance produced by a finite velocity. This does not accord with the observed law of the velocities, where the resistances actually do not increase as fast as the squares of the velocities. Therefore an infinite head would have produced an infinite velocity, in opposition to the resistances: taking off the head of the tube, competent to this velocity, at the entry of the tube, which head would also be infinite, the remainder would in all probability be finite, balancing a finite resistance.

Therefore the value of s may remain finite, although the velocity be infinite; and this is agreeable to all our clearest notions of the resistances.

Adopting this principle, we must find a value of X which will answer all these conditions. 2. It must be sensibly proportional to $\sqrt{s}$, while s is great. It must always be less than $\surd s$. 3. It must deviate from the proportion of $\surd s$ so much the more as $\surd s$ is smaller. 4. It must not vanish when the velocity is infinite. 5. It must agree with a range of experiments with every variety of channel and of slope.

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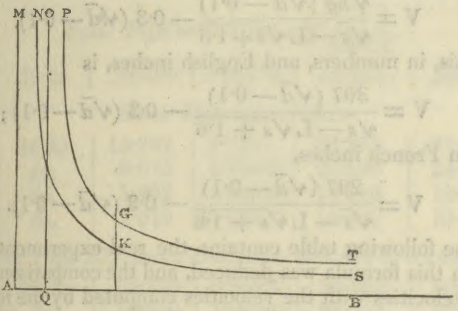
[1] The late Professor Robison of Edinburgh.

[2] In this formula, and in the subsequent part of the investigation, French inches are employed. For English inches the constant number is 307.

We shall understand the nature of this quantity X better by representing by lines the quantities concerned in forming it.

If the velocities were exactly as the square roots of the slopes, the equilateral hyperbola NKS (fig. 11) between

Fig. 11.



its asymptotes MA, AB, would represent the equation $V = \frac{A}{\surd s}$. The values of $\surd s$ would be represented by the abscissæ, and the velocities by the ordinates, and $V s = A$ would be the power of the hyperbola. But since these velocities are not sensibly equal to $\frac{A}{\surd s}$ except when $\surd s$ is very great, and deviate the more from this quantity as $\surd s$ is smaller, we may represent the velocities by the ordinates of another curve PGT, which approaches very near to the hyperbola, at a great distance from A along AB; but separates from it when the abscissæ are smaller: so that if AQ represents that value of $\surd s$ (which we have seen may become less than unity) which corresponds to an infinite velocity, the line QO may be the asymptote of the new curve. Its ordinates are equal to $\frac{A}{X}$, while those of the hyperbola are equal to $\frac{A}{\surd s}$. Therefore the ratio of these ordinates, or $\frac{\surd s}{X}$, should be such that it shall be so much nearer to unity as $\surd s$ is greater, and shall surpass it so much the more as $\surd s$ is smaller.

To express X, therefore, as some function of $\surd s$ so as to answer these conditions, we see in general that X must be less than $\surd s$. And it must not be equal to any power of $\surd s$ whose index is less than unity, because then $\frac{\surd s}{X}$ would differ so much the more from unity as $\surd s$ is greater. Nor must it be any multiple of $\surd s$, such as $q \surd s$, for the same reason. If we make $X = \surd s - K$, K being a constant quantity, we may answer the first condition pretty well. But K must be very small, that X may not become equal to nothing, except in some exceedingly small value of $\surd s$. Now the experiments will not admit of this, because the ratio $\frac{\surd s}{\surd s - K}$ does not increase sufficiently to correspond with the velocities which we observe in certain slopes, unless we make K greater than unity, which again is inconsistent with other experiments. We learn from such canvassing that it will not do to make K a constant quantity. If we should make it any fractionary power of $\surd s$, it would make $X = 0$, that is, nothing, when s is $= 1$, which is also contrary to experience. It would seem, therefore, that nothing will answer for K but some power of $\surd s$ which has a variable index. The logarithm of $\surd s$ has this property. We may therefore try to make $X = \surd s - \log. \surd s$. Accordingly, if we try the equation $V = \frac{A}{\surd s - \text{hyp. log.} \surd s}$, we shall find a very great agreement with the experiments till the declivity becomes considerable, or about $\frac{1}{20}$, which is much greater than any river. But it will not agree with the velocities observed in some mill-courses, and in pipes of a still greater declivity, and gives a velocity that is too small; and in vertical pipes the velocity is not above one half of the true one. We shall get rid of most of these incongruities if we make K consist of the hyperbolic logarithm of $\surd s$ augmented by a small quantity; and by trying various values for this constant quantity, and comparing the results with experiment, we may hit on one sufficiently exact for all practical purposes.

M. de Buat, after repeated trials, found that he would have a very great conformity with experiment by making $K = \log. \sqrt{s + 1{\cdot}6}$, and that the velocities exhibited in his experiments would be very well represented by the formula $V = \frac{297 (\surd d - 0{\cdot}1)}{\surd s - L \sqrt{s + 1{\cdot}6}}$.

Mutual adhesion of the particles of water.

There is a circumstance which our author seems to have overlooked on this occasion, and which is undoubtedly of great effect in these motions, viz. the mutual adhesion of the particles of water. This causes the water which is descending (in a vertical pipe, for example) to drag more water after it, and thus greatly increases its velocity. We have seen an experiment in which the water issued from the bottom of a reservoir through a long vertical pipe having a very gentle taper. It was fifteen feet long, one inch diameter at the upper end, and two inches at the lower. The depth of the water in the reservoir was exactly one foot; in a minute there were discharged $2\frac{9}{10}$ cubic feet of water. It must therefore have issued through the hole in the bottom of the reservoir with the velocity of 8·85 feet per second. And yet we know that this head of water could not make it pass through the hole with a velocity greater than 6·56 feet per second. This increase must therefore have arisen from the cause we have mentioned, and is a proof of the great intensity of this force. We doubt not but that the discharge might have been much more increased by proper contrivances; and we know many instances in water-pipes where this effect is produced in a very great degree.

An actual case

The following case is very distinct. Water is brought into the town of Dunbar, in the county of Haddington, from a spring at the distance of about 3200 yards. It is conveyed along the first 1100 yards in a pipe of two inches diameter, and the declivity is 12 feet 9 inches; from thence the water flows in a pipe of $1\frac{1}{2}$ diameter, with a declivity of 44 feet three inches, making in all 57 feet. When the work was carried as far as the two-inch pipe reached, the discharge was found to be 27 Scotch pints, of $103\frac{1}{2}$ cubic inches each, in a minute. When it was brought into the town, the discharge was 28. Here it is plain that the descent along the second stretch of the pipe could derive no impulsion from the first. This was only able to supply 27 pints, and to *deliver* it into a pipe of equal bore. It was not equivalent to the forcing it into a smaller pipe, and almost doubling its velocity. It must therefore have been *dragged* into this smaller pipe by the weight of what was descending along it, and this water was exerting a force equivalent to a head of 16 inches, increasing the velocity from 14 to about 28.

It must be observed, that if this formula be just, there can be no declivity so small that a current of water will not

Theory.

proves that the smallest declivity will produce a current.

take place in it. And accordingly none has been observed in the surface of a stream when this did not happen. But it also should happen with respect to any declivity of bottom. Yet we know that water will hang on the sloping surface of a board without proceeding further. The cause of this seems to be the adhesion of the water, combined with its viscidity. The viscidity of fluid presents a certain force which must be overcome before any current can take place.

A series of important experiments were made by our author in order to ascertain the relation between the velocity at the surface of any stream and that at the bottom. These are curious and valuable on many accounts. One circumstance deserves our notice here, viz. that *the differences between the superficial and bottom velocities of any stream are proportional to the square roots of the superficial velocities.* From what has been already said on the gradual diminution of the velocities among the adjoining filaments, we must conclude that the same rule holds good with respect to the velocity of separation of two filaments immediately adjoining. Hence we learn that this velocity of separation is in all cases indefinitely small, and that we may, without danger of any sensible error, suppose it a constant quantity in all cases.

A constant part of the accelerating force employed in overcoming the viscidity, &c.

We think, with our ingenious author, that on a review of these circumstances, there is a constant or invariable portion of the accelerating force employed in overcoming this viscidity, and producing this mutual separation of the adjoining filaments. We may express this part of the accelerating force by a part $\frac{1}{S}$ of that slope which constitutes the whole of it. If it were not employed in overcoming this resistance, it would produce a velocity which (on account of this resistance) is not produced, or is lost. This would be $\frac{A}{\sqrt{S}-L\sqrt{S}}$. This must therefore be taken from the velocity exhibited by our general formula. When thus corrected, it would become $V=(\sqrt{d}-0{\cdot}1)\left(\frac{\sqrt{ng}}{\sqrt{s}-L\sqrt{s+1{\cdot}6}}-\frac{\sqrt{ng}}{\sqrt{S}-L\sqrt{S}}\right)$. But as the term $\frac{\sqrt{ng}}{\sqrt{S}-L\sqrt{S}}$ is compounded only of constant quantities, we may express it by a single number. This has been collected from a scrupulous attention to the experiments (especially in canals and great bodies of water moving with very small velocities, in which case the effects of viscidity must become more remarkable), and it appears that it may be valued at $\sqrt{0{\cdot}09}$ inch, or 0·3 inch very nearly.

From the whole of the foregoing considerations, drawn from nature, supported by such reasonings as our most distinct notions of the internal motions will admit, and authorized by a very extensive comparison with experiment, we are now in a condition to conclude a complete formula, expressive of the uniform motion of water, and involving every circumstance which appears to have any share in the operation.

Therefore, let

Formula expressing the uniform motion of water.

V represent the mean velocity, in inches per second, of any current of water, running uniformly, or which is IN TRAIN, in a pipe or open channel, whose section, figure, and slope, are constant, but its length indefinite.

d The hydraulic mean depth, that is, the quotient arising from dividing the section of the channel, in square inches, by its border, expressed in linear inches.

s The reciprocal of the slope of the pipe, or of the surface of the current. It is the denominator of the fraction expressing this slope, the numerator being always unity; and is had by dividing the expanded length of the pipe or channel by the difference of height of its two extremities.

g The velocity (in inches per second) which a heavy body acquires by falling during one second.

n An abstract constant number, determined by experiment to be 243·7.

L The hyperbolic logarithm of the quantity to which it is prefixed, and is had by multiplying the common logarithm of that quantity by 2·3026.

We shall have in every instance

$$V=\frac{\sqrt{ng}\,(\sqrt{d}-0{\cdot}1)}{\sqrt{s}-L\sqrt{s+1{\cdot}6}}-0{\cdot}3\,(\sqrt{d}-0{\cdot}1).$$

This, in numbers, and English inches, is

$$V=\frac{307\,(\sqrt{d}-0{\cdot}1)}{\sqrt{s}-L\sqrt{s+1{\cdot}6}}-0{\cdot}3\,(\sqrt{d}-0{\cdot}1);$$

and in French inches,

$$V=\frac{297\,(\sqrt{d}-0{\cdot}1)}{\sqrt{s}-L\sqrt{s+1{\cdot}6}}-0{\cdot}3\,(\sqrt{d}-0{\cdot}1).$$

The following table contains the real experiments from which this formula was deduced, and the comparison of the real velocities with the velocities computed by the formula. It consists of two principal sets of experiments. The first are those made on the motion of water in pipes. The second are experiments made on open canals and rivers. In the first set, column 1st contains the number of the experiment; 2d, the length of the tube; 3d, the height of the reservoir; 4th, the values of *s*, deduced from columns second and third; 5th gives the observed velocities; and 6th, the velocities calculated by the formula.

In the second set, column 2d gives the area of the section of the channel; 3d, the border of the canal or circumference of the section, deducting the horizontal width, which sustains no friction; 4th, the square root $\sqrt{d}$ of the hydraulic mean depth; 5th, the denominator *s* of the slope; 6th, the observed mean velocities; and 7th, the mean velocities by the formula. In the last ten experiments on large canals and a natural river, the 6th column gives the observed velocities at the surface.[1]

Table taining experi ments which formu deduce

SET I.—EXPERIMENTS ON PIPES.

Experiments by Chevalier de Buat.

Vertical Tube ⅔ of a Line in Diameter, and $\sqrt{d}=0{\cdot}117851$.

No.	Length of Pipe.	Height of Reservoir.	Values of *s*.	Velocities observed.	Velocities calculated
	Inch.	Inch.	Inch.	Inch.	Inch.
1	12	16·166	0·75636	11·704	12·006
2	12	13·125	0·9307	9·753	10·576
Vertical Pipe 1½ Line Diameter, and $\sqrt{d}=0{\cdot}176776$ *Inch.*					
3	34·166	42·166	0·9062	45·468	46·210
4	do.	38·333	0·9951	43·156	43·721
5	do.	36·666	1·0396	42·385	42·612
6	do.	35·333	1·0781	41·614	41·714
The same Pipe Horizontal.					
7	34·166	14·583	2·5838	26·202	25·523
8	do.	9·292	4·0367	21·064	19·882
9	do.	5·292	7·036	14·642	14·447
10	do.	2·083	17·6378	7·320	2·351

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[1] These tables are expressed in French measures. A line is the twelfth part of an inch.

Set I.—*continued.*

Vertical Pipe 2 Lines Diameter, and $\sqrt{d}=0\cdot204124$.

No.	Length of Pipe.	Height of Reservoir.	Values of *s*.	Velocities observed.	Velocities calculated.
	Inch.	Inch.	Inch.	Inch.	Inch.
11	36·25	51·250	0·85451	67·373	64·945
12	do.	45·250	0·96338	59·605	60·428
13	do.	41·916	1·03808	57·220	57·838
14	do.	38·750	1·12047	54·186	55·321
Same Pipe with a slope of $\frac{1}{1\cdot3024}$.					
15	36·25	33·500	1·29174	51·151	50·983
Same Pipe horizontal.					
16	36·25	15·292	2·7901	33·378	33·167
17	do.	8·875	4·76076	25·430	24·553
18	do.	5·292	7·89587	19·940	18·313
19	do.	2·042	20·01637	10·620	10·492
Vertical Pipe $2\frac{9}{10}$ *Lines Diameter, and* $\sqrt{d}=0\cdot245798$.					
20	36·25	53·250	0·95235	85·769	85·201
21	do.	50·250	1·00642	82·471	82·461
22	do.	48·333	1·0444	81·646	80·698
23	do.	48·333	1·0444	79·948	
24	do.	47·916	1·0529	81·027	80·318
25	do.	44·750	1·1241	76·079	77·318
26	do.	41·250	1·2157	73·811	73·904
The same Pipe with the slope $\frac{1}{1\cdot3024}$.					
27	36·25	37·5	1·3323	70·822	70·138
The same Pipe horizontal.					
28	36·25	20·166	2·4303	51·956	50·140
29	do.	9·083	5·2686	33·577	32·442
30	do.	7·361	6·4504	28·658	28·801
31	do.	5	9·3573	23·401	23·195
32	do.	4·916	9·5097	22·989	22·974
33	do.	4·833	9·6652	22·679	22·754
34	do.	3·708	12·4624	19·587	19·550
35	do.	2·713	16·3135	16·631	16·324
36	do.	2·083	21·6639	14·295	14·003
37	do.	1·625	27·5102	12·680	12·115
38	do.	0·833	52·3427	7·577	8·215
Pipes sensibly horizontal, 1 *Inch Diameter,* $\sqrt{d}=0\cdot5$.					
39	117	36	5·6503	84·945	85·524
40	117	26·666	7·48	71·301	72·517
41	138·5	20·950	10·3215	58·808	60·034
42	117	18	10·7880	58·310	58·472
43	138·5	6	33·1962	29·341	29·663
44	737	23·7	33·6658	28·669	29·412
45	do.	14·6	54·2634	21·856	22·056
46	do.	13·7	57·7772	20·970	21·240
47	do.	12·32	64·1573	19·991	19·950
48	do.	8·96	87·8679	16·625	16·543
49	do.	8·96		16·284	
50	do.	7·780	101·0309	15·112	15·232
51	do.	5·93	132·1617	13·315	13·005
52	do.	4·2	186·0037	10·671	10·656
53	do.	4·2		10·441	
54	138·5	0·7	257·8863	8·689	8·824
55	737	0·5	1540·75	3·623	3·218
56	737	0·15	5113·42	1·589	1·647
Experiments by the Abbe Bossut.					
Horizontal Pipe 1 *Inch Diameter,* $\sqrt{d}=0\cdot5$					
57	600	12	54·5966	22·282	21·975
58	600	4	161·312	12·223	11·756

Set I.—*continued.*

Horizontal Pipe $1\frac{1}{3}$ *Inch Diameter,* $\sqrt{d}=0\cdot5774$.

No.	Length of Pipe.	Height of Reservoir.	Values of *s*.	Velocities observed.	Velocities calculated.
	Inch.	Inch.	Inch.	Inch.	Inch.
59	360	24	19·0781	48·534	49·515
60	720	24	33·6166	34·473	35·130
61	360	12	37·0828	33·160	33·106
62	1080	24	48·3542	28·075	28·211
63	1440	24	64·1806	24·004	24·023
64	720	12	66·3020	23·360	23·345
65	1800	24	78·0532	21·032	21·182
66	2160	24	92·9474	18·896	19·096
67	1080	12	95·8756	18·943	18·749
68	1440	12	125·6007	16·128	15·991
69	1800	12	155·4015	14·066	14·119
70	2160	12	185·2487	12·560	12·750
Horizontal Pipe 2·01 *Inch Diameter,* $\sqrt{d}=0\cdot708946$.					
71	360	24	21·4709	58·903	58·803
72	720	24	35·8082	43	43·136
73	360	12	41·2759	40·322	39·587
74	1080	24	50·4119	35·765	35·096
75	1440	24	65·1448	30·896	30·096
76	720	12	70·1426	29·215	28·796
77	1800	24	79·8487	27·470	26·639
78	2160	24	94·7901	27·731	24·079
79	1080	12	99·4979	23·806	23·400
80	1440	12	129·0727	20·707	20·076
81	1800	12	158·7512	18·304	17·788
82	2160	12	188·5172	16·377	16·097
Mr Couplet's Experiments at Versailles.					
Pipe 5 *Inches Diameter,* $\sqrt{d}=1\cdot11803$.					
83	84240	25	3378·26	5·323	5·287
84	do.	24	3518·98	5·213	5·168
85	do.	21·083	4005·66	4·806	4·887
86	do.	16·750	5041·61	4·127	4·225
87	do.	11·333	7450·42	3·154	3·388
88	do.	5·583	15119·96	2·011	2·254
Pipe 18 *Inches Diameter,* $\sqrt{d}=2\cdot12132$.					
89	43200	145·083	304·973	39·159	40·510

SET. II.—EXPERIMENTS WITH A WOODEN CANAL.

Trapezium Canal.

No.	Section of Canal.	Border of Canal.	Values of $\sqrt{d}$.	Values of *s*.	Mean Velocity observed.	Mean Velocity calcul.
	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.
90	18·84	13·06	1·20107	212	27·51	27·19
91	50·60	29·50	1·3096	212	28·92	29·88
92	83·43	26	1·7913	412	27·14	28·55
93	27·20	15·31	1·3329	427	18·28	20·39
94	39·36	18·13	1·4734	427	20·30	22·71
95	50·44	20·37	1·5736	427	22·37	24·37
96	56·43	21·50	1·6201	427	23·54	25·14
97	98·74	28·25	1·8696	432	28·29	29·06
98	100·74	28·53	1·8791	432	28·52	29·23
99	119·58	31·06	1·9622	432	30·16	30·60
100	126·20	31·91	1·9887	432	31·58	31·03
101	130·71	32·47	1·0064	432	31·89	31·32
102	135·32	33·03	1·0241	432	32·32	31·61
103	20·83	13·62	1·2367	1728	8·94	8·58
104	34·37	17	1·4219	1728	9·71	9·98
105	36·77	17·56	1·4471	1728	11·45	10·17
106	42·01	18·69	1·4992	1728	12·34	10·53

SET II.—*continued.*

Rectangular Canal.

No.	Section of Canal.	Border of Canal.	Values of $\sqrt{d}$.	Values of s.	Mean Velocity observed.	Mean Velocity calcul.
	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.
107	34·50	21·25	1·27418	458	20·24	18·66
108	86·25	27·25	1·77908	458	28·29	26·69
109	34·50	21·25	1·27418	929	13·56	11·53
110	35·22	21·33	1·28499	1412	9·20	10·01
111	51·75	23·25	1·49191	1412	12·10	11·76
112	76·19	26·08	1·70921	1412	14·17	13·59
113	105·78	29·17	1·90427	1412	15·55	15·24
114	69	25·25	1·65308	9288	4·59	4·56
115	155·25	35·25	2·09868	9288	5·70	5·86

SET III.—EXPERIMENTS ON THE CANAL OF JARD.

No.	Section of Canal.	Border of Canal.	Values of $\sqrt{d}$.	Values of s.	Velocity obs. at Surface.	Velocity calculated.
116	16252	402	6·3583	8919	17·42	18·77
117	11905	366	5·70320	11520	12·17	14·52
118	10475	360	5·3942	15360	15·74	11·61
119	7858	340	4·8074	21827	9·61	8·38
120	7376	337	4·6784	27648	7·79	7·07
121	6125	324	4·3475	27648	7·27	6·55

Experiments on the River Hayne.

No.	Section of River.	Border of River.	Values of $\sqrt{d}$.	Values of s.	Velocity at Surface.	Velocity (mean) calcul.
122	31498	569	7·43974	6048	35·11	27·62
123	38838	601	8·03879	6413	31·77	28·76
124	30905	568	7·37632	32951	13·61	10·08
125	39639	604	8·10108	35723	15·96	10·53

The theory a well-founded probability.

The comparison must be acknowledged to be most satisfactory, and shows the great penetration and address of the author, in so successfully sifting and appreciating the share which each co-operating circumstance has had in producing the very intricate and complicated effect. It adds some weight to the principles on which he has proceeded in this analysis of the mechanism of hydraulic motion, and must give us great confidence in a theory so fairly established on a very copious induction. The author offers it only as a rational and well-founded probability. To this character it is certainly entitled; for the suppositions made in it are agreeable to the most distant notions we can form of these internal motions. And it must always be remembered, that the investigation of the formula, although it be rendered somewhat more perspicuous by thus having recourse to those motions, has no dependence on the truth of the principles. For it is, in fact, nothing but a classification of experiments, which are grouped together by some one circumstance of slope, velocity, form of section, &c. in order to discover the law of the changes which are induced by a variation of the circumstances which do not resemble. The procedure is precisely similar to that of the astronomer when he deduces the elements of an orbit from a multitude of observations. This was the task of M. de Buat; and he candidly and modestly informs us, that the finding out analytical forms of expression which would exhibit those changes was the work of Mr Benezech de St Honore, a young officer of engineers, and his colleague in the experimental course. It does honour to his skill and address; and we think the whole both a pretty and instructive specimen of the method of discovering the laws of nature in the midst of complicated phenomena. Daniel Bernoulli first gave the rules of this method, and they have been greatly improved by Lambert, Condorcet, and De la Grange. Mr Coulomb has given some excellent examples of their application to the discovery of the laws of friction, of magnetical and electrical attraction, &c. But this present work is the most perspicuous and familiar of them all. It is the empirical method of generalising natural phenomena, and of deducing general rules, of which we can give no other demonstration but that they are faithful representations of matters of fact. We hope that others, encouraged by the success of M. de Buat, will follow this example, where public utility is preferred to a display of mathematical knowledge.

The ex riment highly luable.

Although the author may not have hit upon the precise *modus operandi*, we agree with him in thinking that nature seems to act in a way not unlike what is here supposed. At any rate, the range of experiments is so extensive, and so multifarious, that few cases can occur which are not included among them. The experiments will always retain their value (as we presume that they are faithfully narrated), whatever may become of the theory; and we are confident that the formula will give an answer to any question to which it may be applicable, infinitely preferable to the vague guess of the most sagacious and experienced engineer.

The ve city gi by the mula t large f ordinar works.

We must however observe, that as the experiments on pipes were all made with scrupulous care in the contrivance and execution of the apparatus, excepting only those of Mr Couplet on the main pipes at Versailles, we may presume that the formula gives the greatest velocities which can be expected. In ordinary works, where joints are rough or leaky, where drops of solder hang in the inside, where cocks intervene with deficient water-ways, where pipes have awkward bendings, contractions, or enlargements, and where they may contain sand or air, we should reckon on a smaller velocity than what results from our calculation; and we presume that an undertaker may with confidence promise four fifths of this quantity without any risk of disappointing his employer. We imagine that the actual performance of canals will be much nearer to the formula.

We have made inquiry after works of this kind executed in Britain, that we might compare them with the formula. But all our canals are locked and without motion; and we have only learned by an accidental information from Mr Watt, that a canal in his neighbourhood, which is eighteen feet wide at the surface, and seven feet at the bottom, and four feet deep, and has a slope of one inch in a quarter of a mile, runs with the velocity of seventeen inches per second at the surface, ten at the bottom, and fourteen in the middle. If we compute the motion of this canal by our formula, we shall find the mean velocity to be $13\frac{1}{3}$..

No river in the world has had its motion so much scrutinized as the Po about the end of the last century. It had been a subject of 100 years' continual litigation between the inhabitants of the Bolognese and the Ferrarese, whether the waters of the Rheno should be thrown into the Tronco de Venezia or Po Grande. This occasioned very numerous measures to be taken of its sections and declivity, and the quantities of water which it contained in its different states of fulness. But, unfortunately, the long-established methods of measuring waters which were in force in Lombardy, made no account of the velocity; and not all the entreaties of Castelli, Grandi, and other moderns, could prevail on the visitors in this process to deviate from the established methods. We have therefore no minute accounts of its velocity, though there are many rough estimates to be met with in that valuable collection published at Florence in 1723, of the writings on the motion of rivers. From them we have extracted the *only precise observations* which are to be found in the whole work.

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The Po Grande receives no river from Stellata to the sea, and its slope in that interval is found most surprisingly uniform, namely, six inches in the mile (reduced to English measure). The breadth in its great freshes is 759 feet at Lago Scuro, with a very uniform depth of thirty-one feet. In its lowest state (in which it is called *Po Magra*), its breadth is not less than 700, and its depth about ten and a half.

The Rheno has a uniform declivity from the Ponte Emilio to Vigarano of fifteen inches per mile. Its breadth in its greatest freshes is 189 feet, and its depth nine.

Signor Corrade in his report says, that in the state of the great freshes the velocity of the Rheno is most exactly four fifths of that of the Po.

Grandi says, that, according to many observations of his own, a great fresh in the Rheno employs twelve hours to come from Ponte Emilio to Vigarano, which is thirty miles. This is a velocity of forty-four inches per second. And, by Corrade's proportion, the velocity of the Po Grande must be fifty-five inches per second.

Montanari's observation gives the Po Magra a velocity of thirty-one inches per second.

Let us compare these velocities with the velocities calculated by Buat's formula.

The hydraulic mean depths d and D of the Rheno and Po in the great freshes, deduced from the above measures, are 98·6 and 344 inches; and their slopes s and S are $\frac{1}{4223}$ and $\frac{1}{10360}$. This will give

$$\frac{307\,(\sqrt{\mathrm{D}}-0{\cdot}1)}{\sqrt{\mathrm{S}}-\mathrm{L}\sqrt{\mathrm{S}+1{\cdot}6}}-0{\cdot}3\,(\sqrt{\mathrm{D}}-0{\cdot}1)=52{\cdot}176 \text{ inches, and}$$

$$\frac{307\,(\sqrt{d}-0{\cdot}1)}{\sqrt{s}\,\mathrm{L}\sqrt{s+1{\cdot}6}}-0{\cdot}3\,(\sqrt{d}-0{\cdot}1)=46{\cdot}727 \text{ inches.}$$

These results differ very little from the velocities above mentioned. And if the velocity corresponding to a depth of thirty-one feet be deduced from that observed by Montanari in the Po Magra ten feet deep, on the supposition that they are in the proportion of $\sqrt{d}$, it will be found to be about fifty-three and a half inches per second.

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This comparison is therefore highly to the credit of the theory, and would have been very agreeable to M. de Buat, had he known it, as we hope it is to our readers.

We have collected many accounts of water-pipes, and made the comparisons, and we flatter ourselves that these have enabled us to improve the theory. They shall appear in their proper place; and we may just observe here, that the two-inch pipe, which we formerly spoke of as conveying the water to Dunbar, should have yielded only $25\frac{2}{3}$ Scotch pints per minute by the formula, instead of 27; a small error.

We have, therefore, no hesitation in saying, that this single formula of the uniform motion of water is one of the most valuable presents which natural science and the arts have received during the course of this century.

A table containing the values of $\frac{307}{\sqrt{s}-\mathrm{L}\sqrt{s+1{\cdot}6}}$ ready calculated for every declivity that can occur in water-pipes, canals, or rivers, is given in the article WATER-WORKS. Aided by this, which supersedes the only difficult part of the computation, a person can calculate the velocity for any proposed case in less than five minutes.

We have now established in some measure a THEORY OF HYDRAULICS, by exhibiting a general theorem which expresses the relation of the chief circumstances of all such motions as have attained a state of permanency, in so far as this depends on the magnitude, form, and slope of the channel. This permanency we have expressed by the term TRAIN, saying that the stream is *in train*.

We proceed to consider the subordinate circumstances contained in this theorem; such as, 1st, The forms which nature or art may give to the bed of a running stream, and the manner of expressing this form in our theorem. 2d, The gradations of the velocity, by which it decreases in the different filaments, from the axis or most rapid filament to the border; and the connection of this with the mean velocity, which is expressed by our formula. 3d, Having acquired some distinct notions of this, we shall be able to see the manner in which undisturbed nature works in forming the beds of our rivers, the forms which she affects, and which we must imitate in all their local modifications, if we would secure that permanency which is the evident aim of all her operations. We shall here learn the mutual action of the current and its bed, and the circumstances which insure the stability of both. These we may call the *regimen* or the *conservation* of the stream, and may say that it is *in regimen*, or *in conservation*. This has a relation, not to the dimensions and the slope alone, or to the accelerating force and the resistance arising from mere inertia; it respects immediately the tenacity of the bed, and is different from *the train*.

Regimen
of streams,
what.

4th, These pieces of information will explain the deviation of rivers from the rectilineal course, the resistance occasioned by these deviations, and the circumstances on which the regimen of a winding stream depends.

§ 1. *Of the Forms of the Channel.*

The semi-
circular
form most
favourable
to motion,

The numerator of the fraction which expresses the velocity of a river in train has $\sqrt{d}$ for one of its factors. That form, therefore, is most favourable to the motion which gives the greatest value to what we have called the hydraulic mean depth d. This is the prerogative of the semicircle, and here d is equal to half the radius; and all other figures of the same area are the more favourable, as they approach nearer to a semicircle. This is the form, therefore, of all conduit-pipes, and should be taken for aqueducts which are built of masonry. Ease and accuracy of execution, however, have made engineers prefer a rectangular form; but neither of these will do for a channel formed out of the ground. We shall soon see that the semicircle is incompatible with a regimen; and if we proceed through the regular polygons, we shall find that the half hexagon is the only one which has any pretensions to a regimen; yet experience shows us, that even its banks are too steep for almost any soil. A dry earthen bank, not bound together by grass roots, will hardly stand with a slope of forty-five degrees; and a canal which conveys running waters will not stand with this slope. Banks whose base is to their height as four to three will stand very well in moist soils, and this is a slope very usually given. This form is even affected in the spontaneous operations of nature, in the channels which she digs for the rills and rivulets in the higher and steeper grounds.

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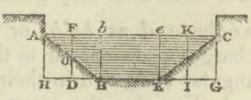
This form has some mathematical and mechanical properties which entitle it to some further notice. Let ABEC (fig. 12) be such a trapezium, and AHGC the rectangle of equal width and depth. Bisect HB and EG by the verticals FD and KI, and draw the verticals bB, eE. Because AH : HB = 3 : 4, we have AB = 5, and BD = 2, and FD = 3, and BD + DF = BA. From these premises it follows, that the trapezium ABEC has the same area with the rectangle FDIK; for HB being bisected in D, the triangles AOF, BOD are equal. Also the border ABEC, which is touched by the passing stream, is equal to FDIK.

Fig. 12.



Therefore the mean depth, which is the quotient of the area divided by the border, is the same in both; and this is the case, whatever is the width BE at the bottom, or even though there be no rectangle such as *b*BE*e* interposed between the slant sides.

Best form of a channel.

Of all rectangles, that whose breadth is twice the height, or which is half of a square, gives the greatest mean depth. If, therefore, FK be double of FD, the trapezium ABEC, which has the same area, will have the largest mean depth of any such trapezium, and will be the best form of a channel for conveying running waters. In this case, we have AC = 10, AH = 3, and BE = 2. Or we may say that the best form is a trapezium, whose bottom width is $\frac{2}{3}$ of the depth, and whose extreme width is $\frac{10}{3}$. This form approaches very near to that which the torrents in the hills naturally dig for themselves in uniform ground, where their action is not checked by stones which they lay bare, or which they deposit in their course. This shows us, and it will be fully confirmed by and by, that the channel of a river is not a fortuitous thing, but has a relation to the consistency of the soil and velocity of the stream.

A rectangle, whose breadth is $\frac{4}{3}$ of the depth of water, will therefore have the same depth with a triangle whose surface width is $\frac{8}{3}$ of its vertical depth; for this is the dimensions when the rectangle *b*BE*e* is taken away.

Let A be the area of the section of any channel, w its width (when rectangular), and h its depth of water. Then what we have called its mean depth, or d, will be $\frac{A}{w+2h}$, $= \frac{wh}{w+2h}$. Or if q expresses the ratio of the width to the depth of a rectangular bed, that is, if $q = \frac{w}{h}$, we have a very simple and ready expression for the mean depth, either from the width or depth. For $d = \frac{w}{q+2}$, or $d = \frac{qh}{q+2}$.

Therefore, if the depth were infinite, and the width finite, we should have $d = \frac{w}{2}$; or if the width be infinite, and the depth finite, we have $d = h$. And these are the limits of the values of d; and therefore in rivers whose width is always great in comparison of the depth, we may without much error take their real depth for their hydraulic mean depth. Hence we derive a rule of easy recollection, and which will at all times give us a very near estimate of the velocity and expense of a running stream, viz. *that the velocities are nearly as the square roots of the depths.* We find this confirmed by many experiments of Michelotti.

Estimate of the expense of a running stream.

Also, when we are allowed to suppose this ratio of the velocities and depths, that is, in a rectangular canal of great breadth and small depth, we shall have the quantities discharged nearly in the proportion of the cubes of the velocities. For the quantity discharged d is as the velocity and area jointly, that is, as the height and velocity jointly, because when the width is the same the area is as the height. Therefore, we have $d \doteq hv$. But, by the above remark, $h \doteq v^2$. Therefore, $d \doteq v^3$; and this is confirmed by the experiments of Bossut, vol. ii. 236. Also, because d is as vh, when w is constant, and by the above remark (allowable when w is very great in proportion to h) v is as $\sqrt{h}$, we have d as $h\sqrt{h}$, or $h^{\frac{3}{2}}$, or the squares of the discharges proportional to the cubes of the heights in rectangular beds, and in their corresponding trapeziums.

The

Rules finding dimen

1. Knowing the mean depth and the proportion of the width and real depth, we can determine the dimensions of the bed, and we have $w = qd + 2d$, and $h = d + \frac{2d}{q}$.

2. If we knew the area and mean depth, we can in like manner find the dimensions, that is, w and h; for $A = wh$, and $d = \frac{wh}{w+2h}$; therefore $w = \pm\sqrt{\frac{A^2}{4d^2} - 2A} + \frac{A}{2d}$.

3. If d be known, and one of the dimensions be given, we can find the other; for $d = \frac{wh}{w+2h}$ gives $w = \frac{2hd}{h-d}$, and $h = \frac{wd}{w-2d}$.

mean depth

4. If the velocity V and the slope s for a river in train be given, we can find the mean depth; for $V = \left(\frac{307}{\sqrt{s} - L\sqrt{s+1{\cdot}6}} - 0{\cdot}3\right)(\sqrt{d} - 0{\cdot}1)$. Whence we deduce $\sqrt{d} - 0{\cdot}1 = \frac{V}{\frac{307}{\sqrt{s} - L\sqrt{s+1{\cdot}6})} - 0{\cdot}3}$, and $\sqrt{d} =$ to this quantity $+ 0{\cdot}1$.

slope

5. We can deduce the slope which will put in train a river whose channel has given dimensions. We make $\frac{307(\sqrt{d} - 0{\cdot}1)}{V + 0{\cdot}3(\sqrt{d} - 0{\cdot}1)} = \sqrt{s}$. This should be $= \sqrt{s} - L\sqrt{s+1{\cdot}6}$, which we correct by trials, which will be exemplified when we apply these doctrines to practice.

Having thus established the relation between the different circumstances of the form of the channel to our general formula, we proceed to consider,

§ 2. *The Gradations of Velocity from the middle of the Stream to the sides.*

The knowledge of this is necessary for understanding the regimen of a river; for it is the velocity of the filaments in contact with the bed which produces any change in it, and occasions any preference of one to another in respect of regimen or stability. Did these circumstances not operate, the water, true to the laws of hydraulics, and confined within the bounds which have been assigned them, would neither enlarge nor diminish the area of the channel. But this is all that we can promise of waters perfectly clear, running in pipes or hewn channels. But rivers, brooks, and smaller streams, carry along waters loaded with mud or sand, which they deposit wherever their velocity is checked; and they tear up, on the other hand, the materials of the channel wherever their velocity is sufficiently great. Nature, indeed, aims continually at an equilibrium, and works without ceasing to perpetuate her own performances, by establishing an equality of action and re-action, and proportioning the forms and direction of the motions to her agents, and to local circumstances. Her work is slow but unceasing; and what she cannot accomplish in a year she will do in a century. The beds of our rivers have acquired some stability, because they are the labour of ages; and it is to time that we owe those deep and wide valleys which receive and confine our rivers in channels, which are now consolidated, and with slopes which have been gradually moderated, so that they no longer either ravage our habitations or confound our boundaries. Art may imitate nature, and, by directing her operations (which she still carries on according to her own imprescriptible laws) according to our views, we can hasten her progress, and accomplish our purpose, during the short period of human life. But we can do this only by studying the unalterable laws of mechanism. These are presented to us by spontaneous nature. Fre-

Natur be imi in mal artific stream

quently we remain ignorant of their foundation; but it is not necessary for the prosperity of the subject that he have the talents of the senator; he can profit by the statute without understanding its grounds. It is so in the present instance. We have not as yet been able to infer the law of retardation observed in the filaments of a running stream from any sound mechanical principle. The problem, however, does not appear beyond our powers, if we assume, with Sir Isaac Newton, that the velocity of any particular filament is the arithmetical mean between those of the filaments immediately adjoining. We may be assured, that the filament in the axis of an inclined cylindrical tube, of which the current is in train, moves the fastest, and that all those in the same circumference round it are those which glide along the pipe. We may affirm the same thing of the motions in a semicylindrical inclined channel conveying an open stream. But even in these we have not yet demonstrated the ratio between the extreme velocities, nor in the different circles. This must be decided experimentally.

And here we are under great obligations to M. de Buat. He has compared the velocities in the axes of a prodigious number and variety of streams, differing in size, form, slope, and velocity, and has computed in them all the mean velocities, by measuring the quantities of water discharged in a given time. His method of measuring the bottom velocity was simple and just. He threw in a gooseberry, as nearly as possible of the same specific gravity with the water. It was carried along the bottom almost without touching it. See Resistance of Fluids, p. 180.

He discovered the following laws: 1. In small velocities the velocity in the axis is to that at the bottom in a ratio of considerable inequality. 2. This ratio diminishes as the velocity increases, and in very great velocities approaches to the ratio of equality. 3. What was most remarkable was, that neither the magnitude of the channel, nor its slope, had any influence in changing this proportion, while the mean velocity remained the same. Nay, though the stream ran on a channel covered with pebbles or coarse sand, no difference worth noticing was to be observed from the velocity over a polished channel. 4. And if the velocity in the axis is constant, the velocity at the bottom is also constant, and is not affected by the depth of water or magnitude of the stream. In some experiments the depth was thrice the width, and in others the width was thrice the depth. This changed the proportion of the magnitude of the section to the magnitude of the rubbing part, but made no change on the ratio of the velocities. This is a thing which no theory could point out.

Another most important fact was also the result of his observation, viz. that *the mean velocity in any pipe or open stream is the arithmetical mean between the velocity in the axis and the velocity at the sides of a pipe or bottom of an open stream.* We have already observed, that the ratio of the velocity in the axis to the velocity at the bottom diminished as the mean velocity increased. This variation he was enabled to express in a very simple manner, so as to be easily remembered, and to enable us to tell any one of them by observing another.

If we take unity from the square root of the superficial velocity, expressed in inches, the square of the remainder is the velocity at the bottom; and the mean velocity is the half sum of these two. Thus, if the velocity in the middle of the stream be 25 inches per second, its square root is five; from which if we take unity, there remains four. The square of this, or 16, is the velocity at the bottom, and $\frac{25 + 16}{2}$, or $20\frac{1}{2}$, is the mean velocity.

This is a very curious and most useful piece of information. The velocity in the middle of the stream is the easiest measured of all, by any light small body floating down; and the mean velocity is the one which regulates the train, the discharge, the effect on machines, and all the most important consequences.

Theory.

We may express this by a formula of most easy recollection. Let V be the mean velocity, v the velocity in the axis, and u the velocity at the bottom; we have

expressed by a formula.

$$u = (\sqrt{v} - 1)^2, \text{ and } V = \frac{v + u}{2}.$$

Also $v = (\sqrt{V - \frac{1}{4}} + \frac{1}{2})^2$, and $v = (\sqrt{u} + 1)^2$.

$$V = (\sqrt{v} - \tfrac{1}{2})^2 + \tfrac{1}{4}, \text{ and } V = (\sqrt{u} + \tfrac{1}{2})^2 + \tfrac{1}{4}.$$

$$u = (\sqrt{v} - 1)^2, \text{ and } u = (\sqrt{V - \tfrac{1}{4}} - \tfrac{1}{2})^2.$$

Also $v - u = 2\sqrt{V - \frac{1}{4}}$ and $v - V, = V - u, = \sqrt{V - \frac{1}{4}}$; that is, the difference between these velocities increases in the ratio of the square roots of the mean velocities diminished by a small constant quantity.[1]

This may perhaps give the mathematicians some help in ascertaining the law of degradation from the axis to the sides. Thus, in a cylindrical pipe, we may conceive the current as consisting of an infinite number of cylindrical shells sliding within each other like the draw-tubes of a spy-glass. Each of these is in equilibrio, or as much accelerated by the one within it as it is retarded by the one without; therefore, as the *momentum* of each diminishes in the proportion of its diameter (the thickness being supposed the same in all), the velocity of separation must increase by a certain law from the sides to the axis. The magnitude of the small constant quantity here spoken of seems to fix this law.

Place of the mean velocity not discovered.

The place of the mean velocity could not be discovered with any precision. In moderate velocities it was not more than one fourth or one fifth of the depth distant from the bottom. In very great velocities it was sensibly higher, but never in the middle of the depth.

The knowledge of these three velocities is of great importance. The superficial velocity is easily observed, hence the mean velocity is easily computed. This multiplied by the section gives the expense; and if we also measure the expanded border, and then obtain the mean depth (or $\sqrt{d}$), we can, by the formula of uniform motion, deduce the slope, or, knowing the slope, we can deduce any of the other circumstances.

The following table of these three velocities will save the trouble of calculation in one of the most frequent questions of hydraulics.

Velocity in Inches.			Velocity in Inches.		
Surface.	Bottom.	Mean.	Surface.	Bottom.	Mean.
1	0·000	0·5	16	9·	12·5
2	0·172	1·081	17	9·753	13·376
3	0·537	1·768	18	10·463	14·231
4	1·	2·5	19	11·283	15·141
5	1·526	3·263	20	12·055	16·027
6	2·1	4·050	21	12·674	16·837
7	2·709	4·854	22	13·616	17·808
8	3·342	5·67	23	14·402	18·701
9	4·	6·5	24	15·194	19·597
10	4·674	7·337	25	16·	20·5
11	5·369	8·184	26	16·802	21·401
12	6·071	9·036	27	17·606	22·303
13	6·786	9·893	28	18·421	23·210
14	7·553	10·756	29	19·228	24·114
15	8·254	11·622	30	20·044	25·022

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[1] In these formulæ, and in the following table, the velocities are understood to be expressed in French inches.

Theory.

Velocity in Inches.			Velocity in Inches.		
Surface.	Bottom.	Mean.	Surface.	Bottom.	Mean.
31	20·857	25·924	66	50·751	58·376
32	21·678	26·839	67	51·639	59·319
33	22·506	27·753	68	52·505	60·252
34	23·339	28·660	69	53·392	61·196
35	24·167	29·583	70	54·273	62·136
36	25·	30·5	71	55·145	63·072
37	25·827	31·413	72	56·025	64·012
38	26·667	32·338	73	56·862	64·932
39	27·51	33·255	74	57·790	65·895
40	28·345	34·172	75	58·687	66·843
41	29·192	35·096	76	59·568	67·784
42	30·030	36·015	77	60·451	68·725
43	30·880	36·940	78	61·340	69·670
44	31·742	37·871	79	62·209	70·605
45	32·581	38·790	80	63·107	71·553
46	33·432	39·716	81	64·	72·5
47	34·293	40·646	82	64·883	73·441
48	35·151	41·570	83	65·780	74·390
49	36·	42·5	84	66·651	75·325
50	36·857	43·428	85	67·568	76·284
51	37·712	44·356	86	68·459	77·229
52	38·564	45·282	87	69·339	78·169
53	39·438	46·219	88	70·224	79·112
54	40·284	47·142	89	71·132	80·066
55	41·165	48·082	90	72·012	81·006
56	42·016	49·008	91	72·915	81·957
57	42·968	49·984	92	73·788	82·894
58	43·771	50·886	93	74·719	83·859
59	44·636	51·818	94	75·603	84·801
60	45·509	52·754	95	76·51	85·755
61	46·376	53·688	96	77·370	86·685
62	47·259	54·629	97	78·305	87·652
63	48·136	55·568	98	79·192	88·596
64	49·	56·5	90	80·120	89·56
65	49·872''	57·436	100	81·	90·5

The knowledge of the velocity at the bottom is of the greatest use for enabling us to judge of the action of the stream on its bed; and we shall now make some observations on this particular.

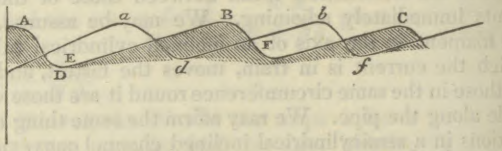
Operation of the stream on its bed,

Every kind of soil has a certain velocity consistent with the stability of the channel. A greater velocity would enable the waters to tear it up, and a smaller velocity would permit the deposition of more moveable materials from above. It is not enough, then, for the stability of a river, that the accelerating forces are so adjusted to the size and figure of its channel that the current may be in train: it must also be in equilibrio with the tenacity of the channel.

We learn from observation, that a velocity of three inches per second at the bottom will just begin to work upon fine clay fit for pottery, and however firm and compact it may be, it will tear it up. Yet no beds are more stable than clay when the velocities do not exceed this: for the water soon takes away the impalpable particles of the superficial clay, leaving the particles of sand sticking by their lower half in the rest of the clay, which they now protect, making a very permanent bottom, if the stream does not bring down gravel or coarse sand, which will rub off this very thin crust, and allow another layer to be worn off. A velocity of six inches will lift fine sand; eight inches will lift sand as coarse as linseed; twelve inches will sweep along fine gravel; twenty-four inches will roll along rounded pebbles an inch diameter; and it requires three feet per second at the bottom to sweep along shivery angular stones of the size of an egg.

The manner in which unwearied nature carries on some of these operations is curious, and deserves to be a little noticed. All must recollect the narrow ridges or wrinkles which are left on the sand by a temporary fresh or stream. They are observed to lie across the stream, and each ridge consists of a steep face AD, BF (fig. 13), which looks down the stream, and a gentler slope DB, FC, which connects this with the next ridge.

Fig. 13.



As the stream comes over the first steep AD, it is directed almost perpendicularly against the point E immediately below D, and thus it gets hold of a particle of coarse sand, which it could not have detached from the rest had it been moving parallel to the surface of it. It easily rolls it up the gentle slope EB; arrived there, the particle tumbles over the ridge, and lies close at the bottom of it at F, where it is protected by the little eddy, which is formed in the very angle; other particles lying about E are treated in the same way, and, tumbling over the ridge B, cover the first particle, and now protect it effectually from any farther disturbance. The same operation is going on at the bottom of each ridge. The brow or steep of the ridge gradually advances down the stream, and the whole set change their places, as represented by the line *adbf*; and after a certain time the particle which was deposited in F is found in an unprotected situation, as it was in E, and it now makes another step down the stream.

The Abbé Bossut found, that when the velocity of the stream was just sufficient for lifting the sand (and a small excess hindered the operation altogether), a ridge advanced about twenty feet in a day.

Since the current carries off the most moveable matters of the channel, it leaves the bottom covered with the remaining coarse sand, gravel, pebbles, and larger stones. To these are added many which come down the stream while it is more rapid, and also many which roll in from the sides as the banks wear away. All these form a bottom much more solid and immoveable than a bottom of the medium soil would have been. But this does not always maintain the channel in a permanent form, but frequently occasions great changes, by obliging the current, in the event of any sudden fresh or swell, to enlarge its bed, and even to change it altogether, by working to the right and to the left, since it cannot work downwards. It is generally from such accumulation of gravel and pebbles in the bottom of the bed that rivers change their channels.

It remains to ascertain, in absolute measures, the force which a current really exerts in attempting to drag along with it the materials of its channel; and which *will* produce this effect unless resisted by the inertia of these materials. It is therefore of practical importance to know this force.

Nor is it abstruse or difficult. For when a current is in train, the accelerating force is in equilibrio with the resistance, and is therefore its immediate measure. Now this accelerating force is precisely equal to the weight of the body of water in motion multiplied by the fraction which expresses the slope. The mean depth being equal to the quotient of the section divided by the border, the section is equal to the product of the mean depth multiplied by the border. Therefore, calling the border b, and the mean depth d, we have the section $= db$. The body of water in motion is therefore dbs (because s was the slant length of a part whose difference of elevation is 1), and the accelerating force is $dbs \times \frac{1}{s}$, or db. But if we would only consider this resistance as corresponding to an unit of the length of the channel, we must divide the quantity db by s, and the resistance is then $\frac{db}{s}$. And if we would consider the resistance only for an unit of the border, we must divide this expression by b; and thus this resistance (taking an inch for the unit) will be expressed for one square inch of the bed by the weight of a bulk of water which has a square inch for its base, and $\frac{d}{s}$ for its height. And lastly, if E be taken for any given superficial extent of the channel or bed, and F the obstruction, which we consider as a sort of friction, we shall have $F = \frac{Ed}{s}$.

Thus, let it be required to determine in pounds the resistance or friction on a square yard of a channel whose current is in train, which is ten feet wide, four feet deep, and has a slope of one foot in a mile. Here E is nine feet. Ten feet width and four feet depth give a section of forty feet. The border is eighteen feet. Therefore $d = \frac{40}{18} = 2{\cdot}2222$, and s is 5280. Therefore the friction is the weight of a column of water whose base is nine feet, and height $\frac{2{\cdot}2222}{5280}$, or nearly $3\frac{6}{10}$ ounces avoirdupois.

§ 3. *Settlement of the Beds of Rivers.*

He who looks with a careless eye at a map of the world, is apt to consider the rivers which ramble over its surface as a chance-medley disposition of the drainers which carry off the waters. But it will afford a most agreeable object to a considerate and contemplative mind to take it up in this very simple light; and, having considered the many ways in which the drenched surface might have been cleared of the superfluous waters, to attend particularly to the very way which nature has followed. In pursuing the troubled waters of a mountain torrent, or the pure streams which trickle from their bases, till he sees them swallowed up in the ocean, and in attending to the many varieties in their motions, he will be delighted with observing how the simple laws of mechanism are made so fruitful in good consequences, both by modifying the motions of the waters themselves, and also by inducing new forms on the surface of the earth, fitted for re-acting on the waters, and producing those very modifications of their motions which render them so beneficial. The permanent beds of rivers are by no means fortuitous gutters hastily scooped out by dashing torrents; but both they and the valleys through which they flow are the patient but unceasing labours of nature, prompted by goodness and directed by wisdom.

Whether we trace a river from the torrents which collect the superfluous waters of heaven, or from the springs which discharge what would otherwise be condemned to perpetual inactivity, each feeder is but a little rill, which could not ramble far from its scanty source among growing plants and absorbent earth, without being sucked up and evaporated, did it not meet with other rills in its course. When united, they form a body of water still inconsiderable, but much more able, by its bulk, to overcome the little obstacles to its motion; and the rivulet then moves with greater speed, as we have now learned. At the same time, the surface exposed to evaporation and absorption is diminished by the union of the rills. Four equal rills have only the surface of two when united. Thus the portion which escapes arrestment, and travels downward, is continually increasing. This is a happy adjustment to the other operations of nature. Were it otherwise, the lower and more valuable countries would be loaded with the passing waters in addition to their own surplus rains, and the immediate neighbourhood of the sea would be almost covered by the drains of the interior countries. But, fortunately, those passing waters occupy less room as they advance, and by this wise employment of the most simple means, not only are the superfluous waters drained off from our fertile fields, but the drains themselves become an useful part of the country by their magnitude. They become the habitation of a prodigious number of fishes, which share the Creator's bounty; and they become the means of mutual communication of all the blessings of cultivated society. The vague ramblings of the rivers scatter them over the face of the country, and bring them to every door. It is not even an indifferent circumstance, that they gather strength to cut out deep beds for themselves. By this means they cut open many springs. Without this, the produce of a heavy shower would make a swamp which would not dry up in many days. And it must be observed, that the same heat which is necessary for the vigorous growth of useful plants will produce a very copious evaporation. This must return in showers much too copious for immediate vegetation, and the overplus would be destructive. Is it not pleasant to contemplate this adjustment of the great operations of nature, so different from each other, that if chance alone directed the detail, it was almost an infinite odds that the earth would be uninhabitable?

Theory.

Their effect on the countries through which they pass.

But let us follow the waters in their operations, and note the face of the countries through which they flow. Attending to the breadth, the depth, and the slope of the valleys, we shall be convinced that their present situation is extremely different from what it was in ancient days; and that the valleys themselves are the works of the rivers, or at least of waters which have descended from the heights, loaded with all the lighter matters which they were able to bring away with them. The rivers now flow in beds which have a considerable permanency; but this has been the work of ages. This has given stability, both by filling up and smoothing the valleys, and thus lessening the changing causes, and also by hardening the beds themselves, which are now covered with aquatic plants, and lined with the stones, gravel, and coarser sand, out of which all the lighter matters have been washed away.

The surface of the high grounds is undergoing a continual change; and the ground on which we now walk is by no means the same which was trodden by our remote ancestors. The showers from heaven carry down into the valleys, or sweep along by the torrents, a part of the soil which covers the heights and steeps. The torrents carry this soil into the brooks, these deliver part of it into the great rivers, and these discharge this fertilizing fat of the earth into the sea, where it is swallowed up, and for ever lost for the purposes of vegetation. Thus the hillocks lose of their height, the valleys are filled up, and the mountains are laid bare and show their naked precipices, which formerly were covered over with flesh and skin, but now look like the skeleton of this globe. The low countries, raised and nourished for some time by the substance of the high lands, will go in their turn to be buried in the ocean; and then the earth, reduced to a dreary flat, will become an immense uninhabitable mass. This catastrophe is far distant, because this globe is in its youth, but it is not the less certain; and the united labours of the human race could not long protract the term.

But, in the mean time, we can trace a beneficent purpose, and a nice adjustment of seemingly remote circumstances. The grounds near the sources of all our rivers are indeed gradually stripped of their most fertile ingredi-

Theory.

Beneficence displayed in the changes they produce.

ents. But had they retained them for ages, the sentient inhabitants of the earth, or at least the nobler animals, with man at their head, would not thence have derived much advantage. The general laws of nature produce changes in our atmosphere which must ever render these great elevations unfruitful. That genial warmth, which is equally necessary for the useful plant as for the animal which lives on it, is confined to the lower grounds. The earth, which on the top of Mount Hæmus could only bring forth moss and dittany, when brought into the gardens of Spalatro produced pot-herbs so luxuriant, that Diocletian told his colleague Maximian that he had more pleasure in their cultivation than the Roman empire could confer. Thus nature not only provides us manure, but conveys it to our fields. She even keeps it safe in store for us till it shall be wanted. The tracts of country which are but newly inhabited by man, such as great part of America, and the newly-discovered regions of Terra Australis, are still almost occupied by marshes and lakes, or covered with impenetrable forests; and they would remain long enough in this state, if population, continually increasing, did not increase industry, and multiply the hands of cultivators along with their necessities. The Author of Nature was alone able to form the huge ridges of the mountains, to model the hillocks and the valleys, to mark out the courses of the great rivers, and give the first trace to every rivulet; but has left to man the task of draining his own habitation and the fields which are to support him, because this is a task not beyond his powers. It was therefore of immense advantage to him that those parts of the globe into which he has not yet penetrated should remain covered with lakes, marshes, and forests, which keep in store the juice of the earth, which the influence of the air and the vivifying warmth of the sun would have expended long ere now in useless vegetation, and which the rains of heaven would have swept into the sea, had they not been thus protected by their situation or their cover. It is therefore the business of man to open up these mines of hoarded wealth, and to thank the Author of all good, who has thus husbanded them for his use, and left them as a rightful heritage for those of after days.

The earth had not in the remote ages, as in our day, those great canals, those capacious voiders, always ready to drain off the rain-waters (of which only part is absorbed by the thirsty ground) and the pure waters of the springs from the foot of the hills. The rivers did not then exist, or were only torrents, whose waters, confined by the gulleys and glens, are searching for a place to escape. Hence arise those numerous lakes in the interior of great continents, of which there are still remarkable relics in North America, which in process of time will disappear, and become champaign countries. The most remote from the sea, unable to contain its waters, finds an issue through some gorge of the hills, and pours over its superfluous waters into a lower basin, which, in its turn, discharges its contents into another, and the last of the chain delivers its waters by a river into the ocean. The communication was originally begun by a simple overflowing at the lowest part of the margin. This made a torrent, which quickly deepened its bed; and this circumstance increasing its velocity, as we have seen, would extend this deepening backward to the lake, and draw off more of its waters. The work would go on rapidly at first, while earth and small stones only resisted the labours of nature; but these being washed away, and the channel hollowed out to the firm rock on all sides, the operation must go on very slowly, till the immense cascade shall undermine what it cannot break off, and then a new discharge will commence, and a quantity of flat ground will emerge all round the lake. The torrent, in the mean time, makes its way down the country, and digs a canal, which may be called the first sketch of a river, which will deepen and widen its bed continually. The water of several basins united, and running together in a great body, will, according to the principles which we have established, have a much greater velocity, with the same slope, than those of the lakes in the interior parts of the continent; and the sum of them all united in the basin next the sea, after having broken through its natural mound, will make a prodigious torrent, which will dig for itself a bed so much the deeper as it has more slope and a greater body of waters.

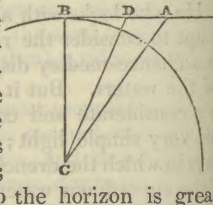
The formation of the first valleys, by cutting open many springs which were formerly concealed under ground, will add to the mass of running waters, and contribute to drain off the waters of these basins. In course of time many of them will disappear, and flat valleys among the mountains and hills are the traces of their former existence.

When nature thus traces out the courses of future rivers, it is to be expected that those streams will most deepen their channels which in their approach to the sea receive into their bed the greatest quantities of rain and spring-waters, and that towards the middle of the continent they will deepen their channels less. In these last situations the natural slope of the fields causes the rain-water, rills, and the little rivulets from the springs, to seek their ways to the rivers. The ground can sink only by the flattening of the hills and high grounds; and this must proceed with extreme slowness, because it is only the gentle though incessant work of the rains and springs. But the rivers, increasing in bulk and strength, and of necessity flowing over every thing, form to themselves capacious beds in a more yielding soil, and dig them even to the level of the ocean.

Beds river form one ed pa

The beds of rivers by no means form themselves in one inclined plane. If we should suppose a canal AB (fig. 14) perfectly straight and horizontal at B, where it joins with the sea, this canal would really be an inclined channel of greater and greater slope as it is farther from B. This is evident; because gravity is directed towards the centre of the earth, and the angle CAB contained between the channel and the plumb-line at A is smaller than the similar angle CDB; and consequently the inclination to the horizon is greater in A than in D. Such a canal, therefore, would make the bed of a river; and some have thought that this was the real form of nature's work; but the supposition is a whim, and it is false. No river has a slope at all approaching to this. It would be eight inches declivity in the mile next the ocean, twenty-four inches in the second mile, forty inches in the third, and so on in the duplicate ratio (for the whole elevation) of the distances from the sea. Such a river would quickly tear up its bed in the mountains (were there any grounds high enough to receive it), and, except its first cascade, would soon acquire a more gentle slope. But the fact is, and it is the result of the imprescriptible laws of nature, that the continued track of a river is a succession of inclined channels, whose slope diminishes by steps as the river approaches to the sea. It is not enough to say that this results from the natural slope of the countries through which it flows, which we observe to increase in declivity as we go to the interior parts of the continent. Were it otherwise, the equilibrium at which nature aims in all her operations would still produce the gradual diminution of the slope of rivers. Without it they could not be in a permanent train.

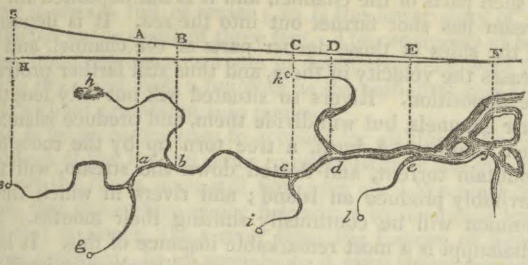
Fig. 14.



How perm cours river tablis

That we may more easily form a notion of the manner in which the permanent course of a river is established, let us suppose a stream or rivulet $s\,a$ (fig. 15) far up the country, makes its way through a soil perfectly uniform to the sea, taking the course $s\,a\,b\,c\,d\,e\,f$, and receiving the *permanent additions* of the stream $g\,a$, $h\,b$, $i\,c$, $k\,d$, $l\,e$, and that its velocity and slope in all its parts are so suited to the tenacity

Fig. 15.



of the soil and magnitude of its section, that neither do its waters during the annual freshes tear up its banks or deepen its bed, nor do they bring down from the high lands materials which they deposit in the channel in times of smaller velocity. Such a river may be said to be in a *permanent state*, to be in *conservation*, or to have *stability*. Let us call this state of a river its REGIMEN, denoting by the word the proper adjustment of the velocity of the stream to the tenacity of the channel. The velocity of its regimen must be the same throughout, because it is this which regulates its action on the bottom, which is the same from its head to the sea. That its bed may have stability, the mean velocity of the current must be constant, notwithstanding the inequality of discharge through its different sections by the brooks which it receives in its course, and notwithstanding the augmentation of its section as it approaches the sea.

On the other hand, it behoved this exact regimen to commence at the mouth of the river, by the working of the whole body of the river, in concert with the waters of the ocean, which always keep within the same limits, and make the ultimate level invariable. This working will begin to dig the bed, giving it as little breadth as possible: for this working consists chiefly in the efforts of falls and rapid streams, which arise of themselves in every channel which has too much slope. The bottom deepens, and the sides remain very steep, till they are undermined and crumbled down; and being then diluted in the water, they are carried down the stream and deposited where the ocean checks its speed. The banks crumble down anew, the valley or hollow forms; but the section, always confined to its bottom, cannot acquire a great breadth, and it retains a good deal of the form of the trapezium formerly mentioned. In this manner does the regimen begin to be established from *f* to *e*.

With respect to the next part *d e*, the discharge or produce is diminished by the want of the brook *l e*. It must take a similar form, but its area will be diminished, in order that its velocity may be the same; and its mean depth *d* being less than in the portion *e f* below, the slope must be greater. Without these conditions we could not have the uniform velocity, which the assumed permanency in an uniform soil naturally supposes. Reasoning after the same manner for all the portions *c d*, *b c*, *a b*, *s a*, we see that the regimen will be successively established in them, and that the slope necessary for this purpose will be greater as we approach the river head. The vertical section or profile of the course of the river *s a b c d e f* will therefore resemble the line SABCDEF which is sketched above, having its different parts variously inclined to the horizontal line HF.

Such is the process of nature to be observed in every river on the surface of the globe. It long appeared a kind of puzzle to the theorists; and it was this observation of the increasing, or at least this continued velocity with smaller slope, as the rivers increased by the addition of their tributary streams, which caused Guglielmini to have recourse to his new principle, the energy of deep waters. We have now seen in what this energy consists. It is only a greater quantity of motion remaining in the middle of a great stream of water after a quantity has been retarded by the sides and bottom; and we see clearly, that since the addition of a new and perhaps an equal stream does not occupy a bed of double surface, the proportion of the retardations to the remaining motion must continually diminish as a river increases by the addition of new streams. If therefore the slope were not diminished, the regimen would be destroyed, and the river would dig up its channel. We have a full confirmation of this in the many works which have been executed on the Po, which runs with rapidity through a rich and yielding soil. About the year 1600 the waters of the Panaro, a very considerable river, were added to the Po Grande; and although it brings along with it in its freshes a vast quantity of sand and mud, it has greatly deepened the whole Tronco di Venezia from the confluence to the sea. This point was clearly ascertained by Manfredi about the year 1720, when the inhabitants of the valleys adjacent were alarmed by the project of bringing in the waters of the Rheno, which then ran through the Ferrarese. Their fears were overcome, and the Po Grande continues to deepen its channel every day, with a prodigious advantage to the navigations; and there are several extensive marshes which now drain off by it, after having been for ages under water: and it is to be particularly remarked, that the Rheno is the foulest river in its freshes of any in that country. We insert this remark, because it may be of great practical utility, as pointing out a method of preserving and even improving the depth of rivers or drains in flat countries, which is not obvious, but rather appears improper; but it is strictly conformable to a true theory, and to the operations of nature, which never fails to adjust every thing so as to bring about an equilibrium. Whatever the declivity of the country may have been originally, the regimen begins to be settled at the mouths of the rivers, and the slopes are diminished in succession as we recede from the coast. The original slopes inland may have been much greater; but they will (when busy nature has completed her work) be left somewhat, and only so much greater, that the velocity may be the same notwithstanding the diminution of the section and mean depth.

Effects of freshes.

Freshes will disturb this methodical progress relative only to the successive permanent additions; but their effects chiefly accelerate the deepening of the bed, and the diminution of the slope, by augmenting the velocity during their continuance. But when the regimen of the permanent additions is once established, the freshes tend chiefly to widen the bed, without greatly deepening it: for the aquatic plants, which have been growing and thriving during the peaceable state of the river, are now laid along, but not swept away, by the freshes, and protect the bottom from their attacks; and the stones and gravel, which must have been left bare in a course of years, working on the soil, will also collect in the bottom, and greatly augment its power of resistance; and even if the floods should have deepened the bottom some small matter, some mud will be deposited as the velocity of the freshes diminishes, and this will remain till the next flood.

We have supposed the soil uniform throughout the whole course; this seldom happens; therefore the circumstances which insure permaneney, or the regimen of a river, may be very different in its different parts and in different rivers. We may say in general, that the farther that the regimen has advanced up the stream in any river, the more slowly will it convey its waters to the sea.

There are some general circumstances in the motion of rivers which it will be proper to take notice of just now, that they may not interrupt our more minute examination of their mechanism; and their explanations will then occur of themselves as corollaries of the propositions which we shall endeavour to demonstrate.

In a valley of small width the river always occupies the lowest part of it; and it is observed, that this is seldom in the middle of the valley, and is nearest to that side on which the slope from the higher grounds is steepest, and this with-

In narrow valleys rivers adhere to the steepest hills.

out regard to the line of its course. The river generally adheres to the steepest hills, whether they advance into the plain or retire from it. This general feature may be observed over the whole globe. It is divided into compartments by great ranges of mountains; and it may be observed, that the great rivers hold their course not very far from them, and that their chief feeders come from the other side. In every compartment there is a swell of the low country at a distance from the bounding ridge of mountains; and on the summit of this swell the principal feeders of the great river have their sources.

The name *valley* is given with less propriety to these immense regions, and is more applicable to tracts of champaign land which the eye can take in at one view. Even here we may observe a resemblance. It is not always in the very lowest part of this valley that the river has its bed: although the waters of the river flow in a channel below its immediate banks, these banks are frequently higher than the grounds at the foot of the hills. This is very distinctly seen in Lower Egypt, by means of the canals which are carried backward from the Nile for accelerating its fertilizing inundations. When the calishes are opened to admit the waters, it is always observed that the districts most remote are the first covered, and it is several days before the immediately adjoining fields partake of the blessing. This is a consequence of that general opinion of nature by which the valleys are formed. The river in its floods is loaded with mud, which it retains as long as it rolls rapidly along its limited bed, tumbling its waters over and over, and taking up in every spot as much as it deposits: but as soon as it overflows its banks, the very enlargement of its section diminishes the velocity of the water; and it may be observed still running in the track of its bed with great velocity, while the waters on each side are stagnant at a very small distance: therefore the water, on getting over the banks, must deposit the heaviest, the firmest, and even the greatest part of its burden, and must become gradually clearer as it approaches the hills. Thus a gentle slope is given to the valley in a direction which is the reverse of what one would expect. It is, however, almost always the case in wide valleys, especially if the great river comes through a soft country. The banks of the brooks and ditches are observed to be deeper as they approach the river, and the merely superficial drains run backwards from it.

The bed of rivers is enlarged near the sea,

We have already observed that the enlargement of the bed of a river, in its approach to the sea, is not in proportion to the increase of its waters. This would be the case even if the velocity continued the same; and, therefore, since the velocity increases in consequence of the greater energy of a large body of water, which we now understand distinctly, a still smaller bed is sufficient for conveying all the water to the sea.

the water being checked by the tides of the ocean.

This general law is broken, however, in the immediate neighbourhood of the sea; because in this situation the velocity of the water is checked by the passing flood-tides of the ocean. As the whole waters must still be discharged, they require a larger bed, and the enlargement will be chiefly in width. The sand and mud are deposited when the motion is retarded. The depth of the mouth of the channel is therefore diminished. It must therefore become wider. If this be done on a coast exposed to the force of a regular tide, which carries the waters of the ocean across the mouth of the river, this regular enlargement of the mouth will be the only consequence, and it will generally widen till it washes the foot of the adjoining hills; but if there be no tide in the sea, or a tide which does not set across the mouth of the river, the sands must be deposited at the sides of the opening, and become additions to the shore, lengthening the mouth of the channel. In this sheltered situation, every trivial circumstance will cause the river to work more on particular parts of the bottom, and deepen the channel there. This keeps the mud suspended in such parts of the channel, and it is not deposited till the stream has shot farther out into the sea. It is deposited on the sides of those deeper parts of the channel, and increases the velocity in them, and thus still farther protracts the deposition. Rivers so situated will not only lengthen their channels, but will divide them, and produce islands at their mouths. A bush, a tree torn up by the roots by a mountain torrent, and floated down the stream, will thus inevitably produce an island; and rivers in which this is common will be continually shifting their mouths. The Mississippi is a most remarkable instance of this. It has a long course through a rich soil, and disembogues itself into the bay of Mexico, in a place where there is no *passing tide*, as may be seen by comparing the hours of high water in different places. No river that we know carries down its stream such numbers of rooted-up trees; they frequently interrupt the navigation, and render it always dangerous in the night-time. This river is so beset with flats and shifting sands at its mouth, that the most experienced pilots are puzzled; and it has protruded its channel above fifty miles in the short period that we have known it. The discharge of the Danube is very similar: so is that of the Nile, for it is discharged into a still corner of the Mediterranean. It may now be said to have acquired considerable permanency; but much of this is owing to human industry, which strips it as much as possible of its subsideable matter. The Ganges, too, is in a situation pretty similar, and exhibits similar phenomena. The Maragnon might be noticed as an exception; but it is not an exception. It has flowed very far in a level bed, and its waters come pretty clear to Para; but, besides, there is a strong transverse tide, or rather current, at its mouth, setting to the south-east both during flood and ebb. The mouth of the Po is perhaps the most remarkable of any on the surface of this globe, and exhibits appearances extremely singular. Its discharge is into a sequestered corner of the Adriatic. Though there be a more remarkable tide in this gulf than in any part of the Mediterranean, it is still but trifling, and it either sets directly in upon the mouth of the river or retires straight away from it. The river has many mouths, and they shift prodigiously. There has been a general increase of the land very remarkable. The marshes where Venice now stands were in the Augustan age everywhere penetrable by the fishing-boats, and in the fifth century could only bear a few miserable huts; now they are covered with crowds of stately buildings. Ravenna, situated on the southernmost mouth of the Po, was, in the Augustan age, at the extremity of a swamp, and the road to it was along the top of an artificial mound, made by Augustus at an immense expense. It was, however, a fine city, containing extensive docks, arsenals, and other massy buildings, being the great military port of the empire, where Augustus laid up his great ships of war. In the Gothic times it became almost the capital of the western empire, and was the seat of government and of luxury. It must therefore be supposed to have every accommodation of opulence, and we cannot doubt of its having paved streets, wharfs, &c.; so that its wealthy inhabitants were at least walking dryfooted from house to house. But now it is an Italian mile from the sea, and surrounded with vineyards and cultivated fields, and is accessible in every direction. All this must have been formed by depositions from the Po, flowing through Lombardy loaded with the spoils of the Alps, which were here arrested by the reeds and bulrushes of the marsh. These things are in common course; but when wells are dug, we come to the pavements of the ancient city, and these pavements are all on one exact level, and they *are eight feet below the surface of the sea at low water.* This cannot be ascribed to the subsiding of the ancient city. This would be irregular, and greatest among the heavy

The

buildings. The tomb of Theodoric remains, and the pavement round it is on a level with all the others. The lower story is always full of water; so is the lower story of the cathedral to the depth of three feet. The ornaments of both these buildings leave no room to doubt that they were formerly dry; and such a building as the cathedral could not sink without crumbling into pieces.

It is by no means easy to account for all this. The depositions of the Po and other rivers must raise the ground; and yet the rivers must still flow over all. We must conclude that the surface of the Adriatic is by no means level, and that it slopes like a river from the Lagoon of Venice to the eastward. In all probability it even slopes considerably outwards from the shore. This will not hinder the alternations of ebb and flow tide, as will be shown in its proper place. The whole shores of this gulf exhibit most uncommon appearances.

Ri s are con x ath rt the ream, and e cau of it.

The last general observation which we shall make in this place is, that the surface of a river is not flat, considered athwart the stream, but convex; this is owing to its motion. Suppose a canal of stagnant water; its surface would be a perfect level. But suppose it possible, by any means, to give the middle waters a motion in the direction of its length, they must drag along with them the waters immediately contiguous. These will move less swiftly, and will in like manner drag the waters without them; and thus the water at the sides being abstracted, the depth must be less, and the general surface must be convex across. The fact in a running stream is similar to this; the side waters are withheld by the sides, and every filament is moving more slowly than the one next it towards the middle of the river, but faster than the adjoining filament on the land side. This alone must produce a convexity of surface. But besides this, it is demonstrable that the pressure of a running stream is diminished by its motion, and the diminution is proportional to the height which would produce the velocity with which it is gliding past the adjoining filament. This convexity must in all cases be very small. Few rivers have the velocity nearly equal to eight feet per second, and this requires a height of one foot only. An author quoted by M. Buffon says, that he has observed on the river Aveiron an elevation of three feet in the middle during floods; but we suspect some error in the observation.

§ 4. *Of the Windings of Rivers.*

Win g cours f rivers ow forme

Rivers are seldom straight in their course. Formed by the hand of nature, they are accommodated to every change of circumstance. They wind around what they cannot get over, and work their way to either side according as the resistance of the opposite bank makes a straight course more difficult; and this seemingly fortuitous rambling distributes them more uniformly over the surface of a country, and makes them everywhere more at hand, to receive the numberless rills and rivulets which collect the waters of our springs and the superfluities of our showers, and to comfort our habitations with the many advantages which cultivation and society can derive from their presence. In their feeble beginnings the smallest inequality of slope or consistency is enough to turn them aside and make them ramble through every field, giving drink to our herds and fertility to our soil. The more we follow nature into the minutiæ of her operations, the more must we admire the inexhaustible fertility of her resources, and the simplicity of the means by which she produces the most important and beneficial effects. By thus twisting the course of our rivers into ten thousand shapes, she keeps them long amidst our fields, and thus compensates for the declivity of the surface, which would otherwise tumble them with great rapidity into the ocean, loaded with the best and richest of our soil. Without this, the showers of heaven would have little influence in supplying the waste of incessant evaporation. But as things are, the rains are kept slowly trickling along the sloping sides of our hills and steeps, winding round every clod, nay, every plant, which lengthens their course, diminishes their slope, checks their speed, and thus prevents them from quickly brushing off from every part of the surface the lightest and best of the soil. The fattest of our holm lands would be too steep, and the rivers would shoot along through our finest meadows, hurrying every thing away with them, and would be unfit for the purposes of inland conveyance, if the inequalities of soil did not make them change this headlong course for the more beautiful meanders which we observe in the course of the small rivers winding through our meadows. Those rivers are in general the straightest in their course which are the most rapid, and which roll along the greatest bodies of water: such are the Rhone, the Po, the Danube. The smaller rivers continue more devious in their progress, till they approach the sea, and have gathered strength from all their tributary streams.

What nature left for man to perform.

Every thing aims at an equilibrium, and this directs even the rambling of rivers. It is of importance to understand the relation between the force of a river and the resistance which the soil opposes to those deviations from a rectilineal course; for it may frequently happen that the general procedure of nature may be inconsistent with our local purposes. Man was set down on this globe, and the task of cultivating it was given him by nature, and his chief enjoyment seems to be to struggle with the elements. He must not find things to his mind, but he must mould them to his own fancy. Yet even this seeming anomaly is one of nature's most beneficent laws; and his exertions must still be made in conformity with the general train of the operations of mechanical nature; and when we have any work to undertake relative to the course of rivers, we must be careful not to thwart their general rules, otherwise we shall sooner or later be punished for their infraction. Things will be brought back to their former state, if our operations are inconsistent with that equilibrium which is constantly aimed at, or some new state of things which is equivalent will soon be induced. If a well-regulated river has been improperly deepened in some place to answer some particular purpose of our own, or if its breadth has been improperly augmented, we shall soon see a deposition of mud or sand choke up our fancied improvements; because, as we have enlarged the section without increasing the slope or the supply, the velocity must diminish, and floating matters must be deposited.

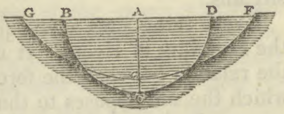
It is true, we frequently see permanent channels where the forms are extremely different from that which the waters would dig for themselves in an uniform soil, and which approaches a good deal to the trapezium described formerly. We see a greater breadth frequently compensate for a want of depth; but all such deviations are a sort of constraint, or rather are indications of inequality of soil. Such irregular forms are the works of nature; and if they are permanent, the equilibrium is obtained. Commonly the bottom is harder than the sides, consisting of the coarsest of the sand and of gravel; and therefore the necessary section can be obtained only by increasing the width. We are accustomed to attend chiefly to the appearances which prognosticate mischief, and we interpret the appearances of a permanent bed in the same way, and frequently form very false judgments. When we see one bank low and flat, and the other high and abrupt, we suppose that the waters are passing along the first in peace, and with a gentle stream, but that they are rapid on the other side, and are tearing away the bank; but it is just the contrary. The bed being permanent, things are in equilibrio, and each bank is of a form just competent to that equilibrium. If the soil on both sides be uniform, the stream is most rapid on that side where the bank is low and flat, for in no other form would it withstand the action of the stream; and it has been worn away till its flatness compensates for the greater force of the stream. The stream on the other side must be more gentle, otherwise the bank could not remain abrupt. In short, in a state of permanency, the velocity of the stream and form of the bank are just suited to each other. It is quite otherwise before the river has acquired its proper regimen.

Necessity of attending to nature in regulating the course of rivers.

A careful consideration therefore of the general features of rivers which have settled their regimen, is of use for informing us concerning their internal motions, and directing us to the most effectual methods of regulating their course.

We have already said that perpendicular brims are inconsistent with stability. A semicircular section is the form which would produce the quickest train of a river whose expense and slope are given; but the banks at B and D (fig. 16) would crumble in, and lie at the bottom, where their horizontal surface would secure them from farther change. The bed will acquire the form G*c*F, of equal section, but greater width, and with brims less shelving. The proportion of the velocities at A and *c* may be the same with that of the velocities at A and C; but the velocity at G and F will be less than it was formerly at B, C, or D; and the velocity in any intermediate point E, being somewhat between those at F and *c*, must be less than it was in any intermediate point of the semicircular bed. The velocities will therefore decrease along the border from *c* towards G and F, and the steepness of the border will augment at the same time, till, in every point of the new border G*c*F, these two circumstances will be so adjusted that the necessary equilibrium is established.

Fig. 16.



The same thing must happen in our trapezium. The slope of the brims may be exact, and will be retained; it will, however, be too great anywhere below, where the velocity is greater, and the sides will be worn away till the banks are undermined and crumble down, and the river will maintain its section by increasing its width. In short, no border made up of straight lines is consistent with that gradation of velocity which will take place whenever we depart from a semicircular form. And we accordingly see, that in all natural channels the section has a curvilineal border, with the slope increasing gradually from the bottom to the brim.

These observations will enable us to understand how nature operates when the inequality of surface or of tenacity obliges the current to change its direction, and the river forms an elbow.

Conditions necessary for a permanent regimen.

Supposing always that the discharge continues the same, and that the mean velocity is either preserved or restored, the following conditions are necessary for a permanent regimen.

1. The depth of water must be greater in the elbow than anywhere else.

2. The main stream, after having struck the concave bank, must be reflected in an equal angle, and must then be in the direction of the next reach of the river.

3. The angle of incidence must be proportioned to the tenacity of the soil.

4. There must be in the elbow an increase of slope, or of head of water, capable of overcoming the resistance occasioned by the elbow.

Reasonableness of these conditions.

The reasonableness, at least, of these conditions will appear from the following considerations.

1. It is certain that force is expended in producing this change of direction in a channel which by supposition diminishes the current. The diminution arising from any cause which can be compared with friction must be greater when the stream is directed against one of the banks. It may be very difficult to state the proportion, and it would occupy too much of our time to attempt it; but it is sufficient that we be convinced that the retardation is greater in this case. We see no cause to increase the mean velocity in the elbow, and we must therefore conclude that it is diminished. But we are supposing that the discharge continues the same; the section must therefore augment, or the channel increase its transverse dimensions. The only question is, In what manner it does this, and what change of form does it affect, and what form is competent to the final equilibrium and the consequent permanency of the bed? Here there is much room for conjecture. M. de Buat reasons as follows: If we suppose that the points B and C (fig. 17) continue on a level, and that the points H and I at the beginning of the next reach are also on a level, it is an inevitable consequence that the slope along CMI must be greater than along BEH, because the depression of H below B is equal to that of I below C, and BEH is longer than CMI. Therefore the velocity along the convex bank CMI must be greater than along BEH. There may even be a stagnation and an eddy in the contrary direction along the concave bank. Therefore, if the form of the section were the same as up the stream, the sides could not stand on the convex bank. When therefore the section has attained a permanent form, and the banks are again in equilibrio with the action of the current, the convex bank must be much flatter than the concave. If the water is really still on the concave bank, that bank will be absolutely perpendicular, nay, may overhang. Accordingly, this state of things is matter of daily observation, and justifies our reasoning, and entitles us to say, that this is the nature of the internal motion of the filaments which we cannot distinctly observe. The water moves most rapidly along the convex bank, and the thread of the stream is nearest to this side. Reasoning in this way, the section, which we may suppose to have been originally of the form M*b* *a*E (fig 18), assumes the shape MBAE.

Fig. 17.

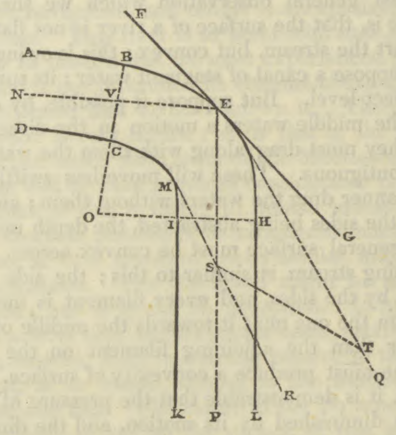
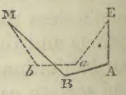


Fig. 18.



2. Without presuming to know the mechanism of the internal motions of fluids, we know that superficial waves are reflected precisely as if they were elastic bodies, making the angles of incidence and reflection equal. In as far, therefore, as the superficial wave is concerned in the operation, M. de Buat's second position is just. The permanency of the next reach requires that its axis shall be in the direction of the line EP (fig. 17), which makes the angle GEP = FEN. If the next reach has the direction EQ, MR, the wave reflected in the line ES will work on the bank at S, and will be

reflected in the line ST, and work again on the opposite bank at T. We know that the effect of the superficial motion is great, and that it is the principal agent in destroying the banks of canals. So far therefore M. de Buat is right. We cannot say with any precision or confidence how the actions of the under filaments are modified; but we know no reason for not extending to the under filaments what appears so probable with respect to the surface-water.

3. The third position is no less evident. We do not know the mode of action of the water on the bank; but our general notions on this subject, confirmed by common experience, tell us that the more obliquely a stream of water beats on any bank, the less it tends to undermine it or wash it away. A stiff and cohesive soil therefore will suffer no more from being almost perpendicularly buffeted by a stream than a friable sand would suffer from water gliding along its face. M. de Buat thinks, from experience, that a clay bank is not sensibly affected till the angle FEB is about thirty-six degrees.

4. Since there are causes of retardation, and we still suppose that the discharge is kept up, and that the mean velocity, which had been diminished by the enlargement of the section, is again restored, we must grant that there is provided, in the mechanism of these motions, an accelerating force adequate to this effect. There can be no accelerating force in an open stream but the superficial slope. In the present case it is undoubtedly so; because by the deepening of the bottom where there is an elbow in the stream, we have of necessity a counter slope. Now, all this head of water, which must produce the augmentation of velocity in that part of the stream which ranges round the convex bank, will arise from the check which the water gets from the concave bank. This occasions a gorge or swell up the stream, enlarges a little the section at BVC; and this, by the principle of uniform motion, will augment all the velocities, deepen the channel, and put every thing again into its train as soon as the water gets into the next reach. The water at the bottom of this basin has very little motion, but it defends the bottom by this very circumstance.

Rema on the condit s, and th reason f them.

Such are the notions which M. de Buat entertains of this part of the mechanism of running waters. We cannot say that they are very satisfactory, and they are very opposite to the opinions commonly entertained on the subject. Most persons think that the motion is most rapid and turbulent on the side of the concave bank, and that it is owing to this that the bank is worn away till it has become perpendicular, and that the opposite bank is flat, because it has not been gnawed away in this manner. With respect to this general view of the matter, these persons may be in the right; and when a stream is turned into a crooked and yielding channel for the first time, this is its manner of action. But M. de Buat's aim is to investigate the circumstances which obtain in the case of a regimen; and in this view he is undoubtedly right as to the facts, though his mode of accounting for these facts may be erroneous. And as this is the only useful view to be taken of the subject, it ought chiefly to be attended to in all our attempts to procure stability to the bed of a river, without the expensive helps of masonry, &c. If we attempt to secure permanency by deepening on the inside of the elbow, our bank will undoubtedly crumble down, diminish the passage, and occasion a more violent action on the hollow bank. The most effectual mean of security is to enlarge the section; and if we do this on the inside bank, we must do it by widening the stream very much, that we may give a very sloping bank. Our attention is commonly drawn to it when the hollow bank is giving way, and with a view to stop the ravages of the stream. Things are not now in a state of permanency, but nature is working in her own way to bring it about. This may not suit *our* purpose, and we must thwart her. The phenomena which we then observe are frequently very unlike to those described in the preceding paragraphs. We see a violent tumbling motion in the stream towards the hollow bank. We see an evident accumulation of water on that side, and the point B is frequently higher than C. This regorging of the water extends to some distance, and is of itself a cause of greater velocity, and contributes, like a head of stagnant water, to force the stream through the bend, and to deepen the bottom. This is clearly the case when the velocity is excessive, and the hollow bank able to abide the shock. In this situation the water thus heaped up escapes where it best can; and as the water obstructed by an obstacle put in its way escapes by the sides, and there has its velocity increased, so here the water gorged up against the hollow bank swells over towards the opposite side, and passes round the convex bank with an increased velocity. It depends much on the adjustment between the velocity and consequent accumulation, and the breadth of the stream and the angle of the elbow, whether this augmentation of velocity shall reach the convex bank; and we sometimes see the motion very languid in that place, and even depositions of mud and sand are made there. The whole phenomena are too complicated to be accurately described in general terms, even in the case of perfect regimen: for this regimen is relative to the consistence of the channel; and when this is very great, the motions may be most violent in every quarter. But the preceding observations are of importance, because they relate to ordinary cases and to ordinary channels.

It is evident, from M. de Buat's second position, that the proper form of an elbow depends on the breadth of the stream as well as on the radius of curvature, and that every angle of elbow will require a certain proportion between the width of the river and the radius of the sweep. M. de Buat gives rules and formulæ for all these purposes, and shows that in one sweep there may be more than one reflection or rebound. It is needless to enlarge on this matter of mere geometrical discussion. It is with the view of enabling the engineer to trace the windings of a river in such a manner that there shall be no rebounds which shall direct the stream against the sides, but preserve it always in the axis of every reach. This is of consequence, even when the bends of the river are to be secured by masonry or piling; for we have seen the necessity of increasing the section, and the tendency which the waters have to deepen the channel on that side where the rebound is made. This tends to undermine our defences, and obliges us to give them deeper and more solid foundations in such places. But any person accustomed to the use of the scale and compasses will form to himself rules of practice equally sure and more expeditious than M. de Buat's formulæ.

Resistance caused by an elbow, and mode of overcoming it.

We proceed, therefore, to what is more to our purpose, the consideration of the resistance caused by an elbow, and the methods of providing a force capable of overcoming it. We have already taken notice of the salutary consequences arising from the rambling course of rivers, inasmuch as it more effectually spreads them over the face of a country. It is no less beneficial by diminishing their velocity. This it does both by lengthening their course, which diminishes the declivity, and by the very resistance which they meet with at every bend. We derive the chief advantages from our rivers when they no longer shoot their way from precipice to precipice loaded with mud and sand, but peaceably roll along their clear waters, purified during their gentler course, and offer themselves for all the purposes of pasturage, agriculture, and navigation. The more a river winds its way round the foot of the hills, the more is the resistance of its bed multiplied; the more obstacles it meets with in its way from its source to the sea, the more moderate is its velocity; and instead of tearing up the very bowels of the earth, and digging for itself a deep trough, along which it sweeps rocks and rooted-up trees, it flows with majestic

Theory.

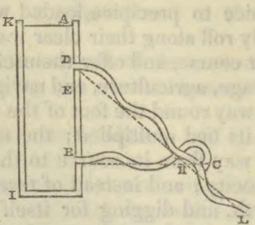
pace even with the surface of our cultivated grounds, which it embellishes and fertilizes.

We may with safety proceed on the supposition, that the force necessary for overcoming the resistance arising from a rebound is as the square of the velocity; and it is reasonable to suppose it proportional to the square of the sine of the angle of incidence, and this for the reasons given for adopting this measure of the general *Resistance of Fluids*. It cannot, however, claim a greater confidence here than in that application; and it has been shown in that article with what uncertainty and limitations it must be received. We leave it to our readers to adopt either this or the simple ratio of the sines, and shall abide by the duplicate ratio with M. de Buat, because it appears by his experiments that this law is very exactly observed in tubes in inclinations not exceeding 40°; whereas it is in these small angles that the application to the general resistance of fluids is most in fault. But the correction is very simple if this value shall be found erroneous. There can be no doubt that the force necessary for overcoming the resistance will increase as the number of rebounds. Therefore we may express the resistance, in general, by the formula $r = \frac{n V^2 \sin.^2 I}{m}$; where r is the resistance, V the mean velocity of the stream, sin. I the sine of the angle of incidence, n the number of equal rebounds (that is, having equal angles of incidence), and m is a number to be determined by experiment. M. de Buat made many experiments on the resistance occasioned by the bendings of pipes, none of which differed from the result of the above formula above one part in twelve; and he concludes, that the resistance to one bend may be estimated at $\frac{V^2 \sin.^2 I}{3000}$. The experiment was in this form. A pipe of one inch diameter, and ten feet long, was formed with ten rebounds of 36° each. A head of water was applied to it, which gave the water a velocity of six feet per second. Another pipe of the same diameter and length, but without any bendings, was subjected to a pressure of a head of water, which was increased till the velocity of efflux was also six feet per second. The additional head of water was $5\frac{9}{10}$ inches. Another of the same diameter and length, having one bend of 24° 34′, and running eighty-five inches per second, was compared with a straight pipe having the same velocity, and the difference of the heads of water was $\frac{37}{100}$ of an inch. A computation from these two experiments will give the above result, or, in English measure, $r = \frac{V^2 \sin.^2 I}{3200}$ very nearly. It is probable that this measure of the resistance is too great; for the pipe was of uniform diameter even in the bends: whereas, in a river properly formed, where the regimen is exact, the capacity of the section of the bend is increased.

Theory applied to inclined tubes and open streams.

The application of this theory to inclined tubes and to open streams is very obvious, and very legitimate and safe. Let AB (fig. 19) be the whole height of the reservoir ABIK, and BC the horizontal length of a pipe, containing any number of rebounds, equal or unequal, but all regular, that is, constructed according to the conditions formerly mentioned. The whole head of water should be conceived as performing, or as divided into portions which perform, three different offices. One portion, $AD = \frac{V^2}{509}$, impels the water into the entry of the pipe with the velocity with which it really moves in it; another portion EB is in equilibrio with the resistances arising from the mere length of the pipe expanded into a straight line; and the third portion DE serves to overcome the resistance of the bends. If, therefore, we draw the horizontal line BC, and, taking the pipe BC out of its place, put it in the position DH, with its mouth C in H, so that DH is equal to BC, the water will have the same velocity in it that it had before. For greater simplicity of argument, we may suppose that when the pipe was inserted at B, its bends lay all in a horizontal plane, and that when it is inserted at D, the plane in which all its bends lie slopes only in the direction DH, and is perpendicular to the plane of the figure. We repeat it, the water will have the same velocity in the pipes BC and DH, and the resistances will be overcome. If we now prolong the pipe DH towards L to any distance, repeating continually the same bendings in a series of lengths, each equal to DH, the motion will be continued with the velocity corresponding to the pressure of the column AD; because the declivity of the pipe is augmented in each length equal to DH, by a quantity precisely sufficient for overcoming all the resistances in that length; and the true slope in these cases is BE + ED, divided by the expanded length of the pipe BC or DH.

Fig. 19.



The analogy which we were enabled to establish between the uniform motion or the train of pipes and of open streams, entitles us now to say, that when a river has bendings, which are regularly repeated at equal intervals, its slope is compounded of the slope which is necessary for overcoming the resistance of a straight channel of its whole expanded length, agreeably to the formula for uniform motion, and of the slope which is necessary for overcoming the resistance arising from its bending alone.

Thus, let there be a river which, in the expanded course of 6000 fathoms, has 10 elbows, each of which has 30° of rebound; and let its mean velocity be 20 inches in a second. If we should learn its whole slope in this 6000 fathoms, we must first find (by the formula of uniform motion) the slope s which will produce the velocity of 20 inches in a straight river of this length, section, and mean depth. Suppose this to be $\frac{1}{21600}$, or 20 inches, in this whole length. We must then find by the formula $\frac{n V^2 \sin.^2 I}{3200}$ the slope necessary for overcoming the resistance of ten rebounds of 30° each. This we shall find to be $6\frac{2}{3}$ inches in the 6000 fathoms. Therefore the river must have a slope of $26\frac{2}{3}$ inches in 6000 fathoms, or $\frac{1}{16200}$; and this slope will produce the same velocity which 20 inches, or $\frac{1}{21600}$, would do in a straight-running river of the same length.

PART II.—PRACTICAL INFERENCES.

Approxi-mation trial an correcti recom-mende practic engine

Having thus established a theory of a most important part of hydraulics, which may be confided in as a just representation of nature's procedure, we shall apply it to the examination of the chief results of every thing which art has contrived for limiting the operations of nature, or modifying them so as to suit our particular views. Trusting to the detail which we have given of the connecting principles, and the chief circumstances which co-operate in producing the ostensible effect; and supposing that such of our readers as are interested in this subject will not think it too much trouble to make the applications in the same detail; we shall content ourselves with merely pointing out the steps of the process, and showing their foundation in the theory itself; and frequently, in place of the direct analysis which the theory enables us to employ for the solution of the problems, we shall recommend a process of approximation by trial and correction, sufficiently accurate, and more within the reach of practical engineers.

Practical Inferences.

We are naturally led to consider in order the following articles.

1. The effects of permanent additions of every kind to the waters of a river, and the most effectual methods of preventing or removing inundations.

2. The effects of weirs, bars, sluices, and keeps of every kind, for raising the surface of a river; and the similar effects of bridges, piers, and every thing which contracts the section of the stream.

3. The nature of canals; how they differ from rivers in respect of origin, discharge, and regimen, and what conditions are necessary for their most perfect construction.

4. Canals for draining land, and drafts or canals of derivation from the main stream. The principles of their construction, so that they may suit their intended purposes; and the change which they produce on the main stream, both above and below the point of derivation.

Of the Effects of Permanent Additions to the Waters of a River.

Problems and examples of the effects of permanent additions to the waters of a river.

From what has already been said, it appears that to every kind of soil or bed there corresponds a certain velocity of current, too small to hurt it by digging it up, and too great to allow the deposition of the materials which it is carrying along. Supposing this known for any particular situation, and the quantity of water which the channel must of necessity discharge, we may wish to learn the smallest slope which must be given to this stream, that the waters may run with the required velocity. This suggests,

PROB. I.[1] Given the discharge D of a river, and V its velocity of regimen: required the smallest slope s, and the dimensions of its bed.

Since the slope must be the smallest possible, the bed must have the form which will give the greatest mean depth d, and should therefore be the trapezium formerly described; and its area and perimeter are the same with those of a rectangle whose breadth is twice its height h. These circumstances gives us the equation $\frac{D}{V} = 2h^2$. For the area of the section is twice the square of the height, and the discharge is the product of this area and the velocity. Therefore $\sqrt{\frac{D}{2V}} = h$ and $\sqrt{\frac{2D}{V}} =$ the breadth b.

The formula of uniform motion gives $\sqrt{s} - L\sqrt{s + 1{\cdot}6} = \frac{297\,(\sqrt{d} - 0{\cdot}1)}{V + 0{\cdot}3\,(\sqrt{d} - 0{\cdot}1)}$. Instead of $\sqrt{d} - 0{\cdot}1$, put its equal $\sqrt{\frac{h}{2}} - 0{\cdot}1$, and every thing being known in the second side of this equation, we easily get the value of s by a few trials after the following manner: Suppose that the second side is equal to any number, such as 9. First suppose that $\sqrt{s}$ is $= 9$, whence $s = 81$. Then the hyperbolic logarithm of $\sqrt{81 + 1{\cdot}6}$ or $\sqrt{82{\cdot}6}$ is 2·21. Therefore we have $\sqrt{s} - L\sqrt{s + 1{\cdot}6} = 9 - 2{\cdot}21 = 6{\cdot}79$; whereas it should have been $= 9$. Therefore say $6{\cdot}79 : 9 = 9 : 11{\cdot}9$ nearly. Now suppose that $\sqrt{s}$ is $= 11{\cdot}9$, whence $s = 141{\cdot}6$. Then $L\sqrt{141{\cdot}6 + 1{\cdot}6} = L\sqrt{143{\cdot}2} = 2{\cdot}482$ nearly, and $11{\cdot}9 - 2{\cdot}482 = 9{\cdot}408$, whereas it should be 9. Now we find that changing the value of $\sqrt{s}$ from 9 to 11·9 has changed the answer from 6·79 to 9·408, or a change of 2·9 in our assumption has made a change of 2·618 in the answer, and has left an error of 0·408. Therefore say $2{\cdot}618 : 0{\cdot}408 = 2{\cdot}9 : 0{\cdot}452$. Then taking 0·452 from 11·9, we have, for our next assumption or value of $\sqrt{s}$, 11·448, whence $s = 131{\cdot}1$. Now $131{\cdot}1 + 1{\cdot}6 = 132{\cdot}7$, and $L\sqrt{132{\cdot}7} = 2{\cdot}444$ nearly, and $11{\cdot}448 - 2{\cdot}444 = 9{\cdot}004$ in place of 9, whence it is inferred that this last value of $\sqrt{s} = 11{\cdot}448$ is sufficiently exact. This may serve as a specimen of the trials by which we may avoid an intricate analysis.

Practical Inferences.

PROB. II. Given the discharge D, the slope s, and the velocity V, of permanent regimen, to find the dimensions of the bed.

Let x be the width and y the depth of the channel, and S the area of the section. This must be $= \frac{D}{V}$, which is therefore $= xy$. The denominator s being given, we may make $\sqrt{s} - L\sqrt{s + 1{\cdot}6} = \sqrt{B}$, and the formula of mean velocity will give $V = \frac{297\,(\sqrt{d} - 0{\cdot}1)}{\sqrt{B}} - 0{\cdot}3\,(\sqrt{d} - 0{\cdot}1)$, which we may express thus: $V = (\sqrt{d} - 0{\cdot}1)\left(\frac{297}{\sqrt{B}} - 0{\cdot}3\right)$, which gives $\frac{V}{\frac{297}{\sqrt{B}} - 0{\cdot}3} = (\sqrt{d} - 0{\cdot}1)$; and, finally, $\frac{V}{\frac{297}{\sqrt{B}} - 0{\cdot}3} + 0{\cdot}1 = \sqrt{d}$.

Having thus obtained what we call the mean depth, we may suppose the section rectangular. This gives $d = \frac{xy}{x + 2y}$. Thus we have two equations, $S = xy$ and $d = \frac{xy}{x + 2y}$. From which we obtain $x = \sqrt{\left(\frac{S}{2d}\right)^2 - 2S} + \frac{S}{2d}$. And having the breadth x and area S, we have $y = \frac{S}{x}$. And then we may change this for the trapezium often mentioned.

These are the chief problems on this part of the subject, and they enable us to adjust the slope and channel of a river which receives any number of successive permanent additions by the influx of other streams. This last informs us of the rise which a new supply will produce, because the additional supply will require additional dimensions of the channel; and as this is not supposed to increase in breadth, the addition will be in depth. The question may be proposed in the following problem.

PROB. III. Given the slope s, the depth and the base of a rectangular bed (or a trapezium), and consequently the discharge D, to find how much the section will rise if the discharge be augmented by a given quantity.

Let h be the height after the augmentation, and w the width for the rectangular bed. We have in any uniform current $\sqrt{d} = \frac{V}{\frac{297}{\sqrt{B}} - 0{\cdot}3} + 0{\cdot}1$. Raising this to a square, and putting for d and V their values $\frac{wh}{w + 2h}$ and $\frac{D}{wh}$, and making $\frac{297}{\sqrt{B}} - 0{\cdot}3 = K$, the equation becomes $\frac{wh}{w + 2h} = \left(\frac{D}{whK} + 0{\cdot}1\right)^2$. Raising the second member to a square, and reducing, we obtain a cubic equation, to be solved in the usual manner.

But the solution would be extremely complicated. We may obtain a very expeditious and exact approximation from this consideration, that a small change in one of the dimensions of the section will produce a much greater change in the section and the discharge than in the mean

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[1] In these problems and examples the measures are expressed in French inches. For English inches the co-efficient 307 must be used in place of 297.

Practical Inferences.

depth d. Having therefore augmented the unknown dimension, which is here the height, make use of this to form a new mean depth, and then the new equation $\sqrt{d} = \frac{D}{w\,h\left(\frac{297}{\sqrt{B}} - 0{\cdot}3\right)} + 0{\cdot}1$ will give us another value of h, which will rarely exceed the truth by $\frac{1}{10}$. This serves (by the same process) for finding another, which will commonly be sufficiently exact. We shall illustrate this by an example.

Let there be a river whose channel is a rectangle 150 feet wide and six feet deep, and which discharges 1500 cubic feet of water per second, having a velocity of twenty inches, and slope of $\frac{1}{12000}$, or about $\frac{7}{12}$ of an inch in 100 fathoms. How much will it rise if it receives an addition which triples its discharge? and what will be its velocity?

If the velocity remained the same, its depth would be tripled; but we know by the general formula that its velocity will be greatly increased, and therefore its depth will not be tripled. Suppose it to be doubled, and to become twelve feet. This will give $d = 10{\cdot}34483$, or 124·138 inches; then the equation $\sqrt{d} - 0{\cdot}1 = \frac{D}{w\,h\left(\frac{297}{\sqrt{B}} - 0{\cdot}3\right)}$, or $h = \frac{D}{w\,(\sqrt{d} - 0{\cdot}1)\left(\frac{297}{\sqrt{B}} - 0{\cdot}3\right)}$, and in which we have $\sqrt{B} = 107{\cdot}8$, $D = 4500 \times 1728 = 7776000$ cubic inches, $w = 1800$ inches, $\sqrt{d} - 0{\cdot}1 = 11{\cdot}0417$, will give $h = 159{\cdot}33$ inches or 13·276 feet; whereas it should have been 12. This shows that our calculated value of d was too small. Let us therefore increase the depth by 0·9, or make it 12·9, and repeat the calculation. This will give us $\sqrt{d} - 0{\cdot}1 = 11{\cdot}3927$, and $h = 12{\cdot}867$, instead of 13·276. Therefore, augmenting our data, 0·9 changes our answer 0·409. If we suppose these small changes to retain their proportions, we may conclude that if 12 be augmented by the quantity $x \times 0{\cdot}9$, the quantity 13·276 will diminish by the quantity $x \times 0{\cdot}409$. Therefore, that the estimated value of h may agree with the one which results from the calculation, we must have $12 + x \times 0{\cdot}9 = 13{\cdot}276 - x \times 0{\cdot}409$. This will give $x = \frac{1{\cdot}276}{1{\cdot}309} = 0{\cdot}9748$; and $x \times 0{\cdot}9 = 0{\cdot}8773$; and $h = 12{\cdot}8773$. If we repeat the calculation with this value of h, we shall find no change.

This value of h gives $d = 131{\cdot}8836$ inches. If we now compute the new velocity by dividing the new discharge 4500 by the new area $150 \times 12{\cdot}8773$, we shall find it to be 27·95 inches, in place of 20, the former velocity.

We might have made a pretty exact first assumption, by recollecting what was formerly observed, that when the breadth is very great in proportion to the depth, the mean depth differs insensibly from the real depth, or rather follows nearly the same proportions, and that the velocities are proportional to the square roots of the depths. Call the first discharge d, the height h, and velocity v, and let D, H, and V, express these things in their augmented state. We have $v = \frac{d}{w\,h}$ and $V = \frac{D}{w\,H}$, and $v : V = \frac{d}{h} : \frac{D}{H}$, and $v^2 : V^2 = \frac{d^2}{h^2} : \frac{D^2}{H^2}$. But by this remark $v^2 : V^2 = h : H$. Therefore $h : H = \frac{d^2}{h^2} : \frac{D^2}{H^2}$, and $\frac{hD^2}{H^2} = \frac{Hd^2}{h^2}$, and $h^3D^2 = H^3d^2$, and $d^2 : D^2 = h^3 : H^3$ (a useful theorem), and $H^3 = \frac{h^3D^2}{d^2}$, and $H = \sqrt[3]{\frac{h^3D^2}{d^2}} = 12{\cdot}48$.

Pract
Infere

Or we might have made the same assumption by the remark also formerly made on this case, that the squares of the discharges are nearly as the cubes of the heights, or $1500^2 : 4500^2 = 6^3 : 12{\cdot}48^3$.

And in making these first guesses, we shall do it more exactly, by recollecting that a certain variation of the mean depth d requires a greater variation of the height, and the increment will be to the height nearly as half the height to the width, as may easily be seen. Therefore, if we add to 12·48 its $\frac{6{\cdot}24}{150}$th part, or its 24th part, viz. 0·52, we have 13 for our first assumption, exceeding the truth only an inch and a half. We mention these circumstances, that those who are disposed to apply these doctrines to the solution of practical cases may be at no loss when one occurs of which the regular solution requires an intricate analysis.

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It is evident that the inverse of the foregoing problems will show the effects of enlarging the section of a river, that is, will show how much its surface will be sunk by any proposed enlargement of its bed. It is therefore needless to propose such problems in this place. Common sense directs us to make these enlargements in those parts of the river where their effect will be greatest, that is, where it is shallowest when its breadth greatly exceeds its depth, or where it is narrowest (if its depth exceed the breadth, which is a very rare case), or, in general, where the slope is the smallest for a short run.

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The same general principles direct us in the method of embankments for the prevention of floods, by enabling us to ascertain the heights necessary to be given to our banks. This will evidently depend, not only on the additional quantity of water which experience tells us a river brings down during its freshes, but also on the distance at which we place the banks from the natural banks of the river. This is a point where mistaken economy frequently defeats its own purpose. If we raise our embankment at some distance from the natural banks of the river, not only will a smaller height suffice, and consequently a smaller base, which will make a saving in the duplicate proportion of the height; but our works will be so much the more durable nearly, if not exactly, in the same proportion. For by thus enlarging the additional bed which we give to the swollen river, we diminish its velocity almost in the same proportion that we enlarge its channel, and thus diminish its power of ruining our works. Except, therefore, in the case of a river whose freshes are loaded with fine sand to destroy the turf, it is always proper to place the embankment at a considerable distance from the natural banks. Placing them at half the breadth of the stream from its natural banks, will nearly double its channel; and, except in the case here mentioned, the space now detached from our fields will afford excellent pasture.

The limits of such a work as ours will not permit us to enter into any detail on the method of embankment. It would require a volume to give instructions as to the manner of founding, raising, and securing the dikes which must be raised, and a thousand circumstances which must be attended to. But a few general observations may be made, which naturally occur while we are considering the manner in which a river works in settling or altering its channel.

It must be remarked, in the first place, that the river will rise higher when embanked than it does while it was allowed to spread; and it is by that means easy to conclude to what height it will rise from the greatest height to which it has been observed to rise in its floods. When at liberty to expand over a wide valley, then it could only rise till it overflowed with a thickness or depth of water sufficient to produce a motion backwards into the valley

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quick enough to take off the water as fast as it was supplied; and we imagine that a foot or two would suffice in most cases. The best way for a prudent engineer will be to observe the utmost rise remembered by the neighbours in some gorge, where the river cannot spread out. Measure the increased section in this place, and at the same time recollect that the water increases in a much greater proportion than the section; because an increase of the hydraulic mean depth produces an increase of velocity in nearly the duplicate proportion of the depth. But as this augmentation of velocity will also obtain between the embankments, it will be sufficiently exact to suppose that the section must here be increased nearly in the same proportion as at the gorge already mentioned. Neglecting this method of information, and regulating the height of our embankments by the greatest swell that has been observed in the plain, will assuredly make them too low, and render them totally useless.

A line of embankment should always be carried on by a strict concert of the proprietors of both banks through its whole extent. A greedy proprietor, by advancing his own embankment beyond that of his neighbours, not only exposes himself to risk by the working of the waters on the angles which this will produce, but exposes his neighbours also to danger, by narrowing the section, and thereby raising the surface and increasing the velocity, and by turning the stream athwart, and causing it to shoot against the opposite bank. The whole should be as much as possible in a line; and the general effect should be to make the course of the stream straighter than it was before. All bends should be made more gentle, by keeping the embankment farther from the river in all convex lines of the natural bank, and bringing it nearer where the bank is concave. This will greatly diminish the action of the waters on the embankment, and insure their duration. The same maxim must be followed in fencing any brook which discharges itself into the river. The bends given at its mouth to the two lines of embankment should be made less acute than those of the natural brook, although by this means two points of land are left out. And the opportunity should be embraced of making the direction of this transverse brook more sloping than before, that is, less athwart the direction of the river.

It is of great consequence to cover the outside of the dike with very compact turf closely united. If it admit water, the interior part of the wall, which is always more porous, becomes drenched in water, and this water acts with its statical pressure, tending to burst the bank on the land side, and will quickly shift it from its seat. The utmost care should therefore be taken to make it and keep it perfectly tight. It should be a continued fine turf, and every bare spot should be carefully covered with fresh sod and rat-holes must be carefully closed up.

Of Straighting or Changing the Course of Rivers.

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We have seen that every bending of a river requires an additional slope in order to continue its train, or enable it to convey the same quantity of water without swelling in its bed. The effect of taking away any of these bends must be to sink the waters of the river. It is proper, therefore, to have it in our power to estimate these effects. It may be desirable to gain property by taking away the sweeps of a very winding stream; but this may be prejudicial, by destroying the navigation on such a river. It may also hurt the proprietors below, by increasing the velocity of the stream, which will expose them to the risk of its overflowing, or of its destroying its bed, and taking a new course. Or this increase of velocity may be inconsistent with the regimen of the new channel, or at least require larger dimensions than we should have given it if ignorant of this effect.

Our principles of uniform motion enable us to answer every question of this kind which can occur; and M. de Buat proposes several problems to this effect. The regular solutions of them are complicated and difficult; and we do not think them necessary in this place, because they may all be solved in a manner not indeed so elegant, because indirect, but abundantly accurate, and easy to any person familiar with those which we have already considered.

We can take the exact level across all these sweeps, and thus obtain the whole slope. We can measure with accuracy the velocity in some part of the channel which is most remote from any bend, and where the channel itself has the greatest regularity of form. This will give us the expense or discharge of the river, and the mean depth connected with it. We can then examine whether this velocity is precisely such as is compatible with stability in the straight course. If it is, it is evident that if we cut off the bends, the greater slope which this will produce will communicate to the waters a velocity incompatible with the regimen suited to this soil, unless we enlarge the width of the stream, that is, unless we make the new channel more capacious than the old one. We must now calculate the dimensions of the channel which, with this increased slope, will conduct the waters with the velocity that is necessary. All this may be done by the foregoing problems; and we may accomplish this most easily by steps. First, suppose the bed the same with the old one, and calculate the velocity for the increased slope by the general formula. Then change one of the dimensions of the channel, so as to produce the velocity we want, which is a very simple process. And in doing this, the object to be kept chiefly in view is not to make the new velocity such as will be incompatible with the stability of the new bed.

Having accomplished this first purpose, we learn, in the very solution, how much shallower this channel with its greater slope will be than the former, while it discharges all the waters. This diminution of depth must increase the slope and the velocity, and must diminish the depth of the river above the place where the alteration is to be made. How far it produces these effects may be calculated by the general formula. We then see whether the navigation will be hurt, either in the old river up the stream, or in the new channel. It is plain that all these points cannot be reconciled. We may make the new channel such, that it shall leave a velocity compatible with stability, and that it shall not diminish the depth of the river up the stream. But having a greater slope, it must have a smaller mean depth, and also a smaller real depth, unless we make it of a very inconvenient form.

The same things viewed in a different light, will show us what depression of waters may be produced by rectifying the course of a river in order to prevent its overflowing. And the process which we would recommend is the same with the foregoing. We apprehend it to be quite needless to measure the angles of rebound, in order to *compute* the slope which is *employed* for sending the river through the bend, with a view to supersede this by straighting the river. It is infinitely easier and more exact to measure the levels themselves, and then we know the effect of removing them.

Nor need we follow M. de Buat in solving problems for diminishing the slope and velocity, and deepening the channel of a river by bending its course. The expense of this would in every case be enormous; and the practices which we are about to discuss afford infinitely easier methods of accomplishing all the purposes which are to be gained by these changes.

Of Bars, Weirs, and Jetties, for raising the Surface of Rivers.

We propose, under the article WATER-WORKS, to consider in sufficient practical detail all that relates to the construction and mechanism of these and other erections

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in water; and we confine ourselves, in this place, to the mere effect which they will produce on the current of the river.

Problems, examples, and consequences of raising the surface of rivers.

We gave the name of *weir* or *bar* to a dam erected across a river for the purpose of raising its waters, whether in order to take off a draft for a mill or to deepen the channel. Before we can tell the effect which they will produce, we must have a general rule for ascertaining the relation between the height of the water above the lip of the weir or bar, and the quantity of water which will flow over.

First, then, with respect to a weir, represented in fig. 20 and fig. 21. The latter figure more resembles their usual form, consisting of a dam of solid masonry, or built of timber, properly fortified with shoars and banks. On the top is set up a strong plank FR, called the wasteboard or waster, over which the water flows. This is brought to an accurate level, of the proper height. Such voiders are frequently made in the side of a mill-course, for letting the superfluous water run off. This is properly the WASTER, or VOIDER: it is also called an OFFSET. The same observations will explain all these different pieces of practice. The following questions occur in course.

Fig. 20.

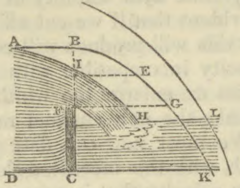
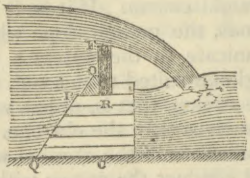


Fig. 21.



PROB. I. Given the length of an offset or wasteboard made in the face of a reservoir of stagnant water, and the depth of its lip under the horizontal surface of the water, to determine the discharge, or the quantity of water which will run over, in a second.

Let AB be the horizontal surface of the still water, and F the lip of the wasteboard. Call the depth BF under the surface h, and the length of the wasteboard l. The water is supposed to flow over into another basin or channel, so much lower that the surface HL of the water is lower, or at least not higher, than F.

If the water could be supported at the height BF, BF might be considered as an orifice in the side of a vessel. In this case, the discharge would be the same as if the whole water were flowing with the velocity acquired from the height $\frac{4}{9}$BF, or $\frac{4}{9}h$. And if we suppose that there is no contraction at the orifice, the mean velocity would be $\sqrt{2g\frac{4}{9}h}, = \sqrt{772 \times \frac{4}{9}h}$, in English inches, per second. The area of this orifice is lh. Therefore the discharge would be $lh\sqrt{772 \times \frac{4}{9}h}$, all being measured in inches. This is the usual theory; but it is not an exact representation of the manner in which the efflux really happens. The water cannot remain at the height BF; but in drawing towards the wasteboard from all sides it forms a convex surface AIH, so that the point I, where the vertical drawn from the edge of the wasteboard meets the curve, is considerably lower than B. But as all the mass above F is supposed perfectly fluid, the pressure of the incumbent water is propagated, in the opinion of M. de Buat, to the filament passing over at F without any diminution. The same may be said of any filament between F and I. Each tends, therefore, to move in the same manner as if it were really impelled through an orifice in its place. Therefore the motions through every part of the line or plane IF are the same as if the water were escaping through an orifice IF, made by a sluice let down on the water, and keeping up the water of the reservoir to the level AB. It is beyond a doubt, says he, that the height IF must depend on the whole height BF, and that there must be a certain determined proportion between them. He does not attempt to determine this proportion theoretically, but says that his experiments ascertain it with great precision to be the proportion of one to two, or that IF is always one half of BF. He says, however, that this determination was not by an immediate and direct measurement; he concluded it from the comparison of the quantities of water discharged under different heights of the water in the reservoir.

We cannot help thinking that this reasoning is very defective in several particulars. It cannot be inferred, from the laws of hydrostatical pressure, that the filament at I is pressed forward with all the weight of the column BI. The particle I is really at the surface; and considering it as making part of the surface of a running stream, it is subjected to hardly any pressure, any more than the particles on the surface of a cup of water held in the hand, while it is carried round the axis of the earth and round the sun. Reasoning according to his own principles, and availing himself of his own discovery, he should have said that the particle at I has an accelerating force depending on its slope only; and then he should have endeavoured to ascertain this slope. The motion of the particle at I has no immediate connection with the pressure of the column BI; and if it had, the motion would be extremely different from what it is: for this pressure alone would give it the velocity which M. de Buat assigns it. Now it is already passing through the point I with the velocity which it has acquired in descending along the curve AI; and this is the real state of the case. The particles are passing through with a velocity already acquired by a sloping current; and they are accelerated by the hydrostatical pressure of the water above them. The internal mechanism of these motions is infinitely more complex than M. de Buat here supposes; and on this supposition, he very nearly abandons the theory which he has so ingeniously established, and adopts the theory of Guglielmini, which he had exploded. At the same time, we think that he is not much mistaken when he asserts that the motions are nearly the same as if a sluice had been let down from the surface to I. For the filament which passes at I has been gliding down a curved surface, and has not been exposed to any friction. It is perhaps the very case of hydraulics where the obstructions are the smallest; and we should therefore expect that its motion will be least retarded.

We have therefore no hesitation in saying, that the filament at I is in the very state of motion which the theory would assign to it if it were passing under a sluice, as M. de Buat supposes. And with respect to the inferior filaments, without attempting the very difficult task of investigating their motions, we shall just say, that we do not see any reason for supposing that they will move slower than our author supposes. Therefore, though we reject his theory, we admit his experimental proposition in general; that is, we admit that the *whole* water which passes through the plane IF moves with the velocity (though not in the same direction) with which it would have run through a sluice of the same depth; and we may proceed with his determination of the quantity of water discharged.

If we make BC the axis of a parabola BEGK, the velocities of the filaments passing at I and F will be represented by the ordinates IE and FG, and the discharge by the area IEGF. This allows a very neat solution of the problem. Let the quantity discharged per second be D, and let the whole height BF be h. Let 2G be the quantity by which we must divide the square of the mean velocity in order to have the producing height. This will be less than $2g$, the acceleration of gravity, on account of the convergency at the sides and the tendency to convergence at the lip F. We formerly gave for its measure 702 inches, instead of 772, and said that the inches discharged per second from an orifice of one inch were 26·49, instead of 27·78.

Let x be the distance of any filament from the horizontal line AB. An element of the orifice, therefore (for we may give it this name), is $l dx$. The velocity of this element is $\sqrt{2Gx}$, or $\sqrt{2G} \times x^{\frac{1}{2}}$. The discharge from it is $l\sqrt{2G}\, x^{\frac{1}{2}}\, dx$, and the integral of this differential or $D = \int l\sqrt{2G}\, x^{\frac{1}{2}}\, dx = \frac{2}{3} l\sqrt{2G}\, x^{\frac{3}{2}} + C$. To determine the constant quantity C, observe that M. de Buat found by experiment that IF was in all cases $\frac{1}{2}$ BF. Therefore D must be nothing when $x = \frac{1}{2} h$; consequently $C = -\frac{2}{3} l\sqrt{2G}\left(\frac{h}{2}\right)^{\frac{3}{2}}$, and the complete integral will be $D = \frac{2}{3} l\sqrt{2G}\left[x^{\frac{3}{2}} - \left(\frac{h}{2}\right)^{\frac{3}{2}}\right]$.

Now make $x = h$, and we have

$$D = \frac{2}{3} l\sqrt{2G}\left[h^{\frac{3}{2}} - \left(\frac{h}{2}\right)^{\frac{3}{2}}\right] = \frac{2}{3} l\sqrt{2G}\left[1 - \left(\tfrac{1}{2}\right)^{\frac{3}{2}}\right] h^{\frac{3}{2}}.$$

But $1 - \left(\frac{1}{2}\right)^{\frac{3}{2}} = 0{\cdot}64645$, and $\frac{2}{3}$ of this is 0·431. Therefore, finally, $D = 0{\cdot}431\, l\sqrt{2G}\, h^{\frac{3}{2}}$.

If we now put 26·49 or 26½ for $\sqrt{2G}$, or the velocity with which a head of water of one inch will impel the water over a weir, and multiply this by 0·431, we get the following quantity, 11·4172, or, in numbers of easy recollection, 11½, for the cubic inches of water per second, which runs over every inch of a wasteboard when the edge of it is one inch below the surface of the reservoir; and this must be multiplied by $h^{\frac{3}{2}}$, or by the square root of the cube of the head of water. Thus, let the edge of the wasteboard be four inches below the surface of the water. The cube of this is 64, of which the square root is eight. Therefore a wasteboard of this depth under the surface, and three feet long, will discharge every second 8 × 36 × 11½ cubic inches of water, or $1\frac{9}{10}$ cubic feet, English measure.

The following comparisons will show how much this theory may be depended on. The first column shows the depth of the edge of the board under the surface, the second shows the discharge by theory, and the third the discharge actually observed. The length of the board was 18·4 inches. The numbers in M. de Buat's experiments are here reduced to English measure.

D.	D. Theor.	D. Exp.	E.
1·778	506	524	28·5
3·199	1222	1218	66·2
4·665	2153	2155	117·1
6·753	3750	3771	204·9

The last column is the cubic inches discharged in a second by each inch of the wasteboard. The correspondence is undoubtedly very great. The greatest error is in the first, which may be attributed to a much smaller lateral contraction under so small a head of water.

But it must be remarked, that the calculation proceeds on two suppositions. The height FI is supposed $\frac{1}{2}$ of BI; and 2G is supposed 702. It is evident, that by increasing the one and diminishing the other, nearly the same answers may be produced, unless much greater variations of h be examined. Both of these quantities are matters of considerable uncertainty, particularly the first; and it must be farther remarked, that this was not measured, but deduced from the uniformity of the experiments. We presume that M. de Buat tried various values of G, till he found one which gave the *ratios* of discharge which he observed. We beg leave to observe, that in a set of numerous experiments which we had access to examine, BI was uniformly much less than $\frac{1}{2}$; it was very nearly $\frac{2}{7}$; and the quantity discharged was greater than what would result from M. de Buat's calculation. It was farther observed that IF depended very much on the form of the wasteboard. When it was a very thin board of considerable depth, IF was very considerably greater than if the board was thick, or narrow, and set on the top of a broad dam-head, as in fig. 21.

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It may be proper to give the formula a form which will correspond to any ratio which experience may discover between BF and IF. Thus, let IF be $\frac{m}{n}$ BF. The formula will be $D = \frac{2}{3} l\sqrt{2G}\left(1 - \left(\frac{m}{n}\right)^{\frac{2}{3}}\right) h^{\frac{3}{2}}$.

Meantime, this theory of M. de Buat is of great value to the practical engineer, who at present must content himself with a very vague conjecture, or take the calculation of the erroneous theory of Guglielmini. By that theory, the board of three feet, at the depth of four inches, should discharge nearly $3\frac{1}{10}$ cubic feet per second, which is almost double of what it really delivers.

We presume, therefore, that the following table will be acceptable to practical engineers, who are not familiar with such computations. It contains, in the first column, the depth in English inches from the surface of the stagnant water of a reservoir to the edge of the wasteboard. The second column is the cubic feet of water discharged in a minute by every inch of the wasteboard.

Depth.	Discharge.	Depth.	Discharge.
1	0·403	10	12·748
2	1·140	11	14·707
3	2·095	12	16·758
4	3·225	13	18·895
5	4·507	14	21·117
6	5·925	15	23·419
7	7·466	16	25·800
8	9·122	17	28·258
9	10·884	18	30·786

When the depth does not exceed four inches, it will not be exact enough to take proportional parts for the fractions of an inch. The following method is exact.

If they be odd quarters of an inch, look in the table for as many inches as the depth contains quarters, and take the eighth part of the answer. Thus, for 3¾ inches, take the eighth part of 23·419, which corresponds to 15 inches. This is 2·927.

If the wasteboard is not on the face of a dam, but in a running stream, we must augment the discharge by multiplying the section by the velocity of the stream. But this correction can seldom occur in practice; because in this case the discharge is previously known, and it is h that we want, which is the object of the next problem.

We only beg leave to add, that the experiments which we mention as having been already made in this country, give a result somewhat greater than this table, viz. about $\frac{1}{16}$. Therefore, having obtained the answer by this table, add to it its 16th part, and we apprehend that it will be extremely near the truth.

When, on the other hand, we know the discharge over a wasteboard, we can tell the depth of its edge under the surface of the stagnant water of the reservoir, because we have $h = \left(\frac{D}{11\frac{1}{2}l}\right)^{\frac{2}{3}}$ very nearly.

We are now in a condition to solve the problem respecting a weir across a river.

Prob. II. The discharge and section of a river being given, it is required to determine how much the water will be raised by a weir of the whole breadth of the river, discharging the water with a clear fall, that is, the surface of the water in the lower channel being below the edge of the weir.

In this case we have 2G = 731 nearly, because there

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will be no contraction at the sides when the weir is the whole breadth of the river. But, further, the water is not now stagnant, but moving with the velocity $\frac{D}{S}$, S being the section of the river.

Therefore let a be the height of the weir from the bottom of the river, and h the height of the water above the edge of the weir. We have the velocity with which the water approaches the weir $= \frac{D}{l\,(a+h)}$, l being the length of the weir or breadth of the river. Therefore the height producing the primary mean velocity is $\left(\frac{D}{l\sqrt{2g}\,(a+h)}\right)^2$. The equation given a little ago will give $h=\left(\frac{D}{0{\cdot}431\,l\sqrt{2G}}\right)^{\frac{2}{3}}$, when the water above the weir is stagnant. Therefore, when it is already moving with the velocity $\frac{D}{l(a+h)}$, we shall have $h=\left(\frac{D}{0{\cdot}431\,l\sqrt{2G}}\right)^{\frac{2}{3}}-\left(\frac{D}{l\sqrt{2g}\,(a+h)}\right)^2$. It would be very troublesome to solve this equation regularly, because the unknown quantity h is found in the second term of the answer. But we know that the height producing the velocity above the weir is very small in comparison of h and of a, and, if only estimated roughly, will make a very insensible change in the value of h; and, by repeating the operation, we can correct this value, and obtain h to any degree of exactness.

To illustrate this by an example. Suppose a river, the section of whose stream is 150 feet, and that it discharges 174 cubic feet of water in a second; how much will the waters of this river be raised by a weir of the same width, and 3 feet high.

Suppose the width to be 50 feet. This will give 3 feet for the depth; and we see that the water will have a clear fall, because the lower stream will be the same as before.

The section being 150 feet, and the discharge 174, the mean velocity is $\frac{174}{150} = 1{\cdot}16$ feet $= 14$ inches nearly, which requires the height of $\frac{1}{4}$ of an inch very nearly. This may be taken for the second term of the value of h. Therefore $h=\left(\frac{D}{0{\cdot}431\,l\sqrt{2G}}\right)^{\frac{2}{3}}-\frac{1}{4}$. Now $\sqrt{2G}$ is, in the present case, 27·03, l is 600, and D is $174 \times 1728 = 300672$. Therefore $h = 12{\cdot}28 - 0{\cdot}25 = 12{\cdot}03$ nearly. Correct this value by substituting a more accurate value of the second term $\left(\frac{D}{l\sqrt{2g}(a+h)}\right)^2$, or 0·14. This will give us $h = 12{\cdot}28 - 0{\cdot}25 = 12{\cdot}03$ for a more accurate value, differing from the former about $\frac{1}{10}$ of an inch. It is needless to carry the approximation farther. Thus we see that a weir which dams up the whole of the former current of three feet deep, will only raise the waters of this river one foot.

The same rule serves for showing how high we ought to raise this weir in order to produce *any given rise* of the waters, whether for the purposes of navigation, or for taking off a draft to drive mills, or for any other service; for if the breadth of the river remain the same, the water will still flow over the weir with nearly the same depth. A very small and hardly perceptible difference will indeed arise from the diminution of slope occasioned by this rise, and a consequent diminution of the velocity with which the river approaches the weir. But this difference must always be a small fraction of the second term of our answer; which term is itself very small; and even this will be compensated, in some degree, by the freer fall which the water will have over the weir.

If the intended weir is not to have the whole breadth of the river (which is seldom necessary even for the purposes of navigation), the waters will be raised higher by the same height of the wasteboard. The calculation is precisely the same for this case. Only in the second term, which gives the head of water corresponding to the velocity of the river, l must still be taken for the whole breadth of the river, while in the first term l is the length of the wasteboard. Also $\sqrt{2G}$ must be a little less, on account of the contractions at the ends of the weir, unless these be avoided by giving the masonry at the ends of the wasteboard a curved shape on the upper side of the wasteboard. This should not be done when the sole object of the weir is to raise the surface of the waters. Its effect is but trifling at any rate, when the length of the wasteboard is considerable, in proportion to the thickness of the sheet of water flowing over it.

The following comparisons of this rule with experiment will give our readers some notion of its utility.[1]

Discharge of the Weir per second.	Head producing the velocity at the Weir.	Head producing the velocity above it.	Calculated Height of the River above the Wasteboard.	Observed Height.
Inches.	Inches.	Inches.	Inches.	Inches.
3888	7·302	0·625	6·677	6·583
2462	5·385	0·350	5·035	4·750
1112	3·171	0·116	3·055	3·166
259	1·201	0·0114	1·189	1·250

It was found extremely difficult to measure the exact height of the water in the upper stream above the wasteboard. The curvature AI extended several feet up the stream. Indeed there must be something arbitrary in this measurement, because the surface of the stream is not horizontal. The deviation should be taken, not from a horizontal plane, but from the inclined surface of the river.

It is plain that a river cannot be fitted for continued navigation by weirs. These occasion interruptions; but a few inches may sometimes be added to the waters of a river by a bar, which may still allow a flat-bottomed lighter or a raft to pass over it. This is a very frequent practice in Holland and Flanders; and a very cheap and certain conveyance of goods is there obtained by means of streams which we would think no better than boundary ditches, and unfit for every purpose of this kind. By means of a bar the water is kept up a very few inches, and the stream has free course to the sea. The shoot over the bar is prevented by means of another bar placed a little way below it, lying flat in the bottom of the ditch, but which may be raised up on hinges. The lighterman makes his boat fast to a stake immediately above the bar, raises the lower bar, brings over his boat, again makes it fast, and, having laid down the other bar again, proceeds on his journey. This contrivance answers the end of a lock at a very trifling expense; and though it does not admit of what we are accustomed to call navigation, it gives a very sure conveyance, which would otherwise be impossible. When the waters can be raised by bars, so that they may be drawn off for machinery or other purposes, they are preferable to weirs, because they do not obstruct floating with rafts, and are not destroyed by the ice.

Prob. III. Given the height of a bar, the depth of water both above and below it, and the width of the river, to determine the discharge.

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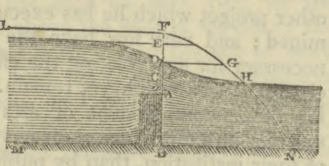
[1] This table from M. de Buat is expressed in French measures.

This is by no means so easily solved as the discharge over a weir, and we cannot do it with the same degree of evidence. We imagine, however, that the following observations will not be very far from a true account of the matter.

We may first suppose a reservoir LFBM (fig. 22) of stagnant water, and that has a wasteboard of the height AB. We may then determine, by the foregoing problems, the discharge through the plane EC. With respect to the discharge through the part CA, it should be equal to the product of this part of the section by the velocity corresponding to the fall EC, which is the difference of the heights of water above and below the bar; for, because the difference of Ea and Ca is equal to EC, every particle a of water in the plane CA is pressed in the direction of this stream with the same force, viz. the weight of the column EC. The sum of these discharges should be the whole discharge over the bar; but since the bar is set up across a running river, its discharge must be the same with that of the river. The water of the river, when it comes to the place of the bar, has acquired some velocity by its slope or other causes, and this corresponds to some height FE. This velocity, multiplied by the section of the river, having the height EB, should give a discharge equal to the discharge over the bar.

Fig. 22.



To avoid this complication of conditions, we may first compute the discharge of the bar in the manner now pointed out, without the consideration of the previous velocity of the stream. This discharge will be a little too small. If we divide it by the section FB, it will give a primary velocity too small, but not far from the truth. Therefore we shall get the height FE, by means of which we shall be able to determine a velocity intermediate between DG and CH, which would correspond to a weir, as also the velocity CH, which corresponds to the part of the section CA, which is wholly under water. Then we correct all these quantities by repeating the operation with them instead of our first assumptions.

M. de Buat found this computation extremely near the truth, but in all cases a little greater than observation exhibited.

We may now solve the problem in the most general terms.

PROB. IV. Given the breadth, depth, and the slope of a river, if we confine its passage by a bar or weir of a known height and width, to determine the rise of the waters above the bar.

The slope and dimensions of the channel being given, our formula will give us the velocity and the quantity of water discharged. Then, by Problem II., find the height of water above the wasteboard. From the sum of these two heights deduct the ordinary depth of the river. The remainder is the rise of the waters. For example:

Let there be a river whose ordinary depth is 3 feet, and breadth 40, and whose slope is 1½ inch in 100 fathoms, or $\frac{1}{4800}$. Suppose a weir on this river 6 feet high and 18 feet wide.

We must first find the velocity and discharge of the river in its natural state; we have $l=480$ inches, $h=36$, $\frac{1}{s}=\frac{1}{4800}$. Our formula of uniform motion gives $V=23{\cdot}45$, and $D=405216$ cubic inches.

The contraction obtains here on the three sides of the orifice. We may therefore take $\sqrt{2G}=26{\cdot}1$. (This example is M. de Buat's, and all the measures are French.) We have also a (the height of the weir) $=72$, and $2g=724$.

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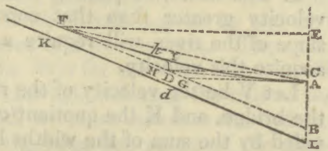
Then the equation $h=\left(\frac{D}{0{\cdot}431\,l\sqrt{2G}}\right)^{\frac{2}{3}}-\left(\frac{D}{l\sqrt{2g}(a+h)}\right)^{2}$ becomes $h=30{\cdot}182$. Add this to the height of the weir, and the depth of the river above the sluice is 102·182 inches = 8 feet and 6·182 inches. From this take 3 feet, and there remains 5 feet and 6·182 inches for the rise of the waters.

There is, however, an important circumstance in this rise of the waters, which must be distinctly understood before we can say what are the interesting effects of this weir. This swell extends, as we all know, to a considerable distance up the stream, but is less sensible as we go away from the weir. What is the distance to which the swell extends, and what increase does it produce in the depth at different distances from the weir?

If we suppose that the slope and the breadth of the channel remain as before, it is plain, that as we come down the stream from that point where the swell is insensible, the depth of the channel increases all the way to the dam. Therefore, as the same quantity of water passes through every section of the river, the velocity must diminish very nearly in the same proportion that the section increases. But this being an open stream, and therefore the velocity being inseparably connected with the slope of the surface, it follows, that the slope of the surface must diminish all the way from that point where the swell of the water is insensible to the dam. The surface, therefore, cannot be a simple inclined plane, but must be concave upwards, as represented in fig. 23, where FKLB represents the channel of a river, and FB the surface of the water running in it. If this be kept up to A by a weir AL, the surface will be a curve FIA, touching the natural surface F at the beginning of the swell, and the line AD which touches it in A will have the slope S corresponding to the velocity which the waters have immediately before going to the weir. We know this slope, because we are supposed to know the discharge of the river and its slope and other circumstances before barring it with a dam; and we know the height of the dam H, and therefore the new velocity at A, or immediately above A, and consequently the slope S. Therefore, drawing the horizontal lines DC, AG, it is plain that CB will be the primary slope of the river, and CA, the slope S corresponding to the velocity in the immediate neighbourhood of A, because these verticals have the same horizontal distance DC. We have therefore CB : CA = S : s very nearly, and S — s : s = CB — CA : CA = AB : CA. Therefore $\mathrm{CA}=\frac{\mathrm{AB}\times s}{\mathrm{S}-s}=\frac{\mathrm{H}s}{\mathrm{S}-s}$. But DA = CA × S, by our definition of slope; therefore $\mathrm{DA}=\frac{\mathrm{HS}s}{\mathrm{S}-s}$.

Fig. 23.



This is all that we can say with precision of this curve. M. de Buat examined what would result from supposing it an arc of a circle. In this case we should have DA = DF, and AF very nearly equal to 2 AD; and as we can thus find AD, we get the whole length FIA of the swell, and also the distances of any part of the curve from the primitive surface FB of the river; for these will be very nearly in the duplicate proportion of their distances from F. Thus ID will be one fourth of AB, &c. Therefore we should obtain the depth Id of the stream in that place. Getting the depth of the stream, and knowing the discharge, we get the velocity, and can compare this with the slope of the surface at I. This should be the slope of that part of the arc of the circle. Making this comparison, he found these circumstances to be incompatible. He found that the section and swell at I, corresponding to an arc of a circle, gave a discharge nearly one fourth too great (they were as 405216 to 492142). Therefore the curve is such that AD is greater than DF, and that it is more incurvated at F than at A. He found, that making DA to DF as 10 to 9, and the curve FIA an arc of an ellipse whose longer axis was vertical, would give a very nice correspondence of the sections, velocities, and slopes. The whole extent of the swell, therefore, can never be double of AD, and must always greatly surpass AD; and these limits will do very well for every practical question. Therefore, making DF nine tenths of AD, and drawing the chord AD, and making DI one half of D *i*, we shall be very near the truth. Then we get the swell with sufficient precision for any point H between F and D, by making $FD^2 : FH^2 = ID : Hh$; and if H is between D and A, we get its distance from the tangent DA by a similar process.

It only remains to determine the swell produced in the waters of a river by the erection of a bridge or cleaning sluice, which contracts the passage. This requires the solution of

Prob. V. Given the depth, breadth, and slope of a river, to determine the swell occasioned by the piers of a bridge or sides of a cleaning sluice, which contract the passage by a given quantity, for a given length of channel.

This swell depends on two circumstances.

1. The whole river must pass through a narrow space, with a velocity proportionably increased; and this requires a certain head of water above the bridge.

2. The water, in passing the length of the piers with a velocity greater than that corresponding to the primary slope of the river, will require a greater slope in order to acquire this velocity.

Let V be the velocity of the river before the erection of the bridge, and K the quotient of the width of the river divided by the sum of the widths between the piers. If the length of the piers, or their dimension in the direction of the stream, is not very great, KV will nearly express the velocity of the river under the arches; and if we suppose for a moment the contraction (in the sense hitherto used) to be nothing, the height producing this velocity will be $\frac{K^2V^2}{2g}$. But the river will not rise so high, having already a slope and velocity before getting under the arches, and the height corresponding to this velocity is $\frac{V^2}{2g}$; therefore the height for producing the augmentation of velocity is $\frac{K^2V^2}{2g} - \frac{V^2}{2g}$. But if we make allowance for contraction, we must employ a co-efficient 2G less than $2g$, and we must multiply the height now found by $\frac{2g}{2G}$. It will then become $\left(\frac{K^2V^2}{2g} - \frac{V^2}{2g}\right)\frac{2g}{2G} = \frac{V^2}{2G}(K^2 - 1)$. This is that part of the swell which must produce the augmentation of velocity.

With respect to what is necessary for producing the additional slope between the piers, let p be the natural slope of the river (or rather the difference of level in the length of the piers) before the erection of the bridge, and corresponding to the velocity V; K^2p will very nearly express the difference of superficial level for the length of the piers, which is necessary for maintaining the velocity KV through the same length. The increase of slope therefore is $K^2p - p = p(K^2 - 1)$. Therefore the whole swell will be $\left(\frac{V^2}{2G} + p\right)(K^2 - 1)$.

These are the chief questions or problems on this subject which occur in the practice of an engineer; and the solutions which we have given may in every case be depended on as very near the truth, and we are confident that the errors will never amount to one fifth of the whole quantity. We are equally certain, that of those who call themselves engineers, and who, without hesitation, undertake jobs of enormous expense, not one in ten is able even to guess at the result of such operations, unless the circumstances of the case happen to coincide with those of some other project which he has executed, or has distinctly examined; and very few have the sagacity and penetration necessary for appreciating the effects of the distinguishing circumstances which yet remain. The society established for the encouragement of arts and manufactures could scarcely do a more important service to the public in the line of their institution, than by publishing in their transactions a description of every work of this kind executed in the kingdom, with an account of its performance. This would be a most valuable collection of experiments and facts. The unlearned practitioner would find among them something which resembles in its chief circumstances almost any project which could occur to him in his business, and would tell him what to expect in the case under his management; and the intelligent engineer, assisted by mathematical knowledge, and the habit of classing things together, would frequently be able to frame general rules. To a gentleman qualified as was the Chevalier de Buat, such a collection would be inestimable, and might suggest a theory as far excelling his as he has excelled all other writers.

We shall conclude this article with some observations on the methods which may be taken for rendering small rivers and brooks fit for inland navigation, or at least for floatage. We get much instruction on this subject from what has been said concerning the swell produced in a river by weirs, bars, or any diminution of its former section. Our knowledge of the form which the surface of this swell affects will furnish rules for spacing these obstructions in such a manner, and at such distances from each other, that the swell produced by one shall extend to the one above it.

If we know the slope, the breadth, and the depth of a river, in the droughts of summer, and have determined on the height of the floodgates, or keeps, which are to be set up in its bed, it is evident that their stations are not matters of arbitrary choice, if we would derive the greatest possible advantage from them.

Some rivers in Flanders and Italy are made navigable in some sort by simple sluices, which, being shut, form magazines of water, which, being discharged by opening the gates, raises the inferior reach enough to permit the passage of the craft which are kept on it. After this momentary rise the keeps are shut again, the water sinks in the lower reach, and the lighters which were floated through the shallows are now obliged to draw into those parts of the reach where they can lie afloat till the next supply of water from above enables them to proceed. This is a very rude and imperfect method, and unjustifiable at this day, when we know the effect of locks, or at least of double gates. We do not mean to enter on the consideration of these contrivances, and to give the methods of their construction, in this place, but refer our readers to what has been already said on this subject in the article Navigation Inland, and to what will be said in the article Water-Works. At present we confine ourselves to the single point of husbanding the different falls in the bed of the river, in such a manner that there may be everywhere a sufficient depth of water; and, in what we have to deliver on the subject, we shall take the form of an example to illustrate the application of the foregoing rules.

Suppose then a river forty feet wide and three feet deep

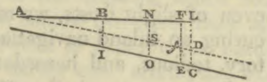
Pr cal Infe nces.

in the droughts of summer, with a slope of one in 4800. This, by the formula of uniform motion, will have a velocity = 23½ inches per second, and its discharge will be 405216 cubic inches, or 234½ feet. It is proposed to give this river a depth of not less than five feet in any place, by means of floodgates of six feet in height and eighteen feet in width.

We first compute the height at which this body of 234½ cubic feet of water will discharge itself over the floodgates. This we shall find by Prob. II. to be 30¼ inches, to which adding 72, the height of the gate, we have 102¼ for the whole height of the water above the floor of the gate; the primitive depth of the river being 3 feet, the rise or swell 5 feet 6¼ inches. In the next place, we find the range or sensible extent of this swell by Prob. I. and the observations which accompany it. This will be found to be nearly 9177 fathoms. Now, since the primitive depth of the river is three feet, there is only wanted two feet of addition; and the question is reduced to the finding what point of the curved surface of the swell is two feet above the tangent plane at the head of the swell, or how far this point is from the gate. The whole extent being 9177 fathoms, and the deviations from the tangent plane being nearly in the duplicate ratio of the distances from the point of contact, we may institute this proportion, $66\frac{1}{4} : 24 = 9177^2 : 5526^2$. The last term is the distance (from the head of the swell) of that part of the surface which is two feet above the primitive surface of the river. Therefore 9177 — 5526, or 3651 fathoms, is the distance of this part from the floodgate; and this is the distance at which the gates should be placed from each other. No inconvenience would arise from having them nearer, if the banks be high enough to contain the waters; but if they are farther distant, the required depth of water cannot be had without increasing the height of the gates; but if reasons of conveniency should induce us to place them nearer, the same depth may be secured by lower gates, and no additional height will be required for the banks. This is generally a matter of moment, because the raising of water brings along with it the chance of flooding the adjoining fields. Knowing the place where the swell ceases to be sensible, we can keep the top of the intermediate floodgate at the precise height of the curved surface of the swell by means of the proportionality of the deviations from the tangent to the distances from the point of contact.

But this rule will not do for a gate which is at a greater distance from the one above it than the 3651 fathoms already mentioned. We know that a higher gate is required, producing a more extensive swell; and the one swell does not coincide with the other, although they may both begin from the same point A. Nor will the curves even be similar, unless the thickness of the sheet of water flowing over the gate be increased in the same ratio. But this is not the case, because the produce of the river, and therefore the thickness of the sheet of water, is constant. But we may suppose them similar without erring more than two or three decimals of an inch; and then we shall have AF : AL = fF : DL; from which, if we take the thickness of the sheet of water already calculated for the other gates, there will remain the height of the gate DL.

Fig. 24.



By following these methods, instead of proceeding by random guesses, we shall procure the greatest depth of water at the smallest expense possible.

ffects reshes.

But there is a circumstance which must be attended to, and which, if neglected, may in a short time render all our works useless. These gates must frequently be open in the time of freshes; and as this channel then has its natural slope increased in every reach by the great contraction of the section in the gates, and also rolls along a greater body of water, the action of the stream on its bed must be increased by the augmentation of velocity which these circumstances will produce; and although we may say that the general slope is necessarily secured by the cills of the floodgates, which are paved with stone or covered with planks, yet this will not hinder this increased current from digging up the bottom in the intervals, undermining the banks, and lodging the mud and earth thus carried off in places where the current meets with any check. All these consequences will assuredly follow if the increased velocity is greater than what corresponds to the regimen relative to the soil in which the river holds on its course.

Practical Inferences.

and of local circumstances,

In order therefore to procure durability to works of this kind, which are generally of enormous expense, the local circumstances must be most scrupulously studied. It is not the ordinary hurried survey of an engineer that will free us from the risk of our navigation becoming very troublesome by the rise of the waters being diminished from their former quantity, and banks formed at a small distance below every sluice. We must attentively study the nature of the soil, and discover experimentally the velocity which is not inconsistent with the permanency of the channel. If this be not a great deal less than that of the river when accelerated by freshes, the regimen may be preserved after the establishment of the gate, and no great changes in the channel will be necessary; but if, on the other hand, the natural velocity of the river during its freshes greatly exceeds what is consistent with stability, we must enlarge the width of the channel, that we may diminish the hydraulic mean depth, and along with this the velocity. Therefore, knowing the quantity discharged during the freshes, divide it by the velocity of regimen, or rather by a velocity somewhat greater (for a reason which will appear by and by), the quotient will be the area of a new section. Then taking the natural slope of the river for the slope which it will preserve in this enlarged channel, and after the cills of the floodgates have been fixed, we must calculate the hydraulic mean depth, and then the other dimensions of the channel. And, lastly, from the known dimensions of the channel and the discharge (which we must now compute), we proceed to calculate the height and the distances of the floodgates, adjusted to their widths, which must be regulated by the room which may be thought proper for the free passage of the lighters which are to ply on the river. An example will illustrate the whole of this process.

illustrated by an example.

Suppose then a small river having a slope of two inches in 100 fathoms, or $\frac{1}{3600}$, which is a very usual declivity of such small streams, and whose depth in summer is two feet, but subject to floods which raise it to nine feet. Let its breadth at the bottom be eighteen feet, and the base of its slanting sides four thirds of their height. All of these dimensions are very conformable to the ordinary course of things. It is proposed to make this river navigable in all seasons by means of keeps and gates placed at proper distances; and we want to know the dimensions of a channel which will be permanent in a soil which begins to yield to a velocity of eighty inches per second, but will be safe under a velocity of twenty-four.

The primitive channel having the properties of a rectangular channel, its breadth during the freshes must be $B = 30$ feet, or 360 inches, and its depth h nine feet or 108 inches; therefore its hydraulic mean depth $d = \frac{Bh}{B + 2h} = 61{\cdot}88$ inches. Its real velocity, therefore, during the freshes, will be 38·9447 inches, and its discharge 1514169 cubic inches or 876¼ cubic feet per second. We see therefore that the natural channel will not be permanent, and will be very quickly destroyed or changed by this great velocity. We have two methods for procuring stability, viz.

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diminishing the slope, or widening the bed. The first method will require the course to be lengthened in the proportion of 24^2 to $38{\cdot}94^2$, or nearly of 38 to 100. The expense of this would be enormous. The second method will require the hydraulic mean depth to be increased nearly in the same proportion (because the velocities are nearly as $\frac{\sqrt{d}}{\sqrt{s}}$). This will evidently be much less costly and, even to procure convenient room for the navigation, must be preferred.

We must now observe, that the great velocity of which we are afraid obtains only during the winter floods. If therefore we reduce this to 24 inches, it must happen that the autumnal freshes, loaded with sand and mud, will certainly deposit a part of it, and choke up our channel below the floodgates. We must therefore select a mean velocity somewhat exceeding the regimen, that it may carry off these depositions. We shall take 27 inches, which will produce this effect on the loose mud without endangering our channel in any remarkable degree.

Therefore we have, by the theorem for uniform motion, $V = 27 = \frac{297\,(\sqrt{d} - 0{\cdot}1)}{\sqrt{s} - \mathrm{L}\sqrt{s + 1{\cdot}6}} - 0{\cdot}3\left(\sqrt{d} - 0{\cdot}1\right)$. Calculating the divisor of this formula, we find it $= 55{\cdot}884$. Hence $\sqrt{d} - 0{\cdot}1 = \frac{27}{\frac{297}{55{\cdot}884} - 0{\cdot}3} = 5{\cdot}3483$, and therefore $d = 30\frac{1}{12}$. Having thus determined the hydraulic mean depth, we find the area S of the section by dividing the discharge 1514169 by the velocity 27. This gives us 56080·368. Then we get the breadth B by the formula formerly given $B = \sqrt{\left(\frac{S}{2d}\right)^2 - 2S} + \frac{S}{2d} = 1802{\cdot}296$ inches, or 150·19 feet, and the depth $h = 31{\cdot}115$ inches

With these dimensions of the section, we are certain that the channel will be permanent; and the cills of the floodgate being all fixed agreeably to the primitive slope, we need not fear that it will be changed in the intervals by the action of the current. The gates being all open during the freshes, the bottom will be cleared of the whole deposited mud.

Station of the floodgates, &c.

We must now station the floodgates along the new channel, at such distances that we may have the depth of water which is proper for the lighters that are to be employed in the navigation. Suppose this to be four feet. We must first of all learn how high the water will be kept in this new channel during the summer droughts. There remained in the primitive channel only two feet, and the section in this case had twenty feet eight inches mean width; and the discharge corresponding to this section and slope $\frac{1}{3600}$ is, by the theorem of uniform motion, 130849 cubic inches per second. To find the depth of water in the new channel corresponding to this discharge and the same slope, we must take the method of approximation formerly exemplified, remembering that the discharge D is 130849, and the breadth B is 1760·8 at the bottom (the slant sides being four thirds). These data will produce a depth of water $= 6\frac{1}{4}$ inches. To obtain four feet therefore behind any of the floodgates, we must have a swell of $41\frac{2}{3}$ inches produced by the gate below.

We must now determine the width of passage which must be given at the gates. This will regulate the thickness of the sheet of water which flows over them when shut; and this, with the height of the gate, fixes the swell at the gate. The extent of this swell, and the elevation of every point of its curved surface above the new surface of the river, require a combination of the height of swell at the floodgate, with the primitive slope and the new velocity. These being computed, the stations of the gates may be assigned, which will secure four feet of water behind each in summer. We need not give these computations, having already exemplified them all with relation to another river.

This example not only illustrates the method of proceeding, so as to be insured of success, but also gives us a precise instance of what must be done in a case which cannot but frequently occur. We see what a prodigious excavation is necessary in order to obtain permanency. We have been obliged to enlarge the primitive bed to about thrice its former size, so that the excavation is at least two thirds of what the other method required. The expense, however, will still be vastly inferior to the other, both from the nature of the work and the quantity of ground occupied. At all events, the expense is enormous, and what could never be repaid by the navigation, except in a very rich and populous country.

There is another circumstance to be attended to. The navigation of this river by sluices must be very desultory, unless they are extremely numerous, and of small heights. The natural surface of the swell being concave upwards, the additions made by its different parts to the primitive height of the river decrease rapidly as they approach to the place A (fig. 23), where the swell terminates; and three gates, each of which raises the water one foot when placed at the proper distance from each other, will raise the water much more than two gates at twice this distance, each raising the water two feet. Moreover, when the elevation produced by a floodgate is considerable, exceeding a very few inches, the fall and current produced by the opening of the gate is such that no boat can possibly pass up the river, and it runs imminent risk of being overset and sunk in the attempt to go down the stream. This renders the navigation desultory. A number of lighters collect themselves at the gates, and wait their opening. They pass through as soon as the current becomes moderate. This would not, perhaps, be very hurtful in a regulated navigation, if they could then proceed on their voyage. But the boats bound up the river must stay on the upper side of the gate which they have just now passed, because the channel is now too shallow for them to proceed. Those bound down the river can only go to the next gate, unless it has been opened at a time nicely adjusted to the opening of the one above it. The passage downwards *may*, in many cases, be continued, by very intelligent and attentive lockmen; but the passage up *must* be exceedingly tedious. Nay, we may say, that *while* the passage downwards is continuous, it is but in a very few cases that the passage upward is practicable. If we add to these inconveniences the great danger of passes during the freshes, while all the gates are open, and the immense and unavoidable accumulations of ice, on occasion even of slight frosts, we may see that this method of procuring an inland navigation is amazingly expensive, desultory, tedious, and hazardous. It did not therefore merit, on its own account, the attention we have bestowed on it. But the discussion was absolutely necessary, in order to show what must be done in order to obtain effect and permanency, and thus to prevent us from engaging in a project which, to a person not duly and confidently informed, is so feasible and promising. Many professional engineers are ready, and with honest intentions, to undertake such tasks; and by avoiding this immense expense, and contenting themselves with a much narrower channel, they succeed: witness the old navigation of the river Mersey. But the work has no duration; and, not having been found very serviceable, its cessation is not matter of much regret. The work is not much spoken of during its continuance. It is soon forgotten, as well as its failure, and engineers are found ready to engage for such another.

It was not a very refined thought to change this imperfect mode for another free from most of its inconveniences. A boat was brought up the river, through one of these gates, only by raising the waters of the inferior reach, and depressing those of the upper: and it could not escape observation, that when the gates were far asunder, a vast body of water must be discharged before this could be done, and that it would be a great improvement to double each gate, with a very small distance between. Thus a very small quantity of water would fill the interval to the desired height, and allow the boat to come through; and this thought was the more obvious, from a similar practice having preceded it, viz. that of navigating a small river by means of double bars, the lowest of which lay flat in the bottom of the river, but could be raised up on hinges. We have mentioned this already; and it appears to have been an old practice, being mentioned by Stevinus in his valuable work on sluices, published about the beginning of the seventeenth century; yet no trace of this method is to be found of much older dates. It occurred, however, accidentally, pretty often in the flat countries of Holland and Flanders, which being the seat of frequent wars, almost every town and village was fortified with wet ditches, connected with the adjoining rivers. Stevinus mentions particularly the works of Condé, as having been long employed, with great ingenuity, for rendering navigable a very long stretch of the Scheldt. The boats were received into the lower part of the fossee, which was separated from the rest by a stone batardeau, serving to keep up the waters in the rest of the fossee about eight feet. In this were a sluice and another dam, by which the boats could be taken into the upper fossee, which communicated with a remote part of the Scheldt, by a long canal. This appears to be one of the earliest locks.

Int uc- tion locks

In the first attempt to introduce this improvement in the navigation of rivers already kept up by weirs, which gave a partial and interrupted navigation, it was usual to avoid the great expense of the second dam and gate, by making the lock altogether detached from the river, within land, and having its basin parallel to the river, and communicating by one end with the river above the weir, and by the other end with the river below the weir, and having a floodgate at each end. This was a most ingenious thought; and it was a prodigious improvement, free from all the inconveniences of currents, ice, &c. &c. It was called a *schlussel*, or lock, with considerable propriety; and this was the origin of the word *sluice*, and of our application of its translation *lock*. This practice being once introduced, it was not long before engineers found that a complete separation of the navigation from the bed of the river was not only the most perfect method for obtaining a sure, easy, and uninterrupted navigation, but that it was in general the most economical in its first construction, and subject to no risk of deterioration by the action of the current, which was here entirely removed. Locked canals, therefore, have almost entirely supplanted all attempts to improve the natural beds of rivers; and this is hardly ever attempted except in the flat countries, where they can hardly be said to differ from horizontal canals.

Concl ing ob vation

The attentive reader must have observed our anxiety to render this dissertation worthy of his notice, by making it practically useful. We have on every occasion appealed from all theoretical deductions, however specious and well supported, to fact and observation of those spontaneous phenomena of nature which are continually passing in review before us in the motion of running waters. Resting in this manner our whole doctrines on experiment, on the observation of what really happens, and what happens in a way which we cannot or do not fully explain, these spontaneous operations of nature came insensibly to acquire a particular value in our imagination. It has also happened in the course of our reflections on these subjects, that these phenomena have frequently presented themselves to our view in groups, not less remarkable for the extent and the importance of their consequences, than for the simplicity, and frequently the seeming insignificancy, nay frivolity, of the means employed. Our fancy has therefore been sometimes warmed with the view of a something, an

> Ens agitans molem, et magno se corpore miscens.

This has sometimes made us express ourselves in a way that is susceptible of misinterpretation, and may even lead into a mistake of our meaning.

We therefore find ourselves obliged to declare, that by the term NATURE, which we have so frequently used *con amore*, we do not mean that indescribable idol which the self-conceit and vanity of some philosophers or pretended philosophers have set up and ostentatiously worshipped, that *ens rationis*, that creature of the imagination, which has long been the object of cool contemplation in the closet of the philosopher, and has shared his attention with many other playthings of his ever-working fancy. By Nature we mean that admirable system of general laws, by which the adored Author and Governor of the universe has thought fit to connect the various parts of this wonderful and goodly frame of things, and to regulate all their operations.

We are not afraid of continually appealing to the laws of nature; and, as we have already observed in the article PHILOSOPHY, we consider these general laws as the most magnificent displays of Infinite Wisdom, and the contemplation of them as the most cheering employment of our understandings.

> Igneus est illis vigor et cœlestis origo
> Seminibus.

At the same time we despise the cold-hearted philosopher who stops short here, and is satisfied, perhaps inwardly pleased, that he has completely accounted for every thing by the laws of unchanging nature; and we suspect that this philosopher would analyse with the same frigid ingenuity, and explain by irresistible στοργὴ, the tender attachment of her whose breast he sucked, and who by many anxious and sleepless nights preserved alive the puling infant. But let us rather listen to the words of him who was the most sagacious observer and the most faithful interpreter of nature's laws, our illustrious countryman Sir Isaac Newton.

"Elegantissima hæcce rerum compages non nisi consilio et *dominio* entis sapientissimi et potentissimi oriri potuit. Omnia, simili constructa consilio, suberunt *unius* dominio. Hic omnia regit, non ut *anima mundi*, sed ut universorum dominus. Propter dominium suum, dominus deus παντοκράτωρ nuncupatur. Deus ad servientes respicit, et *deitas* est dominatio dei, non in corpus proprium, uti sentiunt quibus deus est natura seu anima mundi, sed in servos. Deus summus est ens eternum, infinitum, absolute perfectum. Ens utcunque perfectum, at sine dominio, non est dominus deus. Hunc cognoscimus, solummodo per proprietates ejus et attributa. Attribuuntur ut ex phenomenis dignoscuntur. Phenomena sunt sapientissimæ et optimæ rerum structuræ, atque causæ finales. Hunc admiramur ob perfectiones; hunc veneramur et colimus ob dominium."

Our readers will probably be pleased with the following list of authors who have treated professedly of the motions of rivers: Guglielmini *De Fluviis et Castellis Aquarum*—*Danubius Illustratus*; Grandi *De Castellis*; Zendrini *De Motu Aquarum*; Frisius *De Fluviis*; Lecchi, *Idrostatica i Idraulica*; Michelotti, *Sperienze Idrauliche*; Belidor, *Architecture Hydraulique*; Bossut, *Hydrodynamique*; Buat, *Hydraulique*; Silberschlag, *Théorie des Fleuves*; *Lettres de* M. L'Epinasse *au P. Frisi touchant sa Théorie des Fleuves*; *Tableau des Principales Rivières du Monde*, par

Genetté; Stevins *Sur les Ecluses; Traité des Ecluses*, par Boulard, *qui a remporté le Prix de l'Acad. de Lyons*; Bleiswyck, *Dissertatio de Aggeribus*; Bossut et Viallet *Sur la Construction des Digues*; Stevin, *Hydrostatica*; Tielman van der Horst, *Theatrum Machinarum Universale*; De la Lande *Sur la Canaux de Navigation.* Racolta di Autori chi trattano del Moto dell' Acque, 3 tom. 4to; Firenze, 1723. This most valuable collection contains the writings of Archimedes, Albizi, Galileo, Castelli, Michelini, Borelli, Montanari, Viviani, Cassini, Guglielmini, Grandi, Manfredi, Picard, and Narduci; and an account of the numberless works which have been carried on in the embankment of the Po. A continuation of this collection, containing many important papers, was published at Bologna in 1823, in six volumes. Coulomb, *Expériences sur la Cohérence des Fluides*, &c. in volume iii. of the Memoirs of the Institute, Class of Physical and Mathematical Sciences; Girard, *Essai sur le Mouvement des Eaux courantes, Mémoires sur le Canal de l'Ourcq*, and *Mémoires sur les Canaux de Navigation;* Prony, *Nouvelle Architecture Hydraulique*, and *Recherches Physico-Mathématiques sur la Théorie des Eaux courantes;* Venturi *Sur la Communication latérale du Mouvement des Fluides;* Eytelwein, *Handbuch der Mechanik und der Hydraulik;* De Fontaine, *Travaux du Fleuve du Rhin;* Bidone, *Expériences sur la Dépense des Réservoirs*, in volume xxviii. of the Memoirs of the Academy of Turin; Rennie's two Reports on Hydraulics, in the Transactions of the third and fourth meetings of the British Association. (B. B. B.)

River-Water. This is generally much softer and better accommodated to economical purposes than spring water. For though rivers proceed originally from springs, yet, by their rapid motion, and by being exposed during a long course to the influence of the sun and air, the earthy and metallic salts which they contain are decomposed, the acid flies off, and the terrestrial parts precipitate to the bottom. Rivers are also rendered softer by the vast quantity of rain water, which, passing along the surface of the earth, is conveyed into their channels. But all rivers carry with them a great deal of mud and other impurities; and when they flow near large and populous towns, they become impregnated with a number of heterogeneous substances, in which state the water is certainly unfit for many purposes; yet, by remaining for some time at rest, all the feculencies subside, and the water becomes sufficiently pure for most of the common purposes of life. River-water may be rendered still purer by filtration through sand and gravel.

RIVERHEAD, a town of the county of Kent, in the lathe of Sutton and hundred of Codsheath, twenty-two miles from London. The river Darent, which rises within the parish, has given its name to it. In this parish is the elegant seat of Lord Amherst, called Montreal. A new church in the Gothic style has been lately erected and consecrated. It is situated within the parish of Seven Oaks. The population was in 1801, 750; in 1811, 1012; in 1821, 1216; and in 1831, 1420.

RIVOLI, a city of the kingdom of Sardinia, in Italy, in the province of Piedmont. It is situated at the south foot of the Alps, on the great road over those mountains by way of Mount Cenis. A remarkable castle near it was long the place of residence of King Victor Amadeus, after his abdication of the throne, and he died there in 1732. The prospect from this castle, comprehending a view of the city of Turin, and the beautiful country surrounding it, is peculiarly exciting. The population consists of 6100 inhabitants, who are occupied in the manufactures of silk, linen, and woollen goods, of various kinds.

ROAD, in *Navigation*, a bay or place of anchorage, at some distance from the shore, whither vessels occasionally repair to receive intelligence, orders, or necessary supplies, or to wait for a fair wind. The excellence of a road consists chiefly in its being protected from the reigning winds and the swell of the sea, in having a good anchoring ground, and being at a competent distance from the shore. Those which are not sufficiently protected are termed *open roads*.

ROAD-MAKING. There are few departments of practical mechanics in which every individual, at some period or other of his life, is more immediately interested than in the management of roads and pavements. The mechanical theory of the motions of wheel-carriages, and of the nature of the frictions and resistances that they have to overcome, as relating to the ultimate objects for which roads are constructed, may naturally constitute the first section of an essay on this subject; the second will naturally comprehend the best arrangement of the means for attaining those objects, by the form and construction of such roads and pavements as appear to be the most eligible under various circumstances; and the third may be devoted to some historical illustrations of the principal roads which exist, or which have existed, in various parts of the world.

Sect. I.—*Of the Objects of Roads.*

The grand object of all modern roads is the accommodation of wheel-carriages. The construction of footpaths and of bridle-roads is so simple as to require very little separate consideration; except that, in cities and towns, the convenience of the inhabitants requires that some pains should be taken to avoid dust, and has generally been a reason for employing pavements in preference to gravel roads, which might in some other respects be more eligible.

For facilitating the motion of carriages, the most essential requisite is to have the road as smooth, and as hard, and as level as possible. The wheels of carriages are principally useful in diminishing the friction of the materials; a dray sliding without wheels, even on a railroad of greased and polished iron, would have to overcome a friction as much greater than that of the wheel on its axle, as the diameter of the wheel is greater than that of the axle. The wheels assist us also in drawing a carriage over an obstacle; for the path which the axis of the wheel describes is always smoother and less abrupt than the surface of a rough road, on which the wheel rolls, and so much the smoother as the wheel is larger, since the portions of larger circles, which constitute the path in question, are less curved than those of smaller ones.

But in all common cases of roads not extremely hard, by far the greater part of the resistance actually exhibited by a road to the motion of a carriage, is that which depends on the continual displacement of a portion of the materials from their inelasticity, which causes them to exert a continual pressure on the fore part of the wheel, without rising behind it to propel it forwards by its re-action, as an elastic substance would do. Hence, in a soft sand, although the axles of the wheels may move in a direction perfectly horizontal, the draught becomes extremely heavy. The more the wheel sinks, the greater is the resistance; and if we suppose the degree of elasticity of the materials, and their immediate resistance at different depths, to be known, we may calculate the whole effect of their action on the wheel, and the force that is required to displace them, in the progressive motion of the carriage. Thus, if the materials were perfectly inelastic, acting only on the preceding half of the immersed portion of the wheel, and their immediate pressure or resistance were simply proportional to the depth, like that of fluids, or that of elastic substances compressed, the horizontal resistance would be to the weight nearly as two fifths of the length of the part immersed at once, in the newly formed rut, to the diameter of the wheel; or, on a still more probable supposition respecting the greater resistance of the more deeply-seated parts of the rut, about half as much as this, or as about one fifth of the length of the part immersed in the rut to the diameter. Thus, if a coach or waggon, weighing sixty hundredweight, supported by wheels four feet in diameter, formed a new rut, an inch deep, in a smooth road, the length of the part immersed being about fourteen inches, the resistance would be about $\frac{1}{17}$th of the weight, upon the lowest supposition that is at all admissible, and more probably about one ninth, or from six to seven hundredweight at least; and if the rut were two inches deep, the resistance would be half as much more. But, on any supposition, the increased height, and even the increased breadth, of the wheel, is calculated to diminish the resistance, by diminishing the depth of the part immersed; thus, if a wheel were made four times as high, the length of the part immersed, considering the road as an imperfect fluid, would be doubled, and the resistance would be diminished, theoretically speaking, to about half of its former magnitude; and if the breadth were increased from one to eight, the length of the part immersed would be diminished to about a half, and the resistance would in this case also be reduced to a half.

In soft and boggy soils, as well as in sandy roads, this consideration is of great importance; and the wheels employed for removing heavy weights, in such cases, ought to be as high and as broad as possible consistently with sufficient lightness and economy. But whether a broad, and, at the same time, a low roller, possesses any advantages above a narrow coach-wheel, is a matter much more questionable: it must be remembered that a narrow wheel may often run between stones, where a broader would have to pass over them; and there appears to be no theoretical reason for preferring a low roller, except with respect to a single pair of wheels, as affording a more convenient attachment for the shafts in a moderate inclination, which is both more favourable to the exertion of the horses, and more effective in overcoming the friction; since it has been demonstrated that the angle affording the most advantageous line of draught is exactly the same as the inclination of a plane along which the carriage would just begin to descend by its own weight on the same kind of surface. In fact, however, there is no necessity for fixing the axle-tree precisely in the line of draught; and the principal reason for having the fore wheels lower than the others is for the convenience of turning the carriage more abruptly. A very accurate practical road-maker has observed, that a good road never suffers from narrow wheels with moderate weights not in rapid motion, but that it is equally worn by the rapid driving of heavy stage-coaches, and by the slow grinding of the conical rollers of overloaded, broad-wheeled waggons.

Such being the operations of the wheels of carriages on sandy or on rough roads, it is easy to perceive how much the hardness and smoothness of the surface must facilitate the draught; it is obvious also that the same qualities must be equally conducive to the durability of the road, since the inequalities will always cause the carriage to fall on it with a certain impetus after being elevated by the irregularities, and the same shock which strains the carriage will also tend to wear away the road still more where it is lowest; and, on the other hand, the resistance of the soft materials before the wheel will tend to tear up the road, as it causes the wheel to thrust them before it.

It happens not very uncommonly that the interests of the traveller and the postmaster are somewhat at variance with respect to the qualities of a road. The French postilion keeps to the rough pavement as long as the aching limbs of the ladies in the carriage will allow them to be silent, except when, in going down hill, he saves himself the trouble of locking the wheel, by bringing it to the soft edge of the ditch or kennel; and the horses of the Parisian cabriolets, in their excursions to the suburbs, have sagacity enough to incline always to the pavement, when their drivers allow them to have a will of their own; while a single horseman, on the contrary, more commonly finds his steed on the gravel road, if he happens to leave him to his own direction. In Great Britain the roads are commonly managed by commissioners, who have no community of interest with the innkeepers; on the Continent they are universally under the immediate direction of the different governments, who also appoint the postmasters, while the carriages are almost as uniformly the property of particular individuals, who have no immediate influence on the management of the roads; and this diversity may perhaps explain, in some measure, the different systems of road-making which prevail on the opposite sides of the channel. But it may be said of roads as of governments, "that which is best administered is best;" whether a very smooth pavement not too slippery, or a very hard gravel road not worn into great inequalities.

SECT. II.—*Of the Mechanical Formation of Roads.*

The only strongly-marked division of the different kinds of roads depends on their being paved or gravelled; but each of these classes admits of considerable diversity in the principles on which the road is constructed. The theory of pavement appears to be extremely simple; the stones, however, may be either small or large; the former being understood to be employed without previous preparation of their shape, as in the inferior kind of work which is called "pitching" in the west of England; the latter being more or less cut to fit each other, whether in the form of thick rough blocks, not very remote from cubes, or of flat and smooth flagstones. In the cities of Great Britain the former are commonly used for horse-pavements, and the latter for foot-passengers; but in Florence the whole breadth of the streets is paved with flagstones placed diagonally, and in Naples the surfaces are nearly as smooth; in both these cases it is necessary to roughen the stones frequently with chisels wherever there is a hill or a bridge, in order to prevent the horses slipping, but in both cities the horses from habit are sufficiently sure-footed, even when running with some rapidity. In Milan both kinds of pavements are mixed in the same streets; the smooth in two double lines, for the wheels of carriages coming and going, and the rougher in the intermediate parts, for the feet of the horses, as in the British railroads. But in none of these cities is there much heavy traffic to wear these well-arranged surfaces into such inequalities as would probably soon be observed in the streets of London if they were so delicately formed; although, until this deterioration actually took place, the locomotion would be luxurious both for the horses and for the passengers, and only ruinous to the coachmakers. The Romans used large and heavy blocks for their roads, cutting them on the spot into such forms as enabled them to be best adjusted to those of the neighbouring stones, though seldom exactly rectangular in their surfaces; and even at Pompeii, where the ruts are worn half through the depth of the blocks, the bottom remains tolerably even, in a longitudinal direction, at least as much so as would be required for carts and other carriages of business.

Our more particular object, however, at present, is the consideration of gravel-roads rather than of pavements; the word gravel being here understood to mean in general all stone broken small, whether by nature or by art. The improvement of such roads has long been a subject of great interest with the agricultural and commercial inhabitants of Great Britain. It was soon after the year 1700 that a part of the charge of repairing roads was taken off the respective parishes through which they pass, and levied on the general traveller by means of turnpike-gates; but it was for many years a complaint that the roads were little, if at all, fundamentally improved by the expenditure of the money so raised. This complaint is very energetically advanced in a Dissertation concerning the present State of the High Roads of England, especially of those near London, wherein is proposed a new Method of Repairing and Maintaining them; read before the Royal Society in the winter of 1736–37, by Robert Phillips, and printed in a small separate volume. The author's great object is to recommend washing the roads by a constant stream, if possible, and at any rate, washing the materials of which they are composed. In this respect, notwithstanding the existence of single roads so situated that the effects of water upon them have been very beneficially introduced, his plans for the universal employment of water have been altogether superseded by later experience; but he remonstrates, with great propriety, against the practice, which has, however, continued to prevail so generally even of late years, of laying down large heaps of unprepared gravel, to be gradually consolidated into a harder mass, at the expense of the intolerable labour of the poor animals that are obliged to grind it down. As an illustration of the good effect of water, he mentions that even the sediment deposited by it at the bottom of Fleetditch, which was supposed to be a soft mud, and to require removal when the ditch was filled up, proved in fact to be a hard gravelly substance, which afterwards afforded an excellent foundation for the roads and buildings supported by it.

The attention of the public has been more lately directed to the subject of roads and carriages, by several essays which appeared in the Communications to the Board of Agriculture; they principally belong to the names of Beatson, Wright, Jessop, Hall, Wilkes, Erskine, Ellis, Cumming, Whetley, Amos, and Booth: the most remarkable are Mr Wilkes's Remarks on the Advantages of Concave Roads; Mr Ellis's on Washing Roads; Mr Wilkes's on Railways; and Mr Cumming's on Wheel-Carriages; showing particularly the disadvantage of broad conical wheels, and the historical progress of the practice of bending the line of the axes.

But all these improvements, whether real or imaginary, have since been in a great measure superseded by the ingenuity and success of Mr Loudon Macadam, a gentleman whose practice is in general principally to be applauded for its obvious simplicity and economy, though he has also had the merit of discovering that the simplest and cheapest methods, in particular cases, especially in that of boggy soils, are also the most scientific and the most effectual. The practical observations, which are to be here inserted, cannot therefore be so well expressed in any other form, as in that of an abstract of Mr Macadam's own directions.

Mr Macadam's leading principles are (Remarks, p. 37), "that a road ought to be considered as an artificial flooring, forming a strong, smooth, solid surface, at once capable of carrying great weights, and over which carriages may pass without meeting any impediment."

He proceeds to give directions for repairing an old road and for making a new one, in the form of a communication to a committee appointed by the House of Commons, in the year 1819, with some subsequent corrections.

No additional materials, he observes, are to be brought upon a road, unless in any part of it there be not a quantity of clean stone equal to ten inches in thickness.

The stone already in the road, supposing it to have been made in the usual manner, is to be loosened, and broken so that no piece may exceed SIX OUNCES in weight; the road is then to be laid as flat as possible, leaving only a fall of three inches from the middle to the sides when the road is thirty feet wide. The stones, thus loosened, are to be dragged to the side by a strong heavy rake, with teeth two inches and a half in length, and there broken; but the stones are never to be broken on the road itself.

When the great stones have been removed, and none are left exceeding six ounces in weight, the surface is to be made smooth by a rake, which will also settle the remaining materials into a better consistence, bringing up the stone, and letting the dirt fall down into its place.

The road being so prepared, the stone that has been broken by the side is then to be carefully spread over it: this operation requires very particular attention, and the future quality of the road will greatly depend on the manner in which it is performed; the stone must not be laid on in shovels-full, but scattered over the surface, one shovelfull following another, and being spread over a considerable space.

Only a small part of the length of the road should be *lifted* in this manner at once; that is, about two or three yards; five men in a gang should be employed to *lift* it all across, two continually digging up and raking off the large stones, and preparing the road for receiving them again, and the other three breaking them at the side of the road. It may, however, happen that the surveyor may see cause to distribute the labour in a proportion somewhat different.

The only proper method of breaking stones, in general, both for effect and for economy, is in a sitting posture. The stones are to be placed in small heaps, and women, boys, and old men past hard labour, may sit down and break them with small hammers into pieces not exceeding *six ounces* in weight. When the heavy work of a quarry can be performed by men, and the lighter by their wives and children, the stone can be obtained by contract for two thirds of the former prices, although the stones were then left four times as large. It has also been recommended by Mr Macadam and others (p. 35), that the largest stone employed should not exceed the measure of an inch in its greatest dimensions, or, in other words, that it should be capable of being contained in a sphere of about an inch in diameter, which would seldom weigh more than a single ounce.

In some cases it would be unprofitable to lift and relay a road, even if the materials should have been originally too large; for example, the road betwixt Bath and Cirencester was made of large stones, but so friable, that in lifting they would have fallen into sand; in this case Mr Macadam merely had the higher parts cut down, and replaced when sifted (p. 107), and the surface kept smooth, until those materials were gradually worn out; and they were afterwards replaced by stone of a better quality, properly prepared. At Egham it was necessary to remove the whole road, in order to separate the small portion of valuable materials from the mass of soft matter in which they were enveloped, and which was carried away, at a considerable expense, before a good road could be made. But although freestone is by no means calculated to make a durable road, yet by judicious management it may be made to form a very good road as long as it lasts. (P. 103.)

Whenever new stone is to be laid on a road already consolidated, the hardened surface is to be loosened with a pick, in order to enable the fresh materials to unite with the old.

A new road, however well it may have been made, will always receive the impressions of the carriage-wheels until it is hardened; a careful person must, therefore, attend the road for some time, in order to rake in the tracks made by the wheels; that is, as long as any loose materials are left that can be so employed.

It is always superfluous, and generally injurious, to add to the broken stone any mixture of earth, clay, chalk, or any other matter that will imbibe water and be affected by frost, or to lay any thing whatever on the clean stone for the purpose of binding it; *for good stone, well broken, will always combine by its own roughness into a solid substance*, with a smooth surface, that will not be affected by the vicissitudes of weather, or disfigured by the action of wheels, which, as they pass over it without a jolt, will consequently be incapable of doing it any considerable injury.

The experience of the year 1820 strongly confirmed the inutility and inconvenience of employing chalk with the stone. In January, when a hard frost was succeeded by a sudden thaw, a great number of roads broke up, and the wheels of the carriages penetrated into the original soil; in particular, it was observed that all the roads of which chalk was a component part became nearly impassable; and even roads made over chalky soils gave way in most places. But not one of the roads that had been thoroughly made after these directions was observed to give way. (P. 44–46.)

The tools required for lifting roads are, 1. Strong *picks*, but short from the handle to the point; 2. small *hammers*, weighing about a pound, with a face the size of a shilling, well steeled, and with a short handle; 3. *rakes*, with wooden heads, ten inches in length, and with iron teeth about two and a half inches long, and very strong, for raking out the large stones when the road is broken up, and for keeping it smooth after it has been finished, and while it is consolidating; 4. very light broad-mouthed *shovels*, to spread the broken stones, and to form the road.

The whole expense of lifting and newly forming a rough road, to the depth of four inches, has generally been from a penny to twopence per square yard, being more or less according to the quantity of stone to be broken. With proper tools, and by proper arrangements, stone may be broken for tenpence or a shilling per ton, including, in some cases, the value of the stone itself. A very material advantage of Mr Macadam's method is the introduction of a much greater proportion of human labour, instead of the work of horses; formerly one fourth of the whole expense was paid, in the district of Bristol, for men's labour, and three fourths for that of horses; now, on the contrary, one fourth only is paid for horses' labour, and the other three to men, women, and children.

Mr Macadam argues very strongly against the old opinion of the necessity of placing a quantity of large stones as a foundation, to carry the road over a wet subsoil. He says, that whatever be the nature of the soil, if it be previously " made quite dry," and a covering impenetrable to rain placed over it, the thickness of the covering needs only to depend on its own capability of becoming impervious. Large stones, he says, will constantly work up by the agitation of the traffic on the road, and leave vacuities for the reception of water; and the only way of keeping the stones in their places is to have them of a uniform size. A rocky bottom causes a road to wear out much the faster [acting, probably, as a lower millstone in facilitating the operation of grinding]. " It is a known fact, that a road lasts much longer over a morass than when made over rock. In the neighbourhood of Bridgewater, for example, the materials consumed on a rocky road, when compared with those which are required for a similar road made over the naked surface of the soil, are in the proportion of seven to five."

In the summer of 1819, upon some new roads made in Scotland, more than three feet of materials, of various dimensions, were laid down; and more than two thirds of them, according to our author, were worse than wasted. In such an arrangement, the water generally penetrates to the bottom of the trench made to receive the road, and remains there to do mischief upon every change of weather.

To prevent such inconveniences, it is necessary, in wet soils, either to make drains to lower ground, or to raise the road above the general level, instead of making a trench to receive the stones; and from the penetration of rain the solidity of the road itself must protect it. A well-made road, not quite four inches in thickness, was found to have kept the earth below it dry in the parish of Ashton near Bristol but six, eight, or ten inches of materials are generally required to make a firm road; being laid on in successive layers of about two inches in thickness, all well broken, well cleaned, and well sized. Sometimes, indeed, a much greater depth of stone than this is required: in a road, for example, which was made from Lewes to East Bourn, entirely upon Mr Macadam's principles, as much as three feet of materials were required in many parts before the road could be sufficiently consolidated; it was, however, ultimately made excellent, though at an expense of not much less than a thousand pounds a mile.

Mr Macadam maintains that the quantity of stone required for paving is fully sufficient to make an excellent gravel road in any part of the world; and in almost every case, materials equally good can be obtained for roads at a still cheaper rate; commonly, indeed, at one tenth of the expense of pavements. It is, however, in steep ascents that pavements are most objectionable; at the north end of Blackfriars Bridge, more horses are said to fall and receive injury than at any other place in the kingdom. In the suburbs of Bristol the pavements have lately been converted into roads with great success. It is probable that neither the inhabitants of these suburbs nor their housemaids were much consulted on the occasion, although justice seems to require that the pedestrian order should not be altogether sacrificed to the equestrian without their consent; but, in fact, the inhabitants of these *ci-devant* streets are said to be well satisfied with the change; and we seem in danger, from the opposition of contending theories, of having all the streets of our cities dug up, and many of our country roads, on the other hand, encumbered with pavements. Mr Macadam received a new encouragement from parliament to the amount of L.4000.

We find some further confirmations and illustrations of Mr Macadam's principles and precepts in the Report of the former Committee of the House of Commons, as reprinted in his Remarks.

This gentleman, it seems, arrived from America in the year 1783, at the time when many new roads were making in Scotland (p. 97); he was then appointed a commissioner of the roads, and studied the subject in that capacity there; he afterwards resided chiefly in Bristol, and was induced to take charge of the roads of that district as a surveyor in 1816, because it was only in that situation that he could carry his principles into practice, and make the necessary experiments for establishing them. He observed in his travels, that the mixture of clay and chalk with the materials of roads was the almost universal cause of their failure; and he convinced himself that, by a proper application of materials, a good road might be made in every country. His improvements have been very generally adopted in the west and the south of England, and principally under his own direction or under that of his family. They had superintended more than 300 miles of road, and twice as many more had been improved by their advice and influence. Sober, active, and well-informed sub-surveyors he considers as the most important of all materials for a good road; and among the extrinsic arrangements which are often required, he thinks the union of different trusts into a single one the most likely to be generally beneficial.

The operation of washing gravel Mr Macadam has not found eligible, because it is more expensive than screening or sifting, and less effectual; for about London the common gravel is not capable of being cleaned by any ordinary washing, though the Thames gravel, where it can be procured, is generally clean and serviceable. Coarse gravel broken, he says, is preferable to fine, as it consolidates more perfectly into a single mass. The old practice of putting a heap of unprepared gravel along the middle of the road, and letting it work its own way gradually to the sides, he thinks every way reprehensible.

The objection to a very convex road is, that travellers only use the middle of it, which is therefore worn into three furrows by the string of horses and by the wheels; if the road is flatter, it becomes worn more equally. Ditches, he observes, only require to be so deep that the surface of the water in them may be a few inches below the level of the road; the farmer often makes them dangerously deep, on account of the value of the mould that is dug out of them. Mr Macadam would prefer a bog to any other foundation for a road, provided that it would allow a man to walk over it; and he justly observes, that the resistance to the motion of a carriage would not be materially affected by the foundation, if the road were well made. From Bridgewater to Cross, a part of the road shakes when a carriage passes over it; yet the consumption of materials is less there than on the limestone rock in the neighbourhood. He does not use any faggots in such cases, nor any stones larger than six ounces in weight; and these never sink in the bog, but unite into one mass like a piece of timber, which rests on it. He makes such a road generally at three different times; and he always prefers working in weather not very dry. The surveyors are directed to carry a pair of scales and a six-ounce weight in their pockets, as a check upon the workmen.

Mr Macadam has generally found reason to approve the usual regulation respecting carriage-wheels; but he thinks broad wheels less advantageous to roads than is commonly supposed. He suggests that the tolls might always be fairly made proportional to the exact number of horses employed; except that the waggoners should be encouraged to harness them in pairs rather than in a line. The conical form of broad wheels he thinks very injurious.

Clean flints from the sea-side are among the best materials for roads, and might often be procured cheap by canals; granite chippings also, brought as ballast, are excellent; and when the middle of the road has been well made with good stones, the sides may often be left for a few feet less abundantly provided with them, as they are naturally much less exposed to wear.

Of the other evidence produced to the committee of the House of Commons, there is much that gives us valuable information respecting the economy of horses and carriages in general, and some that deserves to be noticed, as affording partial exceptions to the universal adoption of the system introduced by Mr Macadam.

Mr Waterhouse observes (p. 85), that stage-coach horses generally last about four years in the neighbourhood of London, and about six in remoter parts. He agrees with Mr Macadam, that a very slight convexity is better for a road than a greater; that roads in wet situations often require underdraining; and that the gravel near London is too often used without being sufficiently cleaned. Mr Horne's horses generally wear out in about three years. The "light" coaches, with their loads, generally weigh about two tons and a half; the coach one, the passengers one, and the luggage a half. The Uxbridge road, he says, is generally heavy, because it lies lower than the neighbouring land, and is not sufficiently drained. Mr Eames reports that the Guildford road is so much improved by the introduction of flints instead of gravel, that sixteen miles are as easily performed on it by his horses as twelve were before the alteration. Mr Farey explains the principle upon which some of the roads about London are watered in winter; it is in order to soften the tenacious mud that is formed upon the surface, to prevent its adhering to the carriage-wheels, and to enable it to be scraped off with ease. He says that about Whitechapel it has been found very advantageous for the heavy traffic to have the middle of the road paved; and he thinks that two lines of pavement, one on each side, would be preferable to a single one, in order that the waggoners might walk at the sides of the road, leaving the middle for lighter carriages. He would have a road fifty-five feet wide, elevated about twelve inches in the middle. Broad wheels, he thinks, are seldom so flat as to bear on their whole surface at once, being commonly rather conoidal than conical; so that they differ less in their effect from narrower wheels than is commonly supposed. Mr Walker adheres to the old opinion, that in soft soils a road ought to be founded on bushes or "bavins;" that is, where they can be expected to remain always wet, so as not to be liable to a very speedy decay. He observes, that if a road does not possess some considerable convexity at first, it will wear concave, and collect mud; the elevation, he thinks, should be about one thirtieth of the breadth. Mr Telford informs the committee (p. 168) that the declivity of the Welsh roads was formerly in many places one inch in ten; and in some one in eight, and even one in six; but that the modern road scarcely ever rises above an inch in thirty; and that the utmost ascent in the whole line is one in seventeen for about two hundred yards. With respect to the weight of the stones, he agrees with Mr Macadam, that they ought not to exceed six or eight ounces; and that gravel is best cleaned by riddling it repeatedly, and leaving it to dry in the intervals.

SECT. III.—*Of the Roads of different Ages and Countries.*

The Romans appear to have been beyond comparison the greatest road-makers of the ancient or the modern world. The story told by Montaigne (iii. vi. p. 206) of a road in Peru, from Quito to Cuzco, 300 leagues long and twenty-five paces broad, made of stones ten feet square, with a running stream and a row of trees on each side, seems to have been considerably exaggerated; and it is not very clear whether the stones he mentions were used for the road or for the houses of entertainment built at intervals by its side; nor have the "rocks cut through" and "mountains levelled" been very particularly noticed by more recent travellers in that country. In Italy only, the Romans are said to have made more than 14,000 miles of road, which was generally executed with great care and labour; and many of their roads still remain as the foundation of the most favourite routes of Italian travellers. The more than Roman despot of modern times was as much a Roman in his road-making as in the selfish character of his general policy; and in proportion to the duration of his dynasty, he performed more than all the Appii and Flaminii of antiquity. Whatever his merits may have been, the beneficial effects of his measures remain; and those who have profited by his improvements have no right to criticise his motives with too great severity.

Of the great roads diverging from the gates of ancient Rome, about twelve have been enumerated by antiquaries, and twelve more branched off from these at a small distance from the city; eighteen others commenced in different parts of Italy, and in the whole there are at least fifty, which have been distinguished by appropriate names, without including the military roads through the distant provinces; such, for example, as in England were distinguished by the name of streets, of which many traces yet remain in different parts of the country.

Directly to the sea the Romans travelled by the Ostian road; along its shores to the north-west by the Aurelian, and to the south-east by the Appian. Next within the Aurelian was the Flaminian, then the Salarian, the Nomentanian, the Tiburtine, the Prænestine, the Lavican, and the Latin; and then the Appian, which was the most ancient of all, having been made as far as Capua, in the 442d year of the city, accompanied to a considerable distance by an aqueduct. The Aurelian road was made in the year 512; the Flaminian about 533.

I. The *Flaminian* road still affords the great northern approach to Rome by the Porta del Popolo; it led to Foligno, Ancona, and Rimini, and was continued by the *Emilian* to Bologna, and thence to Aquilegia, near Venice; the present mountain route from Bologna to Rome is still facilitated by the remains of the ancient structures. Besides the Emilian road, the Flaminian was also connected with the *Cassian*, leading to Modena; the *Claudian*, to Arezzo, Florence, and Lucca: there were also six other branches of less note, each named after its founder.

II. III. The *Salarian* and the *Nomentanian* roads lay to the east of the Flaminian; the former, from the Porta Salara, led through the country of the Sabines by Rieti to Hadria; the latter, from the Porta Sant' Agnese, went north-eastwards to Nomentum.

IV. The *Tiburtine* road led from the Porta Tiburtina, now San Lorenzo, to Tivoli, with a branch on the right called the Gabian. The large blocks which were employed to form this road, near the town of Tivoli, in ascending from the river, are still in their ancient places; they are accurately fitted together, and present a surface sufficiently smooth, after having been in use for about two thousand years.

V. VI. VII. The three next in order all met at Anagnia, twenty-four miles beyond Præneste or Palestrina. The *Prænestine*, from the Esquiline gate, now called Porta Maggiore, on account of the magnitude of the ruins of the aqueduct of Clodius, with which it is incorporated, led by Aquinum to Præneste; the *Lavican* led from the same gate, more to the right, by way of Beneventum; and the *Latin* road, from the Porta Latina, went first to Compitum, and from Anagnia proceeded to join the Appian near Capua.

VIII. The *Appian* road is as well known from the minute description of Horace's progress in his journey to Brundusium, as from the eagerness with which a modern traveller reckons the stages that he has completed, on his way to Naples, without a visit from the banditti that infest it. The original extent of this road, from the Colosseum to Capua, was 142 Roman miles; and it was continued 238 miles further to Brundusium by Julius Cæsar. It was constructed with large stones, or rather rocks, joined together with great care; and it is said to have had a foot-pavement two feet wide on each side, besides the agger, or principal mass of stones in the middle, and the two marginal parts, which were probably unpaved.

IX. The *Ostian* road led from the Porta di San Paolo, near the Tiber, in a straight line to the mouth of that river.

X. The *Aurelian*, from the Porta Aurelia, a gate which was near the Moles Adriani, or Castle of Sant' Angelo, led by Laurentum to Centumcellæ or Civita Vecchia, to Genoa, and thence by Susa, across the Montcenis, as far as Arles in Provence. This seems to have been the oldest passage into the Gauls; it was improved by Pompey the Great under the name of the Strata Romana. Several other passages over the Alps are also particularized in the *Itinerary* of Antonine on the roads from Milan to Arles; from Milan to Vienne in Dauphiné, either by the Grecian or by the Cottian Alps, the former north, the latter south of Montcenis; from Milan to Strasburg; and from Milan to Mentz.

XI. XII. The *Triumphal* road began from the Capitol, and went over the Tiber into the country beyond the present site of the Vatican. We may consider as the last of the twelve great roads, originating from Rome, the *Collatine*, leading due north from the Porta Pinciana on the Monte Pincio.

Among the less remarkable roads about the metropolis of the ancient world were also the Campanian, the new and the old Valerian, both leading by Tivoli to the Adriatic; the Tusculan, the Alban, the Ardeatine, on the right of the Appian; the Laurentine, a little more to the right, Pliny's villa being mentioned as accessible from either of these last; the Portuensis, from the Porta Portuese Trasteverina, leading to Ostia; and the Aurelia Nova, beginning from the Porta Janiculi, now Porta San Pancrazio, and leading towards Civita Vecchia.

Whether on the foundations of the ancient roads, or in any new lines that have been prepared in modern times by the magnificence of the pontiffs or of the princes, the great roads of Italy are at present almost universally well made and well repaired. In Lombardy, indeed, and throughout the immense plain that extends from the Alps to the Apennines, they are quite as good, in summer at least, as those in England. The cross roads of Italy are, however, greatly neglected; for it is in fact almost exclusively in Great Britain that private and individual exertion supersedes the necessity of public munificence. The intercourse of Italy with the rest of Europe has been greatly facilitated by the improvements made in the two great passages over the Alps by the authority of Bonaparte. The more useful of these improvements are probably those which have been effected on the southern side of Montcenis, since they enable the traveller to pass with little danger or difficulty at all seasons of the year; the more magnificent are the works at the Simplon, which, however, are not completely secure from the danger of *avalanches*, whenever fresh snow is lying on the ground. The Apennine portion of the Aurelian road has also been greatly improved by some still more recent operations, so that carriages may now pass with comparative ease and safety from Lucca to Genoa; though, for one stage, near Sestri, it is not thought advisable for the travellers to retain their seats within them.

The general declivity of the new road over Montcenis is one inch in fifteen or twenty; and it is never greater in the steepest part, that is, in the fourth and fifth turns that wind up over Lanslebourg, than one in twelve.[1] The road over the Simplon was executed jointly by the French and Italians, under the government of Bonaparte, from 1801 to 1805. The greatest declivity is one inch in twenty-nine; so that an English stage coachman might trot his horses up almost the whole way. The longest gallery or tunnel is about 500 feet under ground.

The roads in France are generally rough in their original formation, and still rougher from want of care in repairing them, as the traveller feels to his cost in passing over the primitive mountains in the south of that country, where the roads are certainly very different from those which are made by Macadam across a bog; although some of the more recent French and Flemish pavements, as long as they remain unimpaired, are truly excellent; the new pavement between Cologne and Brussels, for example, is far more perfect than some of the unpaved parts of the continuation of the same line of road to Calais, although the civil post-masters are in the habit of congratulating their English guests on the "fine gravel road" they will have to pass over. In Germany they have few pavements; and the roads, except in sandy countries, are generally kept, or keep themselves, in good repair; that is, in the south and the west of Germany. Mr Cripps informs us, that the great roads in Sweden are beautiful; they are very slightly convex, and made of granite broken to the size of a walnut. The Irish roads, according to Mr Edgeworth, are generally better than the English; the Scotish, Macadam thinks worse, though the materials are better; but in many parts of Scotland the roads appear to be more than sufficiently good for the commerce of the country.

Bergier, *Histoire des Grands Chemins de l'Empire Ro-*

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[1] Derrien, *Notice Historique et Descriptive sur la Route de Montcenis.*

main, 2 vols. 4to, Brussels, 1728; died in 1622. Considerations on Roads, 8vo, Lond. 1734. Phillips's Dissertation concerning the High Roads, 8vo, Lond. 1737. Homer's Inquiry into the State of the Roads, 1767. Lambert on the best Ascent of Roads, Ac. Berl. 1776. Meister on the Shortest Roads to Different Places, N. Comm. Gott. 1777. Edgeworth on Roads and Carriages. Edgeworth on Railroads. Young's Natural Philosophy, ii. p. 203, Instruments for Making and Cleaning Roads. Communications to the Board of Agriculture, i. 1797, p. 119, Beatson; 162, Wright; 176, Joseph; 183, Hall; 199, Wilkes on Concave Roads; Erskine on Iron Roads; 205, Wright on Watering Roads near London; 207, Ellis on Washing Roads; ii. 1800, p. 353, Cumming on Broad Wheels; 474, Wilkes on Railways; vi. 1808, p. 182, Whetley; p. 464, Amos on Wheels; vii. 1811, p. 10, Cumming on the Origin of Bent Axle-Trees; p. 30, Booth on Wheel-Carriages. Paterson's Practical Treatise. Quarterly Review, May 1820, xxiii. p. 96. Macadam's Remarks on the Present System of Road-making, with Observations deduced from Practice and Experience, with a view to a Revision of the Existing Laws, and the Introduction of Improvement in the Method of Making, Repairing, and Preserving Roads, and Defending the Road Funds from Misapplication, 6th edit. Lond. 1822, 8vo. (L. L.)

ROAN, in the manège. A *roan* horse is one of a bay, sorrel, or black colour, with gray or white spots interspersed very thick. When this party-coloured coat is accompanied with a black head and black extremities, he is called *a roan horse with a blackamoor's head;* and if the same mixture is predominant upon a deep sorrel, he is called *claret-roan.*

ROANNE, an arrondissement of the department of the Loire, in France, which extends over 628 square miles. It comprehends ten cantons, divided into 108 communes, with 124,871 inhabitants. The capital is the city of the same name on the left bank of the Loire, which is so far navigable. It is a well-built city, with broad streets, good houses, and fine quays on the bank of the stream, and contains 9910 inhabitants, who are employed in making linen, cotton, and woollen goods, buttons, gilt ware, and jewellery. It is a place of great transit commerce, from being the chief depôt between Paris and Lyons, where the goods produced in the southern provinces can be transmitted to the capital by means of rivers and canals.

ROANOAK, an island of North America, near the coast of North Carolina. Here the English first attempted to settle in 1585, but were obliged to leave it for want of provisions. Long. 75. 0. E. Lat. 35. 40. N.

ROANOAK, a river of North America, which rises in Virginia, runs through Carolina, and at length falls into the sea, where it forms a long narrow bay called Albemarle Sound.

ROBERT'S ISLES, two large islands in the Pacific Ocean, with several smaller islets in their neighbourhood, discovered by Lieutenant Hergest in 1792. Long. 219. 47. E. Lat. 7. 53. S.

ROBERTSON, WILLIAM, one of the greatest historians of modern times, was the son of the Rev. William Robertson, minister of Borthwick, in the county of Edinburgh, and of Eleanor, the daughter of David Pitcairne, Esq. of Dreghorn. He was descended from the Robertsons of Gladney, a branch of the family which for many generations has possessed the estate of Struan in Perthshire. He was born at Borthwick in the year 1721, and received his early education at Dalkeith school, under Mr Leslie, a classical teacher of much reputation. In 1733 his father became one of the ministers of Old Greyfriar's Church in Edinburgh, and towards the close of the same year, the son commenced his academical studies. He speedily distinguished himself as a young man of superior talents and attainments. He obtained his license in 1741, and in 1743 he was appointed minister of Gladsmuir in the county of Haddington. In 1758 he was translated to Lady Yester's parish in Edinburgh, and other preferments speedily followed. In 1759 he was appointed chaplain of Stirling Castle; in 1761, one of his Majesty's chaplains in ordinary; and in 1762 he was elected principal of the university. In 1764 the office of historiographer to the king for Scotland was revived in his favour, and was accompanied with a salary of two hundred pounds a year. The emoluments arising from this accumulation of offices far exceeded what any Presbyterian clergyman in Scotland had previously enjoyed. About the period of his translation to Edinburgh he was created D. D.

We find it difficult to ascertain at what period were first unfolded the great and singular talents which destined Dr Robertson to be one of the first writers that rescued this island from the reproach of not having any good historians. We are, however, assured, that before the publication of any of his literary performances, even from his first appearance in public life, his abilities had begun to attract the notice of observing men; and to his more intimate friends he discovered marks of such high-minded ambition, as, seconded by those abilities, could not have failed to carry him to the first honours of his profession, in whatever sphere he had been placed, and whatever opposition he might have had to encounter.

The first theatre that offered for the display of his talents was the General Assembly of the Church of Scotland. It is the annual meetings of this court that produce to view men who would otherwise remain in the deepest obscurity. There the humble pastor, whose lot has been cast in the remotest corner of the Highland wilds, feels himself, for a time, on a footing of equality with the first citizen in the kingdom: he can there dispute with him the prize of eloquence, the most flattering distinction to a liberal mind; a distinction which is naturally sought after with the greater eagerness in that assembly, as the simple establishment of the Church of Scotland has rendered it the only pre-eminence to which the greatest part of its members can ever hope to attain.

From the moment Dr Robertson first appeared in this assembly, he became the object of universal attention and applause. His speeches were marked with the same manly and persuasive eloquence that distinguishes his historical compositions; and it was observed by all, that while his young rivals in oratory contented themselves with opening a cause, or delivering a studied harangue, he showed equal ability to start objections or to reply; and that even his most unpremeditated effusions were not unadorned with those harmonious and seemingly measured periods which have been so much admired in his works of labour and reflection. He soon came to be considered as the ablest supporter of the cause which he chose to espouse, and was now the unrivalled leader of one of the great parties which have long divided the church of which he was a member. When we reflect upon this circumstance, and consider how much mankind are the same in every society, we shall be the less surprised to find in the literary works of Dr Robertson an acquaintance with the human heart, and a knowledge of the world, which we in vain look for in many other historians. The man who has spent his life in the difficult task of conducting the deliberations of a popular assembly, in regulating the passions, the interests, the prejudices, of a numerous faction, has advantages over the mere man of letters, which no ability, no study, no second-hand information, can ever compensate.

The first work which extended his reputation beyond the walls of the General Assembly was a sermon preached at Edinburgh in 1758 before the Society for Propagating Christian Knowledge, the subject of which was, "The State of the World at the Appearance of Jesus Christ." The ingenuity with which a multiplicity of detached circumstances are there collected, and shown to tend to one single point, afforded a fair promise of those peculiar powers which he so conspicuously displayed in his historical works. This sermon, which was immediately published, did great honour to the author; and it is probably to the reputation which he thus acquired, that we are to attribute the unanimity with which he was called to be one of the ministers of Edinburgh.

In 1759, he published, in two volumes quarto, " The History of Scotland during the reigns of Queen Mary, and of King James VI. till his accession to the Crown of England, with a Review of the Scots History previous to that period." This work, in its structure, is one of the most complete of all modern histories. It is not a dry jejune narrative of events, destitute of ornament; nor is it a mere frothy relation, all glow and colouring. The historian discovers sufficient powers of imagination to engage the reader's attention, with a due proportion of judgment to check the exuberance of fancy. The arrangement of his work is admirable, and his descriptions are animated. His style is copious, nervous, and correct. He has displayed consummate skill in rendering such passages of our history as are familiar to our recollection agreeable and entertaining. He has embellished old materials with all the elegance of modern dress. He has very judiciously avoided too circumstantial a detail of trite facts. His narratives are succinct and spirited; his reflections copious, frequent, and generally pertinent. His sentiments respecting the guilt of Mary have indeed been warmly controverted by Tytler, Stuart, and Whitaker; and, till the publication of Mr Laing's Dissertation on the same subject, the general opinion seemed to be that their victory was complete. Dr Robertson was no rancorous or malignant enemy of the unfortunate queen. While relating what he doubtless believed, he makes every possible allowance for Mary from the circumstances in which she was placed; and his history will be read with pleasure by candid men of all parties as long as the language in which it is composed shall continue to be understood.

In 1769, Dr Robertson published, in three volumes quarto, " The History of the Reign of the Emperor Charles V. with a View of the Progress of Society in Europe from the Subversion of the Roman Empire to the beginning of the sixteenth century." The vast and general importance of the period which this history comprises, together with the reputation which the historian had deservedly acquired, cooperated to raise such high expectations in the public, that no work perhaps was ever more impatiently expected, or perused with greater avidity. The first volume, which contains an able and eloquent view of the progress of society, is a very valuable part of the work; for it serves not only as a key to the pages that follow, but may be considered as a general introduction to the study of the history of that period, in which the several powers of Europe were formed into one great political system, in which each took a station, in which it long remained, with less alterations than could have been expected, after the shocks occasioned by so many internal revolutions and so many foreign wars. Of the history itself, it may be sufficient to observe, that it has secured to the author a place among the greatest historians of modern times. It is distinguished by elegance of expression, depth of discernment, and correctness of judgment. The characters are drawn with singular skill. They are not contrasted by a studied antithesis, but by an opposition which results from a very acute and penetrating insight into the real merits of each character, fairly deduced from the several circumstances of his conduct exemplified in the history. For this work the author received L.4500 sterling.

In 1779, Dr Robertson published " The History of America," in two volumes quarto. This celebrated work may with great propriety be considered as a sequel to the preceding history. From the close of the fifteenth century we date the most splendid era in the annals of modern times. Discoveries were then made, the influence of which descended to posterity; and events happened that gave a new direction to the spirit of nations. To the inhabitants of Europe, America was in every respect a new world. There the face of the earth changed its appearance. The plants and trees and animals were strange, and nature seemed no longer the same. A continent opened that appeared to have recently come from the hands of the Creator, and which showed lakes, rivers, and mountains on a grander scale, and the vegetable kingdom in greater magnificence, than in the other quarters of the globe, but the animal tribes in a state of degradation, few in number, degenerated in kind, imperfect, and unfinished. The human species in the earliest stage of its progress, vast and numerous nations in the rudest form of the savage state which philosophers have contemplated, and two great empires in the lowest degree of civilization which any records have transmitted to our review, presented to the philosophic eye at this period the most fruitful subject of speculation that was to be found in the annals of history. The discovery of the New World, moreover, was not only a curious spectacle to the philosopher, but, by the change which it effected, an interesting spectacle to the human race. When Columbus set sail for unknown lands, he little expected that he was to make a revolution in the system of human affairs, and to influence the future destiny of Europe. The importance and celebrity therefore of the subject had attracted the attention of philosophers and historians. Views and sketches of the New World had been given by able writers, and splendid portions of the American story had been adorned with all the beauties of eloquence. But previously to the appearance of Dr Robertson's history, no author had bestowed the mature and profound investigation which such a subject required, or had exhibited that complete narration and perfect whole which it is the province of the historian to transmit to posterity. And as the subject upon which the author entered was grand, his execution was masterly. The character of his former works was immediately discerned in this. They had been read with uncommon admiration. When the History of Scotland was first published, and the author altogether unknown, Lord Chesterfield pronounced it to be equal in eloquence and beauty to the production of Livy, the purest and most classical of all the Roman historians. His literary reputation was not confined to his own country: the testimony of Europe was soon added to the voice of Britain. It may indeed be mentioned, as the characteristic quality of the author's manner, that he possessed in no common degree that supported elevation which is suitable to compositions of the higher class; and in his History of America he displayed that happy union of strength and grace which becomes the majesty of the historic muse. In the fourth book of his first volume, which contains a description of America when first discovered, and a philosophical inquiry into the manners and policy of its ancient inhabitants, he displays moreover so much patient investigation and sound philosophy, abounds in such beautiful or interesting description, and exhibits such variety and copiousness of elegant writing, that future times will probably refer to it as that part of his works which gives the best idea of his genius, and is the most finished of all his productions.

In 1787 appeared a translation of Clavigero's History of Mexico; in which work the author hazarded various reflections, tending in several instances to impeach the credit of Dr Robertson's History of America. This attack induced the learned historian to revise his work, and to inquire into the truth of the charges brought against it by the historian of New Spain; and this he appears to have done with a becoming attention to the importance of the facts that are controverted, and to the common interests of truth. The result he published in 1788, under the title of "Additions and Corrections to the former Editions of Dr Robertson's History of America." In many of the disputed passages, he fully answered Clavigero and vindicated himself; in others he candidly submitted to correction, and thus gave additional value to his own work.

The literary labours of Dr Robertson appear to have been terminated in 1791, by the publication of "An Historical Disquisition concerning the Knowledge which the Ancients had of India, and the Progress of Trade with that country prior to the Discovery of the Passage to it by the Cape of Good Hope; with an Appendix, containing Observations on the Civil Polity, the Laws, and Judicial Proceedings, the Arts, the Sciences, and Religious Institutions of the Indians." The perusal of Major Rennell's Memoir, for illustrating his map of Hindustan, suggested to Robertson the design of examining more fully than he had done in his History of America, into the knowledge which the ancients had of India, and of considering what is certain, what is obscure, and what is fabulous, in their accounts of that remote country. Of his various performances, this is not that of which the design is the most extensive, or the execution the most elaborate; but in his historical disquisition we perceive the same patient assiduity in collecting his materials, the same discernment in arranging them, the same perspicuity of narrative, and the same power of illustration, which so eminently distinguish his other writings, and which have long rendered them the delight of the British reader at home, and an honour to British literature abroad.

His truly useful life was closed on the 11th of June 1793, at Grange-House near Edinburgh, after a lingering illness, which he endured with exemplary fortitude and resignation. He had attained the age of seventy-two. It may be justly observed of him, that no man lived more respected, or died more sincerely lamented. Indefatigable in his literary researches, and possessing from nature a sound and vigorous understanding, he acquired a store of useful knowledge, which afforded ample scope for the exertion of his extraordinary abilities, and raised him to the most distinguished eminence in the republic of letters. As a minister of the gospel, he was a faithful pastor, and justly merited the esteem and veneration of his flock. In a word, he may be pronounced to be one of the most perfect characters of the age; and his name will be a lasting honour to the island that gave him birth. His conversation was cheerful, entertaining, and instructive; his manners affable, pleasing, and endearing.

The account of his Life and Writings, published by Mr Dugald Stewart, is one of the noblest pieces of biography that any language can boast of. It was published in a separate form, and likewise accompanies the later editions of his works.

Dr Robertson left a widow and a numerous family in prosperous circumstances. In 1751 he had married Mary the daughter of Mr Nisbet, one of the ministers of Edinburgh, and this domestic union had been productive of much happiness. His eldest son, the late Lord Robertson, was for many years a judge of the Court of Session. Two of his sons belonged to the military profession. His eldest daughter was the wife of Mr Brydone the celebrated traveller, and the mother of the present Countess of Minto. Another daughter married John Russell, Esq. writer to the signet. Lord Brougham is the grandson of Dr Robertson's sister.

ROBERVALLIAN Lines, a name given to certain lines used for the transformation of figures, so called from Roberval, the inventor of them. These lines are the boundaries of lines infinitely extended in length, yet equal to other spaces which are terminated on all sides. It is observed by the Abbé Gallois, that the method of transforming figures which is explained at the end of Roberval's treatise of Indivisibles, was the same with that afterwards published by James Gregory in his *Geometria Universalis*, and also by Dr Barrow in his *Lectiones Geometricæ*; and that it appears from Torricelli's letter, that Roberval was the inventor of this method of transforming figures, by means of certain lines called by Torricelli, for that reason, *Robervallian lines.* The same author adds, that J. Gregory probably first learned this method at Padua in the year 1668; for the method was known in Italy in 1646, although the book was not published till 1692. David Gregory endeavoured to refute this account, in vindication of his uncle James. His answer appeared in the Philosophical Transactions for 1694, and Gallois rejoined in the Memoirs of the French Academy for 1703; so that it remains in a state of uncertainty to which of the two we are to ascribe the invention.

ROBIGUS and ROBIGO, a Roman god and goddess, who joined in the preservation of corn from *blight.* Their festival was kept on the 25th of April.

ROBINS, Benjamin, an ingenious mathematician, was born at Bath in 1707. His parents were Quakers of low condition, and consequently were unable to have him much instructed in human learning; but his own propensity to science having procured him a recommendation to Dr Pemberton at London, by his assistance, while he attained the sublimer parts of mathematical knowledge, he commenced teacher of the mathematics. But the business of teaching, which required confinement, not suiting his active disposition, he gradually declined it, and engaged in business that required more exercise. Hence he tried many laborious experiments in gunnery, from the persuasion that the resistance of the air has a much greater influence on swift projectiles than is generally imagined. Hence also he was led to consider the mechanic arts that depend on mathematical principles; as the construction of mills, the building of bridges, the draining of fens, the rendering of rivers navigable, and the making of harbours. Among other arts, fortification much engaged his attention; and he met with opportunities of perfecting himself by viewing the principal strong places of Flanders, in some tours which he made with persons of distinction.

Upon his return from one of these excursions, he found the learned amused with Dr Berkeley's work entitled "The Analyst," in which an attempt was made to explode the method of fluxions. Mr Robins was therefore advised to clear up this subject by giving a distinct account of Sir Isaac Newton's doctrines, in such a manner as to obviate all the objections that had been made, without naming them. Accordingly he published, in 1735, "A Discourse concerning the Nature and Certainty of Sir Isaac Newton's Method of Fluxions;" and, some exceptions being made to his manner of defending Newton, he afterwards wrote two or three additional discourses. In 1738, he defended the same great philosopher against an objection contained in a note at the end of Baxter's *Matho, sive Cosmotheoria puerilis*; and the following year printed Remarks on Euler's Treatise of Motion, on Dr Smith's System of Optics, and on Dr Jurin's Discourse of distinct and indistinct Vision, annexed to Smith's work. In the mean while, Mr Robins did not solely confine himself to mathematical subjects; for in 1739 he published, without his name, three pamphlets on political affairs. Two of them, relating to the convention and negociation with Spain, were so highly esteemed as to occasion his being employed in a very honourable post: on a committee being appointed to examine into the past conduct of Sir Robert Walpole, he was chosen their secretary.

In 1742, Mr Robins published a small treatise entitled

"New Principles of Gunnery," containing the result of many experiments; and a discourse being published in the Philosophical Transactions, in order to invalidate some of his opinions, he thought proper, in an account which he gave of his book in the same Transactions, to take notice of those experiments. In consequence of this discussion, several of his Dissertations on the Resistance of Air were read, and the experiments exhibited before the Royal Society, for which he was presented by that honourable body with a gold medal.

In 1748 appeared Lord Anson's Voyage round the World, which, though Mr Walter's name is in the title, has been generally thought to be the work of Robins. Walter, chaplain on board the Centurion, had brought it down to his departure from Macao for England, when he proposed to print the work by subscription. It was however, it is said, thought proper that an able judge should review and correct it, and Robins was appointed; when, upon examination, it was resolved that the whole should be written by Robins, and that Walter's papers should only serve as materials. Hence the introduction entire, and many dissertations in the body of the work, it is said, were composed by him, without receiving the least assistance from Walter's manuscript, which chiefly related to the wind and the weather, the currents, courses, bearings, distances, the qualities of the ground on which they anchored, and such particulars as generally fill up a sailor's account. No production of this kind ever met with a more favourable reception: four large impressions were sold within a twelvemonth; and it has been translated into most of the languages of Europe. The fifth edition, printed at London in 1749, was revised and corrected by Robins himself. In the corrigenda and addenda to the first volume of the Biographia Britannica, printed in the beginning of the fourth volume of that work, it is however stated that Robins was only consulted with respect to the disposition of the drawings, and that he had left England before the book was printed. Whether this be the fact, as it is asserted to be by the widow of Mr Walter, it is not for us to determine.

Robins was soon afterwards desired to compose an apology for the unfortunate affair at Prestonpans. It was prefixed as a preface to "The Report of the Proceedings of the Board of General Officers on their Examination into the conduct of Lieutenant-General Sir John Cope;" and this preface was esteemed a masterpiece in its kind. He afterwards, through the interest of Lord Anson, contributed to the improvements made in the Royal Observatory at Greenwich. Having thus established his reputation, he was offered the choice of two considerable employments; either to go to Paris as one of the commissaries for adjusting the limits of Acadia, or to be engineer-general to the East India Company. He chose the latter, and arrived in the East Indies in 1750; but the climate not agreeing with his constitution, he died there the year following.

ROBINSON, Sir Richard, Lord Rokeby and archbishop of Armagh, was immediately descended from the Robinsons of Rokeby in the north riding of the county of York, and was born in 1709. He was educated at Westminster school, from whence he was elected to Christ Church, Oxford, in 1726. In 1733 he took the degree of A. M., and in 1748 that of D. D. Dr Blackburne, archbishop of York, appointed him his chaplain, and collated him first to the rectory of Elton in the east riding of Yorkshire, and next to the prebend of Grindall in the cathedral of York. In 1751, he attended the duke of Dorset, lord-lieutenant of Ireland, to that kingdom, as his first chaplain, and the same year was promoted to the bishopric of Killala. A family connection with the earl of Holdernesse, secretary of state, with the earl of Sandwich and other noblemen related to him, opened the fairest prospects of attaining to the first dignity in the Irish church. Accordingly, in 1759 he was translated to the united sees of Leighlin and Ferns, and in 1761 to Kildare. The duke of Northumberland being appointed to the lieutenancy of Ireland in 1765, he was advanced to the primacy of Armagh, made lord-almoner, and vice-chancellor of the university of Dublin. When Lord Harcourt was lord-lieutenant of Ireland in 1777, the king was pleased, by privy seal at St James's, February 6th, and by patent at Dublin the 26th of the same month, to create him Baron Rokeby of Armagh, with remainder to Matthew Robinson of West Layton, Esq.; and in 1783 he was appointed prelate of the most illustrious order of St Patrick. On the death of the duke of Rutland, lord-lieutenant of Ireland, in 1787, he was nominated one of the lords-justices of that kingdom. Sir William Robinson, his brother, dying in 1785, the primate succeeded to the title of baronet. He was the survivor in the direct male line of the Robinsons of Rokeby, being the eighth in descent from William of Kendal. His grace died at Clifton near Bristol in the end of October 1794.

ROBISON, John, a distinguished professor of natural philosophy, born in 1739 at Boghall, in the parish of Baldernock and county of Stirling, was a younger son of John Robison, Esq. who had formerly been a merchant at Glasgow, and had retired to live in considerable affluence on his estate at Boghall, not far from that city.

He was of a family sufficiently respectable to enable his son at a subsequent period to prove himself, to the satisfaction of the court of St Petersburg, a *gentleman* born. As a younger brother, that son was originally intended for the church, and went at an early age, according to the custom of Scotland, in 1750, to enter as a student in the university of Glasgow, so that he was initiated almost in the rudiments of Grecian literature under the able instruction of Dr Moor, the well-known professor of Greek; and he acquired such a knowledge of the classical languages as served to constitute him a correct scholar through life. He pursued his studies with so much attention as to obtain the approbation of his teachers and the admiration of his contemporaries, who were delighted with the originality and ingenuity of his conversation, though he did not himself reflect with perfect satisfaction upon the degree of application which he had exerted in his academical education. He took the degree of Master of Arts in 1756, having studied mathematics under Dr Robert Simson, and moral philosophy under Dr Adam Smith. The example of so correct and rigid a follower of the ancient methods of demonstration as Dr Simson, must unquestionably have exercised considerable influence on his yet unformed taste in mathematics; but he seems to have had a natural preference, either from the constitution of his mind, or from some previously acquired habits of thinking, for the geometrical method; for we are informed that "he first attracted the regard of Dr Simson by owning his dislike of algebra, and by returning a neat geometrical solution of a problem which had been given out to the class in an algebraical form: with this mode of solution the professor was delighted, though the pupil candidly acknowledged that it had been adopted only because he could not solve the problem in the manner required of the class."

In the course of his studies, he had imbibed an insuperable aversion to the pursuit of his original objects in the church; not certainly from any want of religious feeling, or from a dislike to the kind of life that was intended for him, but probably from some difficulties that had occurred to him respecting particular points of doctrine or of practice. He was therefore compelled to provide himself with some other occupation; and he readily accepted the offer of some of his friends in 1758, to recommend him to Dr Blair, a prebendary of Westminster, who had formed a scheme for sending Prince Edward, the young duke of York, to complete his professional education at sea, in company with a son of Admiral Knowles; and Mr Robison was to have instructed his royal highness in mathematics and navigation. On his arrival in London, he was much disappointed to find that the expedition had never been seriously intended; and he readily accepted an engagement to attend young Knowles as a private tutor, when he went as a midshipman on board of the Neptune of ninety guns, with Admiral Saunders, who had the command of a force intended to co-operate with General Wolfe in the reduction of Quebec; and upon the appointment of his friend as a lieutenant on board of the Royal William, Robison was himself rated as a midshipman in that ship.

The fleet arrived on the coast of America in April 1759; in May they got up the river, and Mr Robison was one of a party of 100 seamen draughted from the Royal William into the admiral's ship, under the command of Lieutenant Knowles. In this capacity he had an opportunity of seeing considerable service, and of making some surveys of the river and of the neighbouring country; an employment for which he was perfectly qualified, both as a geometrician and a draughtsman. He also remarked the effect of the aurora borealis on the compass, which had been noticed by Mairan and Wargentin some years before, but which was then not commonly known. After the battle which was signalized by the victory and death of the gallant Wolfe, the Royal William sailed with his body to Europe, and arrived at Spithead in November. The next year she was sent to cruise off Cape Finisterre; but in six months she was obliged to return home, from having the greater part of the men disabled by the scurvy.

He used to consider the two years that he spent on board of the Royal William as the happiest of his life; and no inconsiderable part of his gratification was derived from the study of seamanship as he saw it practised under the auspices of Captain Hugh Pigot. He did not, however, acquire any firm attachment to the mode of life which he had temporarily adopted; he was rather disposed to resume his academical pursuits, and he had overcome his earlier objections to the ecclesiastical profession. He could not, however, refuse the kindly invitation of Admiral Knowles to come and live with him in the country, and to assist him in some important experiments which he was making upon mechanical and nautical subjects.

In the month of February 1762, Lieutenant Knowles was appointed to the Peregrine sloop, of twenty guns, and Mr Robison accompanied him with the hope of becoming a purser. He visited Lisbon and several other parts of Portugal; but he found a cruise in a small ship much less convenient and agreeable than in a large one, and, fortunately for himself and for mankind, he finally quitted the Peregrine and the naval service in June, and returned to live with Admiral Knowles, who soon after recommended him as a proper person to take charge of Harrison's timekeeper, which had been completed by the labour of thirty-five years, after many unsuccessful experiments, and which was now sent out by desire of the Board of Longitude to the West Indies, under the care of young Harrison and of Mr Robison. The rate of the chronometer was ascertained at Portsmouth the 6th November 1762, and it indicated at Port Royal, in Jamaica, a difference of time amounting to $5^h\ 2^m\ 47^s$, which is only four seconds less than the true longitude. After a few days the observers had a prompt opportunity of returning home by the Merlin sloop, which was sent to Europe with despatches. The voyage was most disastrous with respect to wind and weather, and at last the ship took fire; but she arrived safe at Portsmouth in March, and on the 2d of April the watch gave $11^h\ 58^m\ 6\frac{1}{2}^s$, instead of 12^h, for the time of mean noon, so that the error, after six months, was only $1^m\ 53\frac{1}{2}^s$, amounting to no more than about twenty miles of distance.

Mr Robison received, upon his return, the afflicting intelligence of the total loss of the Peregrine, which had foundered at sea with her commander and the whole of the ship's company. He was also greatly disappointed in the failure of some hopes which had been held out to him from the Admiralty and the Board of Longitude; though in fact there is little reason for the public to regret that he was not gratified with the pursership, which he claimed as the reward of his services. He was indeed afterwards actually made a purser by Lord Sandwich, in 1763; but he then declined accepting the appointment. His biographers very naturally complain of the neglect of those boards which ought to have recompensed him; but certainly the Board of Longitude had no power whatever, and probably not much influence, in the appointment of a purser; and, after all, the delay of a year or two was nothing very uncommon in the navy.

He had now no other resource than to return to Glasgow, and to resume his academical pursuits with renewed energy. It was from this time that he dated his serious application to his studies. He became extremely intimate with Dr Reid and Dr Alexander Wilson; and he had the advantage of being a witness of two of the greatest steps in the improvement of physical science that have been made in modern times, Dr Black's experimental theory of heat, and Mr Watt's invention of a new steam-engine. Dr Black was the first that determined the quantity of heat required for the conversion of ice into water: Mr Watt, who was settled as a mathematical instrument-maker at Glasgow, had been employed in repairing a working model of Newcomen's engine for one of the professors of the university; and it was the difficulty of supplying this model with steam that suggested to Mr Watt the eligibility of having a separate condenser, and that led him, in conjunction with Dr Black, to a knowledge of the quantity of heat consumed in evaporation.

Amid the enthusiasm which is always inspired by the progress of scientific discovery and of practical improvement, Mr Robison found every encouragement and every facility for the pursuit of his favourite objects. He was recommended by Dr Black, upon his removal to Edinburgh in 1766, as his successor in the lectureship of chemistry, though without the appointment of a professor. He took charge, also, of the education of Mr Macdowall of Garthland, and of Mr Charles Knowles, afterwards Sir Charles. Admiral Knowles was soon after recommended by the British government to the empress of Russia, in order to effect a reformation in her navy, having been employed on a similar service in Portugal almost fifty years before; he had always been a firm friend to Mr Robison, and now engaged him on this mission, with a salary of L.250 a year; and they proceeded together to St Petersburg in December 1770. Being hospitably entertained on their way by the prince bishop of Liege, whom they found to constitute, with his chapter and all his servants, a lodge of freemasons, Mr Robison was easily persuaded to become one of that fraternity: in a few days he was made an apprentice, and by degrees attained the rank of Scottish master, as he has himself related in his publication upon the subject. He continued nearly two years at St Petersburg, still acting in the capacity of private secretary to Sir Charles, who was appointed president of the Board of Admiralty, much to the advantage of the Russian navy, though his improvements were frequently retarded by the prejudices of the native officers. Mr Robison was then appointed inspector general of the corps of marine cadets at Cronstadt, with a double salary, and with the rank of lieutenant-colonel. His duty was to receive the report of about forty teachers and professors, respecting the studies of 400 young noblemen, who were their pupils, and to class them according to his judgment of their merits; but he had himself nothing to teach, nor could he have had much occasion for "lecturing fluently in the Russian language," though he was introduced by his friend Kutusoff to the Grand Duke Paul as a proficient in that language; but to the empress he was not personally known. At Petersburg he could have lived without regretting his country, in the society of such men as Euler and Alpinus, admired by the Russians, and beloved by the British; but Cronstadt in winter was deplorably melancholy; and in 1773 he was induced, without much difficulty, to make some little pecuniary sacrifice in accepting the professorship of natural philosophy at Edinburgh, which had become vacant by the death of Dr Russell, and to which he had been recommended by Dr Robertson, then principal of the university. His determination was not disapproved by the Russian government, who granted him a pension of about L.80 a year for life; but it was only paid as long as three or four young men, who had accompanied him as pupils, continued to reside at Edinburgh; some discontent having been expressed because he did not keep up a correspondence with the academy on the improvement of maritime education.

He arrived at Edinburgh in September 1774. He married soon afterwards, and continued to reside in that city for the remaining thirty years of his life, paying only an annual visit to his native place, where he possessed a part of the paternal estate; not being solicitous to extend it, although "he did not diminish it otherwise than as it had been diminished before," that is, in making provision for younger children. His predecessor had been very judicious and successful as a lecturer, though not a mathematician of the highest order: he had himself more practical knowledge and experience in mechanics, and was better acquainted with the foreign mathematicians, who had naturally fallen under his notice during his residence on the continent. His lectures were considered by most of his pupils as somewhat too difficult to be followed; a complaint which, if it did not depend on their own want of preparatory information, arose perhaps rather more from the hasty manner of his enunciation than from the abstruseness of his matter. "The singular facility of his own apprehension," says Professor Playfair, "made him judge too favourably of the same power in others. To understand his lectures completely was, on account of the rapidity and the uniform flow of his discourse, not a very easy task, even for men tolerably familiar with the subject. On this account his lectures were less popular than might have been expected from such a combination of talents as the author of them possessed." This inconvenience was increased "by the small number of experiments he introduced, and a view that he took of natural philosophy, which left but a very subordinate place for them to occupy. An experiment, he would very truly observe, does not establish a general proposition, and never can do more than prove a particular fact;" but he seems to have carried this principle to some little excess: it is, in fact, the *illustration*, and not the *proof*, of general principles that is the object of a public exhibition of experiments; and it is very doubtful whether Archimedes, or Newton, or Leibnitz, or Euler, would have been very successful as *showmen*. With respect, however, to "accuracy of definition, to clearness, brevity, and elegance of demonstration, and even to neatness and precision in experiments," Professor Robison was very successful; his course extended "to every branch of physics and of mixed mathematics," and entered so fully into the detail of each particular division of the subjects, that "a more perfect system of academical instruction is not easily to be imagined." Nothing, in short, was wanting, but so much previous knowledge of mathematics in his pupils as he thought he had a right to expect, though his expectations were too rarely fulfilled.

The Philosophical Society of Edinburgh had almost been suffered to sink into oblivion after the publication of the third volume of its Essays, in 1756. Professor Robison became a member of it soon after his return from Russia, and was chosen secretary of the new society upon its formation by royal charter in 1783, when it incorporated with itself the whole of the surviving members of the former society. In 1798 he received the compliment of a degree of Doctor of Laws from the university of New Jersey; and a similar honour was paid him at Glasgow the year after. In 1800 he was elected, as successor to Dr Black, on the list of the foreign members of the Royal Academy of Sciences of St Petersburg.

In 1785 he was attacked by a severe disorder, from which he was never afterwards wholly free, though it produced little inconvenience besides pain, with some depression of spirits, which was, however, attributed rather to the closeness of his application than to the immediate effect of the disease, which was a glandular induration. For many years he was obliged to obtain the assistance of substitutes in the delivery of his lectures; but towards the end of his life he was able again to perform the duties of the professorship in person. He continued his literary labours with little intermission, and was most happy in the care and attention of his wife and children, whose virtues he found the best alleviation of his sufferings. He took a slight cold, after giving a lecture, on the 28th of January 1805, and died on the 30th.

1. It was comparatively late in life that Professor Robison assumed the character of an author, having communicated to the Royal Society of Edinburgh, in 1786, a paper on the Determination of the Orbit and Motion of the Georgium Sidus, which was published in the Edinburgh Transactions, vol. i. He had observed the opposition of the planet with an equatorial telescope only, and he had computed the elements of its orbit with greater accuracy than any other astronomer had then done; although his suspicion of the effect of such a planet on the motions of Jupiter and Saturn has not been confirmed by later investigations, the irregularities of these planets, on the contrary, having been otherwise explained.

2. A second paper, published in the same collection, vol. ii. p. 82, relates to the Motion of Light, as affected by refracting or reflecting substances which are themselves in motion. The author corrects some errors of Boscovich, who had miscalculated the effect of a water-telescope; but he seems to agree with Dr Wilson in the suggestion of another experiment of a similar nature, which, to say the least, is wholly superfluous.

3. The most important, beyond all comparison, of Professor Robison's scientific publications, are the articles which he communicated from time to time to the third edition of the Encyclopædia Britannica, and to its Supplement. It was under the care of Mr Colin Macfarquhar that the first twelve volumes of that edition of this work were published;[1] and upon his death, in 1793, the task of continuing it was committed to Dr Gleig, to whom Professor Robison became a most essential co-operator, and from that time "the work ceased to be a mere compilation." The first of his contributions, according to Professor Playfair, was the article OPTICS, but it is probable he only revised and enlarged that article: it was followed by PHILOSOPHY, which he wrote jointly with Dr Gleig; by PHYSICS, PNEUMATICS, PRECESSION, PROJECTILES, PUMPS, RESISTANCE, RIVERS, ROOF, ROPE-MAKING, ROTATION, SEAMANSHIP, SIGNAL, SOUND, SPECIFIC GRAVITY, STATICS, STEAM, STEAM-ENGINE, STEELYARD, STRENGTH, TELESCOPE, TIDE, TRUMPET, VARIATION, and WATER-WORKS; and in the

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[1] The third edition of the Encyclopædia Britannica consisted of eighteen volumes; the Supplement to it of two volumes.

Supplement, by Arch, Astronomy, Boscovich, Carpentry, Centre, Dynamics, Electricity, Impulsion, Involution, Machinery, Magnetism, Mechanics, Percussion, Pianoforte, Position, Temperament, Thunder, Trumpet, Tschirnhaus, and Watch-work. Notwithstanding some degree of prolixity and want of arrangement, which could scarcely be avoided in the preparation of original articles for such a mode of publication, the whole of them, taken together, undeniably exhibit a more complete view of the modern improvements of physical science than had ever before been in the possession of the British public; and display such a combination of acquired knowledge with original power of reasoning, as has fallen to the lot of a few only of the most favoured of mankind.

4. It is not altogether with so high approbation that his friends and his biographers have mentioned a work, of a nature rather political than philosophical, entitled Proofs of a Conspiracy against all the Religions and Governments of Europe, Edinb. 1797, 8vo; though it went through several editions. The principal part of the book consists of the history of the *Illuminati* and the German Union, whom he considers as having become the chief agents in a plot first formed by the freemasons, at the suggestion of some ex-jesuit, who proposed for their model the internal economy of the order which he had quitted; and whatever foundation this outline may have had in truth, there is no doubt that the manner in which Professor Robison has filled it up, betrays a degree of credulity extremely remarkable in a person used to calm reasoning and philosophical demonstration: for example, in the admission of a story told by an anonymous German author, that the minister Turgot was the protector of a society that met at Baron d'Holbach's, for the purpose of examining the brains of *living children*, in order to discover the principle of vitality. He does not accuse the English freemasons of having participated in the conspiracy; but he considers the continental lodges as having been universally implicated in it.

5. After the death of Dr Black, in 1799, he undertook to superintend the publication of his Lectures on Chemistry, which appeared in 1803, 2 vols. 4to. And this task, which was rather laborious than difficult, he executed with equal zeal and ability. He endeavoured to reduce to their just estimate the comparative pretensions of the French and British chemists, though he is somewhat puritanically severe in criticizing the literal meaning of the compliments paid to Black by Lavoisier, on which he founds a charge of insincerity.

6. His last publication was the first volume of a series which was to form a complete system, entitled Elements of Mechanical Philosophy, Edinb. 1804, 8vo. It comprehended only Dynamics and Astronomy, and it never became very popular: it was too difficult for the many, who wished for general and philosophical notions only, and not sufficiently precise and demonstrative for the few, who wanted practical and numerical results. In attempting to combine the separate merits of the *Exposition du Système du Monde*, and of the *Mécanique Céleste*, the author sacrificed both the popular simplicity of the former, and the mathematical perfection of the latter. A few inaccuracies, which ought not to escape the attention of the reader of the work, have been pointed out in the Imperial Review for March 1805; a journal long since discontinued.

7. The contents of the volume last mentioned, together with some manuscripts intended to have formed part of a second, and the greater part of the articles furnished by Professor Robison to the Encyclopædia, were collected into a System of Mechanical Philosophy, with Notes, by David Brewster, LL. D. Edinb. 1822, 4 vols. 8vo; a spirited bookseller in London having undertaken the risk of the publication. 1. The first volume begins with the articles Dynamics, Projectiles, Corpuscular Forces, Capillary Attraction, Boscovich's Theory, and Rotation, all as remodelled for the Elements; then follow Strength of Materials, Carpentry, Roof, Construction of Arches, Construction of Centres. 2. The article Steam-Engine is enriched with notes and an appendix by the late Mr Watt: the next is Machinery, then Resistance of Fluids, Rivers, Water-works, Pumps. 3. Astronomy, Telescope, Pneumatics. 4. Electricity, Magnetism, Variation, Temperament, Trumpet, Watch-work, and Seamanship. The notes are not numerous, and the editor's principal labour has been to retrench some passages that appeared to him superfluous when the papers were to stand as parts of such a collection.

"Although Dr Robison's name," says Dr Brewster in his preface, "cannot be associated with the great discoveries of the century which he adorned, yet the memory of his talents and his virtues will be long cherished by his country. Imbued with the genuine spirit of the philosophy which he taught, he was one of the warmest patrons of genius wherever it was found. His mind was nobly elevated above the mean jealousies of rival ambition, and his love of science and of justice was too ardent to allow him either to depreciate the labours of others, or to transfer them to himself. To these great qualities as a philosopher, Dr Robison added all the more estimable endowments of domestic and of social life. His friendship was at all times generous and sincere. His piety was ardent and unostentatious. His patriotism was of the most pure and exalted character; and, like the immortal Newton, whose memory he cherished with a peculiar reverence, he was pre-eminently entitled to the high distinction of a Christian, patriot, and philosopher." His person was handsome, and his physiognomy prepossessing; and he appears to have been endowed with an extraordinary combination of talents, even exclusively of those which were called into immediate activity in his professional pursuits; for he was a good linguist, an excellent draughtsman, and an accomplished musician. His conversation was always energetic and interesting, and sometimes even poetical; and his liberality of sentiment was only limited by his regard for what he considered as the best interests of mankind.

A short account of his life was published in 1802, by a contributor to the Philosophical Magazine, who, among other inaccuracies, thought himself at liberty to assert that he was an admirer of the algebraical form of representation, in preference to the geometrical. His friend Dr Gleig soon after stepped forward to correct these mistakes, in the Antijacobin Review for 1802, and his letter was copied into the Philosophical Magazine. He asserts, from his own knowledge, that even yet Professor Robison "delights much more in geometry than in any of the modes of algebra, assigning as the reason of his preference, that in the longest demonstration the geometrician has always clear and adequate ideas, which the most expert algebraist can very seldom have." It may perhaps be asserted, on the other hand, that the same reasoning would lead us always to employ actual multiplication or division, in preference to the use of logarithms or of a sliding rule; and that the whole of the magic of calculation depends on the abstraction of the results from the numerous and separately unimportant steps by which they are obtained; but the having once seen those steps clearly is certainly of great importance to the process of reasoning, even when the memory no longer retains them; and no mathematician of correct taste can study the ancient geometricians without admiring the elegance and precision of their method, even amidst the pedantry which too frequently envelopes their expressions, and without being grateful for their punctuality in collecting their results into the very convenient form of distinct propositions, and in making such references from each proposition to the foundations on which it depends, as to enable him readily to trace back their steps to the most elementary principles; which is scarcely possible in any of the works of the most modern school of analysis. Professor Robison, however, seems rarely to have cultivated the higher mathematics for their own sake only, or any further than as they could be applied to the study of the phenomena of nature, or to the practice of the combinations of art: in fact, without some such limitation, there would be no track to guide us in the pathless regions of quantity and number, and their endless relations and functions. But besides the utility of the pure mathematics as a branch of early education, in exercising and fortifying the powers of the mind, it is impossible to foresee with certainty *how much* of mathematics may be wanted by the natural philosopher in any given investigation; and Professor Robison, as well as many others of his countrymen, would certainly have been the better for the possession of *a little more*, as the author of the criticisms in the Imperial Review has already had occasion to remark.

Philosophical Magazine, xiii.; Dr Gleig, in Antijacobin Magazine, xi. 1802; Stark's *Biographia Scotica;* Aikin's General Biography, viii. Lond. 1813, 4to; Playfair, in Edinb. Trans. vii. 1815, p. 495; Chalmers's Biographical Dictionary, xxv. Lond. 1816, 8vo. (L. L.)

ROBORANTS, in *Pharmacy*, medicines which strengthen the parts, and give new vigour to the constitution.

ROCAB, a small seaport of Hadramaut, in Arabia, on the Indian Ocean, thirty miles south-south-west of Sahar.

ROCHDALE, a market-town of the county of Lancaster, in the hundred of Salford, 197 miles from London and twelve from Manchester. It is situated in a fine valley on the river Roche, and is overlooked by the church, which stands on an eminence ascended by 118 steps. The hills around it abound in excellent coal. The chief occupation is the manufacture of flannels and other woollen goods. The parish is large, and contains twelve townships, two of which are in the west riding of Yorkshire. The population of the ten in Lancashire amounted in 1801 to 29,954, in 1811 to 45,227, in 1821 to 48,112, and in 1831 to 58,441; that of the Yorkshire part amounted in 1831 to 15,997. By the parliamentary reform bill this town has received the privilege of electing one member to the House of Commons, but it has no municipal corporation.

ROCHE-BERNARD, a town of France, in the department of Morbihan, and arrondissement of Vannes. It is situated on the river Vilaine, and contains 1380 inhabitants; but within the parish are 6670 persons, who are chiefly employed in making flaxen thread and linen goods.

ROCHECHOUART, an arrondissement of the department of the Upper Vienne, in France. It extends over 286 square miles, comprehends five cantons, divided into twenty-nine communes, and contains 48,818 inhabitants. The capital is the town of the same name, on the banks of the river Grenne. It contains 4123 inhabitants. Long. 0. 45. E. Lat. 45. 43. N.

ROCHEFORT, an arrondissement of the department of the Lower Charente, in France, which extends over 257 square miles. It comprises four cantons, divided into forty-two communes, and in 1836 contained 51,727 inhabitants. The capital is a city of the same name, about six miles from the mouth of the river Charente. The harbour is convenient and secure, and constantly contains many men of war. The wharfs are very well contrived, and vessels can take in or discharge the guns and other stores with great facility. It was first made a naval arsenal by Louis XIV. The city is surrounded with walls, and the harbour defended by strong forts. It is a regular, well-built city, with broad streets, containing five churches, a naval hospital, a school of navigation, and fine docks. There were, in 1836, 15,441 inhabitants, besides a garrison in the handsome barracks. There are establishments for making china, for refining sugar, and manufactories of ropes, cables, and sailcloth. Long. 0. 2. 54. W. Lat. 45. 16. 10. N.

ROCHEFOUCAULT, FRANCIS DUKE DE LA, prince of Marsillac, governor of Poitou, was born in 1603. He was the son of Francis, the first duke of Rochefoucault, and was distinguished equally by his courage and his wit. These shining qualities endeared him to all the nobility at court, who were ambitious of decorating themselves at once with the laurels of Mars and of Apollo. He wrote two excellent works; the one a book of Maxims, which, Voltaire says, has contributed more than any thing else to form the taste of the French nation; and the other, Memoirs of the Regency of Queen Anne of Austria. It was partly at the instigation of the beautiful duchess de Longueville, to whom he had long been attached, that the duke de Rochefoucault engaged in the civil wars, in which he signalized himself, particularly at the battle of St Antoine. After the civil wars were ended, he thought of nothing but enjoying the calm pleasures of friendship and literature. His house became the rendezvous of every person of genius in Paris and Versailles. Racine, Boileau, and Savigné, found in his conversation charms which they sought for in vain elsewhere. He was not, however, with all his elegance and genius, a member of the French Academy. The necessity of making a public speech on the day of his reception was the only cause that he did not claim admittance. This nobleman, with all the courage he had displayed upon various critical occasions, and with his superiority of birth and understanding over the common run of men, did not think himself capable of facing an audience to utter only four lines in public, without being out of countenance. He died at Paris in 1680, aged sixty-eight, leaving behind him a character which has been variously drawn by those who during his life were proud of his friendship.

ROCHELLE, an arrondissement of the department of the Lower Charente, in France, extending over 282 square miles. It comprehends seven cantons, divided into fifty-five communes, and in 1836 contained 78,797 inhabitants. The capital is the city of the same name, the seat of the departmental government and of the courts of law. It is on the sea-shore, is strongly fortified, and has a convenient and secure harbour defended by two forts. It is the seat of a bishop, has a cathedral, one Protestant and five Catholic churches, and in the year 1836 had 14,857 inhabitants, who are traders in wine, brandy, salt, and other domestic products, and in all kinds of colonial articles. It is celebrated for its long siege when held by the Protestants in 1628, which was continued for thirteen months, and was attended with dreadful sufferings. Long. 1. 14. 17. W. Lat. 46. 9. 33. N.

ROCHESTER, an ancient city in the county of Kent, thirty miles from London. It is commonly supposed to have been founded by the ancient Britons. In the time of the Romans it was one of their military stations, but did not attain any great celebrity until more than a century after the arrival of the Saxons, who in the reign of King Ethelbert, constituted it the seat of a bishop, and it was considered as a most important military station. By the Britons it was known under the name of *Dourbrys;* the Romans called it *Durobrivæ*, which the Saxons changed to *Roffcaster*, from which its present name has been derived. It is situated on the river Medway, a stream which, rising in the centre of Kent, becomes navigable at Maidstone, and increases, till, near Rochester, it is affected by the tides, which reach it from the Thames at the Nore. At Rochester is the first bridge over that fine stream. This bridge, built in the reign of King John, with the exception of the bridges in London, was long deemed superior to any other in the kingdom in height, strength, and elegance. It consists of eleven arches, three of which have been rebuilt, and the whole, by modern improvement, widened and beautified, and ornamented with balustrades, panels, and bold copings.

Rochester.

The largest arch is forty feet span, and the others thirty feet. The length is 560 feet, and the breadth twenty-four feet between the parapets. The river Medway is capable of receiving the largest vessels up to Rochester, but few are moored off the city, as Chatham, a mile lower down the river, is more convenient from the vicinity to the naval arsenal and the docks.

The ancient castle is an interesting object to all antiquaries. It stands on the south-west side of the city, on such an elevated spot that it can be seen at thirty miles distance. The streets of this city have no peculiar feature, except the narrowness and length; for in fact it consists chiefly of a single street, which is a continuation of Stroud towards the west and of Chatham towards the east, forming two rows of moderate houses, more than two miles from one end to the other, with a few short streets or lanes leading from them southward. With the exception of the cathedral, hereafter to be noticed, the town-hall is the most remarkable edifice: it was built in 1687. It is a handsome structure, with a spacious entrance-hall and staircase, the ceilings of both which are very curiously ornamented. Here the city business is transacted; and at the back part is the city jail. There is a free school, several charitable institutions, a custom-house, and a market-house. The diocese of Rochester is the smallest in the kingdom. It had a cathedral as early as the year 600, which was destroyed by Ethelbert, king of Mercia, in 676; and a few years after the city suffered much by the incursions of the Danes, but appears to have recovered some degree of respectability by the accession of King Athelstan, who appointed masters of the mint to superintend the coinage of money. The cathedral had been dilapidated at the Norman conquest; but Gundulph, who was removed from Normandy to fill the see, acquired money sufficient to rebuild the sacred edifice, though he died in 1094, before it was finished. Like most of the more ancient ecclesiastical erections, its plan is an improvement on the basilica of Rome, and it is built in the form of the cross of Christ, with a massive square tower at the point of intersection. The interior space to the west of the cross was the nave or body of the church, which represented the ship of St Peter: this part is more ancient than the nave of any other cathedral in the kingdom, and still retains most of the peculiar features of the style in which it was originally built, and is indeed one of the most interesting specimens of Norman architecture. The whole length of this nave is a hundred and fifty feet, and its breadth between the pillars thirty-three feet, and from one wall to the other seventy-five feet. The choir has an ascent of ten steps, and is a hundred and fifty-six feet in length. The western front of the cathedral, one of the most perfect specimens of Anglo-Norman architecture, was constructed with consummate ability at a period when the art had arrived at a high point of perfection. The centre door is formed of a semicircular arch, composed of rich mouldings, and is supported by four pillars, with capitals of wreathed foliage. Two of these pillars take the form of Caryatides, and present statues of King Henry I. and his queen Matilda, the daughter of Malcolm III. king of Scotland, being undoubtedly two of the most ancient statues remaining in England. This building presents many other objects of very high interest to the student and the admirer of ancient architecture. The cathedral contains but few monuments, and none with any striking peculiarity.

Rochester is not a place of much trade, except what arises from the great number of travellers passing through it in their way by Dover to and from the continent. The chief occupation is a considerable oyster-fishery, from beds in the river Medway, which river is under the concurrent jurisdiction of its own corporate body, and that of the lord-mayor and aldermen of London. The latter body make periodical visits of conservancy by water, and on such occasions the two corporations indulge together in sumptuous festivity. For municipal purposes, the city is divided into three wards, and is governed by a mayor, six aldermen, and seventeen councillors. The recorder and justices of the peace are appointed by the crown. The city returns two members to parliament. There is a well-supplied market on Fridays, and several annual fairs. The population amounted in 1821 to 8795, and in 1831 to 9811.

Rochford || Rocky Mountains.

ROCHFORD, a market-town of the county of Essex, in the hundred of the same name, thirty-nine miles from London. It is situated on a small river that empties itself into the Crouch. It has a good market on Thursday. The population amounted in 1801 to 1228, in 1811 to 1214, in 1821 to 1382, and in 1831 to 1256.

ROCKET, an artificial fire-work, consisting of a cylindrical case of paper, filled with a composition of certain combustible ingredients; which, being tied to a stick, mounts into the air, and then bursts. See PYROTECHNY.

ROCKY MOUNTAINS, a great mountain chain which traverses the western part of North America, extending from about latitude 70° north to Mexico, where it is continued by the Cordilleras of the Andes. These ranges are considered as forming part of one vast chain, which in South America, near the equator, attains its greatest elevation. At the Isthmus of Panama it is so low as nearly to disappear; but this is in conformity with the narrowness of the land in that quarter, and but for a short space. This slight interruption is not sufficient to entitle us to consider the continuity as broken, so that we have in the western hemisphere one great mountain range extending along both continents, from the Polar Sea on the north, to Cape Horn on the south, a distance of more than one hundred and twenty degrees of latitude, without including the windings. The eastern side of North America is traversed by a similar range of mountains called the Alleghanies, which stretch along in continued and parallel lines; but the extent, breadth, and height of the Rocky Mountains are much greater than those of the former. It is however supposed that the Rocky Mountains extend along the western part of the continent, at about the same distance from the Pacific Ocean that the Alleghanies on the eastern side extend from the Atlantic Ocean. Although but partially explored, the primitive character of the Rocky Mountains is clearly established. Their eastern sides are covered to the height of two hundred or three hundred feet, with a sandstone consisting of the ruins of the granitic rocks upon which it reposes, where disintegration was apparently effected by the gradual agency of an ancient ocean, once occupying the immense plain or basin now extending eastward from the base of these mountains to the chain of the Alleghanies. They have not however been sufficiently explored to admit our advancing any scientific details in regard to them. Many of the detached mountains and prominent peaks have not yet been either named, classified, or described. It does not appear that many of them rise above the region of perpetual refrigeration. But we have the concurrent testimony of Lewis and Clarke, as well as others, that in latitude 47° north, immense quantities of snow are on their summits, between the Missouri and Columbia, in the months of June and July. They are seen like a vast rampart rising from the grassy plains, stretching from north to south. Sometimes their aspect is that of continued ranges of a grayish colour, rising into the blue of the atmosphere, above the region of the clouds. A great number are black, ragged, and precipitous; and their bases are strewn with immense boulders and fragments of rock, detached by earthquakes and the elements. From this iron-bound and precipitous character they probably received the appellation of Rocky Mountains. Some of the peaks are supposed to be twelve or thirteen thousand feet in height; and the general range is considerably higher than any other in North America, with the exception of the

Cordilleras. It is not certainly known whether any of them are volcanic. Pumice stones are often seen floating on the Mississippi, and still oftener on the Missouri. These are generally of a reddish yellow, or flame colour, and are amongst the largest and finest specimens of this substance to be met with. Some assert that they proceed from hills of burning coal, but we never heard of hills of burning coal ever yielding such a product. They are entirely a volcanic production, and beyond doubt are either discharged from craters at present active, or are washed away by the mountain torrents, from places which were formerly the scene of such phenomena. Mica is also abundantly carried along by the waters which flow from the Rocky Mountains. The great rivers that are discharged from their eastern and western declivities wind among the mountains, the Arkansas on the east, and the Oregon or Columbia on the west, more than a hundred leagues before they issue into the plains. In following the beds of such streams, travellers pass through the range without much difficulty, so that the reports of the early travellers that they presented a high, continuous, and almost impassable barrier, are incorrect. Various leaders of expeditions have passed them at different points, and affirm that they found no such formidable and insurmountable barriers, the mention of which was wont to deter traders from attempting to cross from east to west or from west to east by this route. Following the river Platt, which is one of the principal southern branches of the Missouri, the traveller finds a road even to Lake Buenaventura, on the Pacific plains, that needs little labour to adapt it to the passage of horses and waggons. The acclivity is nowhere so great as to exceed an ascent of three degrees.

This vast range has been divided into the Rocky, Chepywan, and Masserne Mountains, on what ground is not exactly known. The ranges on the south, at the sources of the Arkansas, and running thence towards the Gulf of Mexico, are called the Masserne Mountains. A single peak of this ridge, seen as a landmark for immense distances over the subjacent plains, is called Mount Pike, a very appropriate name. It is described as of incomparable grandeur in appearance, and has been differently estimated at from seven to ten thousand feet in height. On the ridges of the Rocky Mountains, the Colorado of the Pacific, the Rio del Norte of Mexico, the Roche-jaune or Yellow-stone of the Missouri, and the Arkansas and Red River of the Mississippi, streams which have outlets at such immense distances apart, all have their origin. Many accounts have been given of the appearance of silver and other metals in the Rocky Mountains, but they have been too partially explored to entitle us to pronounce on the extent or value of the veins.

ROCROY, an arrondissement of France, in the department of the Ardennes, which extends over 295 square miles. It comprehends five cantons and sixty-eight communes, and the population in 1836 amounted to 46,156. The capital is a fortified city of the same name, situated in the midst of a wood. It contains 600 houses, and in 1836 had 3682 inhabitants. It is celebrated for its siege in 1643, when taken from the Spaniards by the great Condé. Long. 4. 26. 32. E. Lat. 49. 55. 36. N.

RODEZ, an arrondissement of the department of the Aveyron, in France, which extends over 797 square miles. It comprehends eleven cantons, divided into sixty-nine communes, and in 1836 contained 99,704 inhabitants. The capital is the city of the same name, and the seat of the departmental government and courts of law. It is the seat of a bishop, and has a fine cathedral, with a tower 250 feet high, which is a prominent object at more than forty miles distance. Rodez contains four churches, a lyceum, a hospital, and an exchange, with 9685 inhabitants, extensively employed as coppersmiths, and having manufactures of thin woollens, cutlery, and leather. Long. 2. 29. 5. E. Lat. 44. 21. N.

Rodney.

RODNEY, George Brydges, Lord Rodney, was born on the 19th of February 1718. He was the descendant of an ancient family, and was related to the duke of Chandos. His father Henry Rodney obtained, at the age of fourteen, a commission as cornet of horse; but having quitted the army after a short period of service, he settled at Walton-upon-Thames, and married Mary, eldest daughter and co-heiress of Sir Henry Newton, envoy extraordinary to the grand duke of Tuscany, and afterwards judge of the court of admiralty. Through the interest of the duke, who usually attended the king on his journeys to and from Hanover, Mr Rodney obtained the command of the royal yacht; and having on one of these occasions been asked what mark of favour he would wish the king to confer upon him, he requested that his majesty would stand sponsor for his son. Such a request was easily granted; and accordingly his second son was named after his royal and noble godfathers.

At a very early age he was sent to Harrow school; and having quitted it at the age of twelve, he received from the king a letter of service, the last ever granted, and went to sea. On the Newfoundland station he served for six years with Admiral Medley. On the 15th of February 1739 he was made lieutenant in the Dolphin, by Admiral Haddock, in the Mediterranean, and served successively in the Essex, Royal Sovereign, and Namur. Admiral Mathews having in 1742 appointed him to the Plymouth of sixty-four guns, he convoyed three hundred sail of the Lisbon trade through the midst of the French fleet, then cruising in the channel; and for his conduct on this occasion he received the warmest thanks of the merchants. In the rank of captain he was confirmed by the admiralty, and was appointed to the command of the Sheerness, in which he continued for eighteen months. He was then removed to the Ludlow Castle, of forty guns. In this ship he fought and took the great St Maloes privateer, of forty guns, and one hundred men above his own complement. From this period till December 1745, he was employed in various pieces of service, which afforded him no particular opportunities of obtaining distinction. Having been appointed to the Centurion, he for two years cruised in the North Sea; and on that station he commanded while the pretender was in Edinburgh, and until the arrival of Admiral Byng. He was now promoted to the command of the Eagle, of sixty-four guns; and in 1747 he was despatched in a small squadron for the purpose of intercepting the French fleet, homeward-bound from St Domingo. On the 20th of June they fell in with this fleet off Cape Ortegal. The French men-of-war deserted their convoy during the night, and no fewer than forty-eight merchantmen were captured. Rodney afterwards joined the squadron of Admiral Hawke, and bore a distinguished part in the action off Finisterre on the 14th of October in the same year. Near the close of this war, a small squadron, of which the Eagle was one, fell in with a Spanish fleet from the West Indies, consisting of twelve sail of the line with a rich convoy, and, notwithstanding their own inferiority, they took from them six sail of merchantmen.

Captain Rodney was appointed to the Rainbow in March 1748, and was soon afterwards sent as governor and commander-in-chief on the Newfoundland station. This was his first appearance with the rank of commodore. He had received particular instructions to discover, if possible, an island in the Western Ocean, said to be in lat. 49. N., about three hundred leagues from Britain. After cruising fourteen days to no purpose, he sailed for St John's, the seat of his government. In this station he continued till the month of October 1752, when he returned home to take his seat in parliament, having been elected for the borough of Saltash.

In May 1757 he sailed in the Dublin, of seventy-four guns, with Hawke's expedition for the bombardment of

Rochefort; and in February 1758, with Boscawen in the expedition against Louisbourg. On the 19th of May 1759 he was promoted to the rank of rear-admiral, and was immediately appointed to the command of a small squadron destined to bombard Havre de Grace. This service he performed in a very effectual manner; and having continued to keep the sea till the close of the ensuing year, he returned to Britain. In 1761 he was elected member of parliament for Penryn. On the 6th of October he hoisted his flag on board the Marlborough, having been appointed commander-in-chief at Barbadocs and the Leeward Islands, and to conduct the naval operations of the armament destined for the attack of Martinique. This island, together with St Lucia, was speedily reduced.

The admiral returned home on the 12th of August 1763. On the 21st of the preceding October he had been made vice-admiral of the blue. In 1764 he was created a baronet, and during the following year was appointed governor of Greenwich Hospital. In 1768 he was returned to parliament for Northampton. On the 18th of October 1770 he became vice-admiral of the white, and on the 24th of October 1771 vice-admiral of the red. During the latter year, on the 23d of January, he had been appointed commander-in-chief at Jamaica, and with this command was not permitted to retain the office of governor. Having returned to Britain, he struck his flag at Portsmouth on the 4th of September 1774.

Being inattentive, as many seamen are, to the rules of economy, his circumstances became so embarrassed that he was obliged to fly from his country, with very slight hopes of ever being able to return. He was in France when the ill-advised policy of that court prompted them to take a decided part with America against Great Britain; and it is said that some men in power, no strangers to the desperate state of Sir George's affairs, offered him a high command in the French navy, if he would carry arms against his own country. This offer he rejected with becoming indignation. Soon after this gallant behaviour, the duke de Chartres, afterwards the infamous Orleans, told Sir George that he was himself to have a command in the fleet to be opposed to that under the command of his countryman Keppel; and with an insulting air asked him what he thought would be the consequence of their meeting. "That my countryman will carry your highness with him to learn English," was the high-spirited reply. These statements do not perhaps rest on sufficient authority; but we learn from his own correspondence, that Maréchal Biron expressed his willingness to advance whatever sum he might require, even to the amount of two thousand pounds. Having accepted a loan of a thousand louis, he was in 1778 enabled to pay his bills in Paris, and to revisit his own country. He was speedily enabled to discharge this debt, and to make a satisfactory arrangement with his creditors.

On the 1st of October 1779, Rodney was appointed commander-in-chief of Barbadoes and the Leeward Islands. His first exploit after this appointment was on the 8th of January ensuing, when he took sixteen Spanish transports, together with seven ships and vessels of war, which had left St Sebastian's a week before. On the 16th of the same month he fell in with the Spanish fleet, consisting of eleven sail of the line, under the command of Don Juan de Langara; of which one was blown up during the engagement, five were taken and carried into Gibraltar, among which was the admiral's ship, and the rest were much shattered. In April the same year, he fell in with the French fleet under the command of Admiral Guichen, at Martinique, whom he compelled to fight, and whom he completely beat; though, from the shattered state of his own fleet, and the unwillingness of the enemy to risk another action, he took none of their ships. The successful efforts of the gallant admiral during the year 1780 were generally applauded through the nation. He received the thanks of both houses of parliament, and addresses of thanks from various parts of Great Britain, and the islands to which his victories were more particularly serviceable. In December the same year, he made an unsuccessful attempt, together with General Vaughan, on St Vincent's. In 1781, he continued his exertions, with much success, in defending the West India Islands; and, along with the above-named general, he conquered St Eustatius, on which occasion his conduct to the inhabitants has been much, though perhaps unjustly, censured. The island was certainly a nest of contraband traders. On the 12th of April 1782, he came to a close action with the French fleet under Count de Grasse; during which he sunk one ship and took five, of which the admiral's ship, the Ville de Paris, was one. On the 22d of May, the thanks of both houses of parliament were voted to the admiral, his officers, and seamen, for this brilliant and decisive victory. He was appointed vice-admiral of Great Britain, and was raised to the peerage by the title of Baron Rodney of Stoke in Somersetshire. The House of Commons voted him an annual pension of L.2000. In the year 1793 this pension was permanently settled on the title; and in 1806 a pension of L.1000 Irish was granted to his grandson for life. Having been superseded, very ungraciously, in his command, Lord Rodney once more steered a homeward course. He landed at Bristol on the 15th of September 1782, and next day proceeded to join his family at Purbrook near Portsmouth. He survived for ten years, having died on the 24th of May 1792, after he had completed the seventy-fourth year of his age.[1]

Lord Rodney had been twice married; first to the sister of the earl of Northampton, and next to the daughter of John Clies, Esq. With her he did not reside for several years before his death. He was succeeded in his title and estates by his son George, who married, in 1781, Martha, daughter of the Right Hon. Alderman Harley, by whom he had issue.

RODOSTO, a city of Turkey in Europe, in the province of Galipoli. It is situated on a small gulf of the same name, on the Sea of Marmora. It is strongly fortified, and well built, having, for a Turkish town, broad streets. It is the seat of a Greek archbishop, has five Greek and two Armenian churches, many mosques, baths, and caravanserais, 4000 houses, and 16,000 inhabitants. It is a place of considerable trade, chiefly in the products of the surrounding district. Long. 27. 20. 5. E. Lat. 40. 58. 34. N.

ROE, the seed or spawn of fish. See ICHTHYOLOGY.

ROEBUCK, JOHN, was born at Sheffield in Yorkshire in the year 1718. His father was a manufacturer of Sheffield goods, and by his ability and industry acquired a considerable fortune. He intended John to follow his own lucrative employment; but he was powerfully attached to other pursuits, and his father did not discourage his rising genius, but gave him a liberal education. After an elementary training, he was placed under the tuition of Dr Doddridge, by whose instructions he was rapidly improved in many branches of useful knowledge. Having completed his studies at the academy, he was afterwards sent to the university of Edinburgh, where he studied medicine, and chemistry, which then began to attract some attention in Scotland. He was much distinguished among his fellow students by his logical and metaphysical acuteness, and by great ingenuity in his arguments. Here he formed an acquaintance with Dr Robertson, Mr Hume, and other literary characters.

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[1] The Life and Correspondence of the late Admiral Lord Rodney. By Major-General Mundy. Lond. 1830, 2 vols. 8vo. The author married Lord Rodney's youngest daughter.

Having completed his medical course at Edinburgh, he afterwards spent some time at the university of Leyden, where in 1743 he took the degree of M. D. He began to practise as a physician at Birmingham, a place which was then making rapid progress in arts, manufactures, and population, and where a favourable opening was presented to him by the death of an aged physician.

The extensive use of sulphuric acid in chemistry led many to various methods of obtaining it; and Dr Roebuck attempted to prepare it in such a manner as to reduce the price, for which purpose he substituted leaden vessels in the room of glass; and he had the good fortune to effect his benevolent design. Of this useful article he established a manufactory at Prestonpans in the year 1749, which was opposed by Dr Ward, but without success, as Roebuck's discovery did not come within Ward's patent. Dr Roebuck and his partner retained the advantages of their industry and ingenuity for a number of years, supplying the public with sulphuric acid at a much cheaper rate than had been formerly done. He found it expedient to relinquish his medical profession, and he resided in Scotland during the greater part of the year. He made some discoveries in the smelting of ironstone, greatly facilitating that process by using pit-coal instead of charcoal. He and his partner therefore projected a very extensive manufactory of iron, for which they soon procured a sufficient capital, as their friends had much confidence in their integrity and abilities. Dr Roebuck at length made choice of a spot on the banks of the river Carron, as the most advantageous situation for the establishment of their manufactory, abundance of ironstone, limestone, and coal, being found in its immediate vicinity. The preparations for this establishment were finished in the end of the year 1759; the first furnace was blown on the 1st of January 1760; and a second was soon afterwards erected.

These works turned the attention of Dr Roebuck to the state of coal in the neighbourhood, and to the means of procuring the extraordinary supplies which the iron-works might require. He therefore became lessee of the extensive coal and salt works at Borrowstownness, the property of the duke of Hamilton; in which he sunk, in the course of a few years, not only his own, and a considerable part of his wife's fortune, but the regular profits of his more successful works; and, what distressed him above every thing else, the great sums of money which he borrowed from his relations and friends, without the prospect of ever being able to repay them. This ruinous adventure cut off for ever the flattering prospects of an independent fortune which his family had once cherished; and he drew from his colliery only a moderate annual support, for which he was indebted to the indulgence of his creditors. Some years before his death, he was seized with a disorder that required a dangerous operation, and this he bore with his usual spirit and resolution. He was restored to a considerable share of his wonted health and activity; but its effects never wholly left him. He visited his works till within a few weeks of his decease, in order to give instructions to his clerks and overseers, and was confined to bed only a few days. He departed this life on the 17th of July 1794, retaining all his faculties, spirit, and good humour, to the last.

ROEMER, Olaus, a celebrated Danish mathematician and astronomer, was born at Arhusen in Jutland, in the year 1644, and was sent to the university of Copenhagen at the age of eighteen. By his assiduous application to the study of astronomy and mathematics, he became so eminent in those sciences, that Picard was astonished and delighted with him, when making observations in the north, by the order of Louis XIV. He was prevailed on to accompany Picard to France, and being presented to the king, he was chosen the dauphin's tutor in the study of mathematics. He was afterwards united with Picard and Cassini in making astronomical observations, and became a member of the Academy of Sciences in 1672. His discoveries acquired him great reputation during his ten years' residence at Paris; and he did not scruple to assert, that Picard and Cassini took the merit of many things which belonged exclusively to himself. Roemer was the first person who discovered the velocity with which light moves, by means of the eclipses of Jupiter's satellites, determining it to be about seven or eight minutes in coming from the sun to the earth. This opinion was opposed by many, but it was afterwards demonstrated in a most ingenious manner by Dr Bradley.

Christian V. king of Denmark, recalled Roemer to his native country in the year 1681, when he was appointed professor of astronomy at Copenhagen. He was also employed in the reformation of the coin and architecture of the country, in regulating the weights and measures, and in laying out the high roads throughout the kingdom; and his conduct was truly creditable to himself, and gave the greatest satisfaction to his royal employer. The consequence was that the king bestowed many dignities upon him, and among others appointed him chancellor of the exchequer. In fine, he was made councillor of state and burgomaster of Copenhagen under Frederic IV. who succeeded the king already mentioned. While Roemer was engaged in preparing to publish the result of his observations, he was cut off on the 19th of September 1710, when about sixty-six years of age. Horrebow, his disciple, made up this loss, by publishing in 4to, in 1753, when professor of astronomy at Copenhagen, various observations of Roemer, with his method of observing, under the title of *Basis Astronomiæ*. He had printed various astronomical observations and pieces in several volumes of the Memoirs of the Royal Academy of Sciences at Paris.

ROERMOND, or Ruremonde, one of the circles into which the province of Limburg is divided. It contains six cantons. The capital is the city of the same name, which stands on the left bank of the Maas, where the river Roer falls into it. It is fortified, but not strongly, and contains 4480 inhabitants, who make woollen cloths and carry on trade by the river. Long. 5. 53. 54. E. Lat. 51. 11. 48. N.

ROGA, in *Antiquity*, a present which the emperors made to the senators, magistrates, and even to the people; and the popes and patriarchs to their clergy. These rogæ were distributed by the emperors on the first day of the year, on their birthday, or on the *natalis dies* of the cities; and by the popes and patriarchs in passion-week. Roga is also used for the common pay of the soldiers.

ROGATION, Rogatio, in Roman jurisprudence, a demand made by the consuls or tribunes of the Roman people, when a law was proposed to be passed. *Rogatio* is also used for the decree itself made in consequence of the people's giving their assent to this demand; to distinguish it from a *senatus consultum*, or decree of the senate.

Rogation-Week, the week immediately succeeding Whitsunday; so called from the three feasts therein, viz. on Monday, Tuesday, and Wednesday.

ROGER de Hoveden, a learned man of the thirteenth century, was born in Yorkshire, most probably at the town of that name, now called *Howden*, some time in the reign of Henry I. After he had received the first parts of education in his native country, he studied the civil and canon laws, which were then become the most fashionable and lucrative branches of education. He was appointed domestic chaplain to Henry II. who employed him to transact several ecclesiastical affairs, in which he acquitted himself with honour. But his most meritorious work was, his Annals of England from A. D. 731, when Bede's Ecclesiastical History ends, to A. D. 1202. This work, which is one of the most voluminous of our ancient histories, is more valuable for the sincerity with which it is written, and the great variety of facts which it contains, than for the beauty of its style or the regularity of its arrangement.

ROGONATGUNGE, a town of Hindustan, in the province of Bengal, district of Pachete, 136 miles west-north-west from Calcutta. Long. 86. 20. E. Lat. 23. 15. N.

ROGONATPOOR, a town of Hindustan, province of Bengal, district of Pachete, 130 miles north-west from Calcutta. Long. 86. 44. E. Lat. 23. 32. N.

ROHAN, Henry Duke of, peer of France, and prince of Leon, was born at the Chateau de Blein, in Brittany, in 1579. Henry IV. under whose eye he gave distinguished proofs of his bravery at the siege of Amiens, when only sixteen years of age, loved him with as much affection as if he had been his own son. After the death of Henry, he became chief of the Calvinists in France; and was equally formidable for his genius as his sword. In defence of the civil and religious rights of his party, he maintained three wars against Louis XIII. The first, which terminated to the advantage of the Protestants, broke out when that prince wished to establish the Romish religion in Bearn; the second, because of the siege which Cardinal de Richelieu ordered to be laid to Rochelle; and the third, when that place was besieged a second time. The consequences of this war are sufficiently known: Rochelle surrendered, and the duke de Rohan, perceiving, that after the taking of this place, the majority of his party were endeavouring to make up matters with the court, succeeded in procuring for them a general peace in 1629, upon very honourable and advantageous terms. There is a very particular anecdote of him, extracted from the Memoirs of the Duchess of Rohan, Margaret of Bethune, daughter of the famous Sully. While the duke de Rohan was at Venice, a proposal was made to him from the Porte, that for 200,000 crowns, and an annual tribute of 20,000, the grand signior would give him the island of Cyprus, and fully invest him with the dignity and prerogatives of king. The duke was warmly inclined to comply with this proposal, and to settle in the island the Protestant families of France and Germany. He negociated this business at the Porte by means of the intervention of the patriarch Cyril, with whom he had much correspondence; but different circumstances, and in particular the death of the patriarch, contributed to break off the treaty. The republic of Venice chose Rohan for their commander in chief against the Imperialists; but Louis XIII. took him from the Venetians, and sent him ambassador into Switzerland, and into the Grisons. He wished to assist these people in bringing back La Valteline under their obedience, the revolt of which the Spaniards and Imperialists encouraged. Rohan, being declared general of the Grisons, after many victories drove the German and Spanish troops entirely from La Valteline in 1633. He again defeated the Spaniards in 1636, at the banks of the lake of Come. France, not thinking it proper to withdraw her troops, the Grisons rose up in arms, and the duke de Rohan, not satisfied with the conduct of the court, entered into a special treaty with them on the 28th of March 1637. This hero, fearing the resentment of Cardinal de Richelieu, retired to Geneva, with a view to join his friend the duke of Saxe-Weimar, who wished him to undertake the command of his army, then ready to engage the Imperialists near Rhinfeldt. Although he declined this honour, yet he took the command of the regiment of Nassau, with which he threw the enemy into confusion; but was himself wounded, 28th February 1638, and died of his wounds the 13th of April following, at the age of fifty-nine. He wrote several interesting performances: 1. The Interests of Princes, printed at Cologne in 1666, in 12mo; in which work he fully examines the public interests of all the princes of Europe. 2. The Perfect General, or an Abridgement of the Wars from Cæsar's Commentaries, in 12mo. Here he makes it appear, that a knowledge of the tactics of the ancients might be of much use to the moderns. 3. A Treatise on the Corruption of the Ancient Militia. 4. A Treatise on the Government of the thirteen Provinces. 5. Memoirs; the best edition of which is in two vols. 12mo. They contain the history of France from 1610 to 1629. 6. A Collection of some Political Discourses on State Affairs, from 1612 to 1629, 8vo, Paris, 1644, 1693, 1755; with the Memoirs and Letters of Henry Duke de Rohan relative to the War of La Valteline, three vols. 12mo, Geneva, 1757. This was the first edition which appeared of these curious memoirs: we owe it to the great attention and diligence of Baron de Zurlauben, who published them from different authentic manuscripts. He likewise ornamented this edition with geographical, historical, and genealogical notes, and a preface, which contains an abridged but highly interesting life of the duke de Rohan, author of the memoirs.

ROHAULT, James, a celebrated Cartesian philosopher, was the son of a merchant of Amiens, where he was born in 1620. He became well skilled in the mathematics, and taught them at Paris. He died at Paris in 1675. He wrote in French, 1. A Treatise on Natural Philosophy; 2. The Elements of Mathematics; 3. A Treatise on Mechanics, which is very curious; 4. Philosophical Conversations, and other works. His Physics have been translated into Latin by Dr Samuel Clarke, with notes, in which the Cartesian errors are corrected upon the Newtonian system.

ROHILCUND, in Sanscrit *Kuttair* or *Kuttaher*, an extensive and valuable district of Hindustan, situated between the rivers Ganges and Goggra, and between the twenty-eighth and thirtieth degrees of north latitude, and from seventy-eight to eighty east longitude. It is extremely well watered by the rivers Ganges and Ramgunga. The latter traverses the country throughout its whole extent, and joins the Ganges at Kanoge. Many smaller streams intersect the country, and contribute to its fertility, being distributed by means of canals and reservoirs. Water is also found by digging a foot under ground. With all these advantages, this country is remarkably fertile, and was extremely productive and well cultivated under its native sovereigns, though, when it was ceded to the British in 1801 by the nabob of Oude, it was in a state of desolation, owing to his tyranny and extortion. It abundantly produces grain of all sorts, sugar-cane, indigo, cotton, and tobacco. It also contains large forests of valuable timber, the wood of which is floated down the Dewah or Goggra, which issues from the Kemaon Mountains, and runs past the town of Pillibeet, and is thence embarked for Patna, Calcutta, and other large towns in the south. Its chief towns are Bareilly, Bissowly, Budavon, Moradabad, Owlah, Pillibeet, Rampore, Sumbul, with several others. In the early history of the Mogul empire, Rohilcund is celebrated as a very flourishing country, and of great political importance; and in many parts are still to be seen the remains of magnificent edifices, palaces, gardens, mosques, colleges, and mausoleums. In more recent times this district was occupied by a number of Afghans of the tribe of Roh or Rohillas. The founders of the dynasty were two brothers, named Shah Aalum, and Hussein Khan, who quitted Afghanistan about the year 1673, and settled in this country, where they pursued some inconsiderable employments under the Emperor Aurungzebe. Their descendants acquired possession of a considerable territory, which they ruled with prudence and moderation; and their territories were cultivated like a garden. A quarrel ensued between them and the nabob of Oude, to whose vengeance they were consigned by the British, who sent troops to aid in their extermination, under the understood condition that they were to share in the spoil. They were defeated by the British troops; and their country, given up to fire and oll- ‖ llin.

sword, was most cruelly wasted. Under Fyzoola Khan, one of the sons of Aly Mohammed, the country was in a most flourishing condition; and several of the Rohilla chiefs resided in each of the large towns, where they lived in a princely and hospitable manner, and gave every protection and encouragement to the farmers, so that the revenue amounted to a million sterling; but under the waste and ruin of this cruel invasion the revenue decreased in the course of twenty years to L.400,000, and the country went gradually to ruin. The country was transferred to the British in 1801, and is now governed by a civil establishment of officers stationed at Bareilly.

ROLL, or Roller, is a piece of wood, iron, brass, &c. of a cylindrical form, used in the construction of several machines, and in several works and manufactures.

ROLLAND, an island in the Southern Ocean, discovered by Kerguelen in 1773, about nine miles in circumference. Long. 68. 43. E. Lat. 48. 37. N.

ROLLI, Paul, an Italian poet, was born at Rome in 1687. He was the son of an architect, and a pupil of the celebrated Gravina, who inspired him with a taste for learning and poetry. An intelligent and learned English peer, having brought him to London, introduced him to the royal family as a master of the Tuscan language. Rolli remained in England till the death of Queen Caroline his protectress, and the patroness of literature in general. He returned to Italy in 1747, where he died in 1767, in the eightieth year of his age, leaving behind him a very curious collection in natural history, with a valuable and well-chosen library. His principal works first appeared in London in 1735 in 8vo. They consist of odes in blank verse, elegies, songs, and other poems, after the manner of Catullus. A collection of his epigrams was printed at Florence in 1776, in 8vo, to which is prefixed an account of his life by Fondini. What Martial said of his own collection may be said of this, "that there are few good, but many indifferent or bad pieces in it." Rolli, however, bore the character of one of the best Italian poets of his age. During his stay in London he procured editions of several authors of his own country. The principal of these were the Satires of Ariosto, the burlesque works of Berni, Varchi, &c. two vols. in 8vo; the Decameron of Boccace, 1727, in 4to and folio, in which he has faithfully copied the celebrated and valuable edition published by the Juntas in 1527; and, lastly, of the elegant Lucretia of Marchetti, which was printed at London in 1717, in 8vo, through the influence and attention of Rolli. This edition is beautiful; but the work is thought to be of a pernicious tendency. He likewise translated into Italian verse the Paradise Lost of Milton, printed at London in folio in 1735; and the Odes of Anacreon, London, 1739, in 8vo.

ROLLIN, Charles, a celebrated French writer, was the son of a cutler at Paris, and was born there on the 30th of January 1661. He studied at the College du Plessis, in which he obtained an exhibition through the interest of a Benedictine monk whom he had served at table, and who discovered in him some marks of genius. Here he acquired the regard of M. Gobinet, principal of the college, who had a particular esteem for him. After having studied humanity and philosophy, he applied to divinity three years at the Sorbonne; but he did not prosecute this study, and was satisfied with obtaining the tonsure. He afterwards became professor of rhetoric in his own college; and in 1688 succeeded Horsan, his master, as professor of eloquence in the Royal College. No man ever exercised the functions of it with greater eclat; he often made Latin orations to celebrate the memorable events of the times, and frequently accompanied them with poems, which were generally read and esteemed. In 1694 he was chosen rector of the university, and he continued in that office two years, which was then a mark of distinction. By virtue of his office, he spoke the annual panegyric upon Louis XIV. He made many very useful regulations in the university; and particularly revived the study of the Greek language, which was then much neglected. He substituted academical exercises in the place of tragedies; and introduced the practice which had been formerly observed, of causing the students to get by heart passages of Scripture. He was a man of indefatigable application, and trained innumerable persons, who did honour to the church, the state, and the army. The first president Portail was pleased one day to reproach Rollin in a jocular strain, as if he exceeded even himself in doing business; to whom Rollin replied, with that plainness and sincerity which was natural to him, "It becomes you well, sir, to reproach me with this; it is this habit of labour in me which has distinguished you in the place of advocate-general, which has raised you to that of first president; you owe the greatness of your fortune to me."

Rollin.

Upon the expiration of the rectorship, Cardinal Noailles engaged him to superintend the studies of his nephews, who were in the College of Laon; and in this office he was agreeably employed, when, in 1699, he was with great reluctance made coadjutor to the principal of the College of Beauvais. This college was then a kind of desert, inhabited by very few students, and without any regular discipline; but Rollin's great industry soon repeopled it, and raised it to that credit which it long retained. In this situation he continued till 1712; when the war between the Jesuits and the Jansenists drawing towards a crisis, he fell a sacrifice to the prevalence of the former. Father le Tellier, the king's confessor, a furious agent of the Jesuits, infused into his master prejudices against Rollin, whose connection with Cardinal de Noailles would alone have sufficed to make him a Jansenist; and on this account he lost his share in the principality of Beauvais. No man, however, could thus have suffered a smaller loss than Rollin, who had every thing left that was necessary to make him happy; retirement, books, and enough for his support. He now began to be employed upon Quinctilian; an author whom he justly valued, and could not without uneasiness see neglected. He retrenched in him whatever he thought rather curious than useful for the instruction of youth; he placed summaries or contents at the head of each chapter, and he accompanied the text with short and select notes. His edition appeared in 1715, in two vols. 12mo, with an elegant preface explaining his method and views.

In 1710, the university of Paris, willing to have a head suitable to the importance of their interests in a very critical conjuncture of affairs, chose Rollin again rector; but he was displaced in about two months by a lettre de cachet. The university had presented to the parliament a petition, in which it protested against taking any part in the adjustment of the late disputes; and their being congratulated in a public oration by Rollin on this step, occasioned the letter, which ordered them to choose a rector of more moderation. Whatever the university might suffer by the removal of Rollin, the public was probably a gainer; for he now applied himself to the composition of his Treatise on the Manner of Studying and Teaching the Belles Lettres, which was published in octavo, two volumes in 1726, and two more in 1728.

This work, though greatly deficient in order, and displaying neither depth nor philosophy, has been exceedingly successful; and its success encouraged its author to undertake another work of equal use and entertainment; his "Ancient History of the Egyptians, Carthaginians, Assyrians, Babylonians, Medes and Persians, Macedonians, and Greeks," which he finished in thirteen volumes 8vo, and published between 1730 and 1738. Voltaire, after having observed that Rollin was "the first member of the university of Paris who wrote French with dignity and correctness," says of this work, that "though the last volumes, which were written in too great a hurry, are not equal to the first, it is nevertheless the best compilation that had yet appeared in any language; because it is seldom that compilers are eloquent, and Rollin was remarkably so." This is perhaps saying too much. In this work there are indeed some passages very well handled; but they are only such as he had taken from the ancient authors, in doing justice to whom he was always very happy. The reader will easily discover in this work the same attachment to religion, the same desire for the public good, and the same love of virtue, which appear in that on the belles lettres. But it is to be lamented that his chronology is neither exact nor consistent; that he states facts inaccurately; that he has not sufficiently examined the exaggerations of ancient historians; that he often interrupts the most solemn narrations with mere trifles; and that his style is not uniform. Nothing can be more noble and more refined than his reflections; but they are strewed with too sparing a hand, and want that lively and laconic turn on account of which the historians of antiquity are read with so much pleasure. There is a visible negligence in his diction with regard to grammatical usage, and the choice of his expressions, which he does not at all times select with sufficient taste, although, on the whole, he writes well, and has preserved himself free from many of the faults of modern authors. While the last volumes of his Ancient History were printing, he published the first of his Roman History, which he lived to carry on, through the eighth and into part of the ninth, to the war against the Cimbri, about seventy years before the battle of Actium. Mr Crevier, the worthy disciple of Rollin, continued the history to the battle of Actium, which closes the tenth volume; and afterwards completed the original plan of Rollin in sixteen volumes 12mo, which was, to bring it down from the foundation of the city to the reign of Constantine the Great. This work had not so great success as his Ancient History. It is alternately diffuse and barren; and the greatest advantage of the work is, that there are several passages from Livy translated with great elegance into French. He also published a Latin translation of some of the theological writings relative to the disputes of the times in which he lived. Rollin was one of the most zealous adherents of the Abbé Paris; and before the enclosure of the cemetery of St Medard, this distinguished character might have been often seen praying at his tomb. This he confesses in his Letters. He published also Smaller Pieces, containing different Letters, Latin harangues, discourses, complimentary addresses, &c. Paris, 1771, two volumes 12mo. The collection is valuable for some good pieces which it contains, for the favourable opinion which it exhibits of solid probity, sound reason, and the zeal of the author for the progress of virtue and the preservation of taste. The Latin of Rollin is very correct, and much after the Ciceronian style, and embellished with most judicious thoughts and agreeable images. Full of the reading of the ancients, from which he brought quotations with as much propriety as plenty, he expressed himself with much spirit. His Latin poems are likewise entitled to commendation.

This excellent person died in 1741. He had been named by the king a member of the Academy of Inscriptions and Belles Lettres in 1701; but as he had not then brought the College of Beauvais into repute, and found he had more business upon his hands than was consistent with a decent attendance upon the functions of an academician, he begged the privileges of a veteran, which where honourably granted him. Nevertheless, he maintained his connections with the academy, attended their assemblies as often as he could, laid the plan of his Ancient History before them, and demanded an academician for his censor. Rollin was a man of an admirable composition; very ingenious, consummate in polite learning, of rigid morals, and eminently pious. His religion however carried him into the territories of superstition; and he wanted nothing but a mixture of philosophy in his nature to make him a very perfect character. Nothing could be more benign, more pacific, more sweet, more moderate, than Rollin's temper. He showed, it must be owned, some zeal for the cause of Jansenism; but in all other respects he was exceedingly moderate. The celebrated poet Rousseau conceived such a veneration for him, that he came out of banishment incognito to Paris, on purpose to visit him, and pay his respects to him. He looked upon his histories, not only as the best models of the historic kind, but as a complete system of politics and morals, and a most instructive school, in which princes as well as subjects might learn all their duties.

ROLLING, the motion by which a ship rocks from side to side like a cradle, by the agitation of the waves.

ROLLO, the conqueror of Normandy, was a Norwegian duke, banished from his country by Harold Harfager (who conquered Norway in 870) on account of the piracies he exercised. He first retired with his fleet among the islands of the Hebrides to the north-west of Scotland, whither the flower of the Norwegian nobility had fled for refuge ever since Harold had become master of the whole kingdom. He was there received with open arms by those warriors, who, eager for conquest and revenge, waited only for a chief to undertake some glorious enterprise. Rollo, placing himself at their head, and seeing his power formidable, sailed towards England, which had long been a field open on all sides to the violence of the northern nations. But the great Alfred had some years before established such order in his part of the island, that Rollo, after several fruitless attempts, despaired of forming there such a settlement as should make him amends for the loss of his own country. He pretended, therefore, to have had a supernatural dream, which promised him a glorious fortune in France, and which served at least to support the ardour of his followers. The weakness of the government in that kingdom, and the confusion in which it was involved, were still more persuasive reasons to insure them of success. Having therefore sailed up the Seine to Rouen, he immediately took that capital of the province, then called Neustria, and making it his magazine of arms, he advanced to Paris, to which he laid siege in form. This war at length ended in the entire cession of Neustria, which Charles the Simple was obliged to give up to Rollo and his Normans in order to purchase a peace. Rollo received it in perpetuity to himself and his posterity, as a feudal duchy dependent on the crown of France. A description of the interview between Charles and this new duke gives us a curious picture of the manners of these Normans; for the latter would not take the oath of fealty to his sovereign lord any other way than by placing his hands within those of the king; and absolutely refused to kiss his feet, as custom then required. It was with great difficulty that he was prevailed on to let one of his warriors perform this ceremony in his stead; but the officer to whom Rollo deputed this service suddenly raised the king's foot so high, that he overturned him on his back; a piece of rudeness which was only laughed at: to such a degree were the Normans feared, and Charles despised. Rollo was soon afterwards persuaded to embrace Christianity, and he was baptized with much ceremony by the archbishop of Rouen, in the cathedral of that city. As soon as he saw himself in full possession of Normandy, he exhibited such virtues as rendered the province happy, and deserved to make his former outrages forgotten. Religious, wise, and liberal, this captain of pirates became, after Alfred, the greatest and most humane prince of his time.

ROLLOCK, Robert, the first principal of the university of Edinburgh, was the son of David Rollock of Powis, in the vicinity of Stirling. He was born in the year 1555, and was taught the rudiments of the Latin tongue by a person then eminent in his profession. From school he was sent to the university of St Andrews, where his progress was so rapid, that he was made professor of philosophy soon after he took the degree of A. M.

The magistrates of Edinburgh having petitioned the king to found a university in that city, they obtained a charter, by which they were allowed all the privileges of a university, which was built in 1582, and Mr Rollock was chosen principal and professor of divinity. He was soon famous in the university on account of his lectures, and among his countrymen at large for his persuasive mode of preaching. In the year 1593, Rollock and others were appointed by parliament to confer with the popish lords; and in the following year he was one of those made choice of by the General Assembly to present his majesty with a paper entitled "The dangers which, through the impunity of excommunicated papists, traffickers with the Spaniards, and other enemies of the religion and state, are imminent to the true religion professed within this realm, his majesty's person, crown, and liberty of this our native country." Their zeal against popery was carried to excess, and they seem to have been of opinion, that it was incumbent on the civil magistrate to punish idolatry with death. In the year 1595, he was empowered, along with others, to visit the different universities in Scotland, with a view to inquire into the doctrine and practice of the different masters, the discipline adopted by them, and the state of their rents and living, which they were ordered to report to the next General Assembly.

He was chosen moderator of the General Assembly in the year 1597, at which period he was fortunate enough to obtain the redress of several glaring abuses. The greater part of his life was spent in conducting the affairs of the church, yet Spotswood assures us that he would rather have preferred retirement and study. Indeed the feebleness of his constitution was not equal to the hurry and bustle of public life, and it led him to prefer the retirement of study. He was very much affected with the stone, the pains of which he bore with the fortitude and resignation of a Christian. He died at Edinburgh on the last day of February 1598, in the forty-third year of his age. Short as his life was, he published many works, of which the following is a catalogue. A Commentary on the first book of Beza's Questions; on St Paul's Epistle to the Ephesians; on the prophet Daniel; a Logical Analysis of St Paul's Epistle to the Romans; some Questions and Answers concerning the Covenant of Grace and the Sacraments; a Treatise of Effectual Calling; a Commentary on the Epistles of Paul to the Thessalonians and Philemon; on fifteen select Psalms; on the Gospel of St John, with a Harmony of the four Evangelists upon the Death, Resurrection, and Ascension of Jesus Christ; certain Sermons on several places of St Paul's Epistles; a Commentary on the Epistle to the Colossians; a Logical Analysis of the Epistle to the Hebrews; of the Epistle to the Galatians; a Commentary upon the first two chapters of the first Epistle of St Peter; a Treatise of Justification, and another of Excommunication. All these, except the Sermons, were written in Latin. Of the pious and learned author, a more particular account may be found in a volume printed under the subsequent title: "De Vita et Morte Roberti Rollok, Academiæ Edinburgenæ Primarii, Narrationes, auctoribus Georgio Robertson et Henrico Charteris." Edinb. 1826, 4to. Robertson's biographical tract was originally published in 1599. That of Charteris was printed from a manuscript in the public library of the university.

ROLPAH, a town of Northern Hindustan, and capital of a district of the same name, in the province of Nepaul. It is a woody country, governed by a chief, who pays an annual tribute to the rajah of Nepaul. Long. 82. 5. E. Lat. 29. 22. N.

ROMA Isle, in the Eastern Seas, about forty miles in circumference. Long. 127. 30. E. Lat. 7. 35. N.

Roman Catholics.

ROMAN CATHOLICS. Under the head History (Ecclesiastical) will be found an account of the rise and progress of that religious system which, before the sixteenth century, held undisputed sway in what was called the Christian world. Under the head Reformation is given a history of the successful struggles made by several of the states of Europe to deliver themselves from priestly domination; and for a view of the theological tenets of the Roman Catholics, we may refer to the articles Pope, Popery, Purgatory, &c. It only remains that we shortly notice the extent to which the Roman Catholic faith prevails in the world at the present day, and the political state of its adherents in our own country.

There is no country where popery is the established religion, in the same sense in which the Churches of England and Scotland are the established religion of Britain. The Catholic clergy everywhere claim *independent*, if not supreme authority, and never form any political alliance with the state. In some countries, however, popery is not only the religion of the government, but also exclusively, or almost exclusively, of the people; and to that extent it may be called the *established religion* of the state. In others, the people are divided between the catholic and the protestant faith, and both are recognised by the government. The cruelty and oppression which have been perpetrated by religious zealots, ambitious priests, and crafty rulers, under the sacred name of religion, have given occasion to the infidel and the scoffer to cast on Christianity itself the reproach which is due only to fanaticism and bigotry. To this reproach both Catholic and Protestant are liable; but there can be no doubt, that in the efforts of the Church of Rome to maintain its ancient dominion over the human mind, it has been more unscrupulous in the use of persecution than the Protestant powers. Happily, however, the fierceness of persecution has now greatly abated in catholic countries; and, on the other hand, Catholics are tolerated in every protestant state.

France.

In France the *Charte* gives freedom of worship to all religions; but about 14-15ths of the people belong to the Catholic Church, the small remainder being Protestants.

Switzerland.

In Switzerland, outer Appenzell, almost the whole of Berne, Basel, Schaffhausen, Vaud, and Neufchatel, the greater part of Glarus, Grisons, Aargau, Thurgau, and Geneva, and the minority in Friburg, Soleure, and St. Gall, profess Calvinism. *Catholicism* is professed exclusively in Lucerne, Uri, Schwitz, Unterwald, Zug, inner Appenzell, Fessin, and Valais; by the majority in Friburg, Soleure, and St. Gall; and by the minority in the other cantons. About 12-20ths of the Swiss are Protestant; the remainder Catholics.

Belgium.

In Belgium all religions are freely professed; but catholicism is the religion of almost the entire nation.

Holland.

In Holland all religions are professed with equal freedom; but Calvinism is the religion of the state. The Catholics are comparatively few.

Germany.

In Germany catholicism and protestantism are so mixed, that it is scarcely possible to assign them definite limits, or approximate to their relative numbers. Protestantism, however, prevails mostly in the northern and south-western parts of the country; popery in the south-east, south, and west. Their numbers are not far from being equal.

Austrian Empire.

In the Austrian empire popery is the dominant religion, and professed by the great majority of the inhabitants.

Prussia.

In Prussia protestantism is the government religion; but the professors of all religions enjoy freedom of worship, and almost equal rights. Lutheranism is professed by the great majority in East Prussia, Brandenburg, Pomerania, and Saxony; popery in the Westphalian and Rhenish provinces, and the grand-duchy of Posen. Silesia and West Prussia are almost equally divided.

Denmark, Sweden, and Norway.

In Denmark, Sweden, and Norway, Lutheranism is the state religion, but all others are tolerated. The Catholics are few in number.

Russia.

Catholics abound in Russia, but mostly in the Polish provinces, where they are not only freely tolerated, but enjoy every political right in common with other subjects. Their number may amount to about 12,000,000, or 1-5th of the population of the empire.

Italy, Spain, and Portugal.

In Italy, Spain, and Portugal, popery is dominant and exclusive; but other religions, though not legally tolerated, are not now persecuted.

Turkey, Greece.

In Turkey and Greece popery is fully tolerated, but professed by few if by any of the natives.

America.

In America popery is the dominant religion of all the late Spanish and Portuguese colonies. In some of them no other religion is tolerated *by law*, but nobody is persecuted for professing any other. In the United States of North America, there are about 800,000 Catholics. In Lower Canada, they form the majority of the population.

Britain.

In Great Britain popery is now not merely tolerated, but Roman Catholics are admitted to equal, or nearly equal, political rights with Protestants.

In 1837, the total number of Catholics throughout the world, was reckoned by Adrien Balbi at 139,000,000, out of 737,000,000, which he considers to be the total population of the globe.

Before the passing of the various Roman Catholic Emancipation Acts, the Catholics in Great Britain and Ireland were subjected to a system of stringent penal laws. The laws in force against them, previously to the Act 18 Geo. III. cap. 60; and 31 Geo. III. cap. 32, may be divided into three classes: 1. Those respecting persons professing popery. 2. Those respecting popish recusants convict. 3. Those respecting popish priests.

I. Persons professing popery, besides the penalties for not attending their parish church, were disabled from taking their lands by either descent or purchase, after eighteen years of age, until they renounced their errors; were obliged at twenty-one to register their estates before acquired, and all future conveyances and wills relating to them; were incapable of presenting to any advowson, or granting to any other person any avoidance of the same; might not keep or teach any school under pain of perpetual imprisonment; and if they willingly heard or said mass, they forfeited for the one 100, and for the other 200 marks, and were to suffer a year's imprisonment. If any evil industry was used to rivet the errors of popery upon those who already professed it; if any person sent another abroad to be educated in popery, or to reside in any religious house for that purpose, or contributed to his maintenance when there, the sent, the sender, and the contributor, were disabled to sue in law or equity, to be executor or administrators to any person, or to bear any office in the realm, and forfeited all their goods and chattels, and likewise all their real estate for life. Where these errors were aggravated by apostacy or perversion, where a person was reconciled to the see of Rome, or procured others to be reconciled, the offence amounted to high treason.

II. Popish recusants convicted in a court of law of not attending the service of the Church of England, were subject to the following disabilities, penalties, and forfeitures, over and above those before mentioned. They were considered as persons excommunicated; they could hold no office or employment; if they kept arms in their houses, the same might be seized by the Justices of the Peace; they might not come within ten miles of London, under the penalty of L 100; could bring no action at law or suit in equity; were not allowed to travel above five miles from home, unless by licence, upon pain of forfeiting all their goods; and they might not come to court under the penalty of L.100. No marriage or burial of such recusant, or baptism of his child, should be had otherwise than by the ministers of the Church of England, under other severe penalties. A married woman, when recusant, forfeited two-thirds of her dower or jointure, and might not be executrix, or administratrix to her husband, or have any part of his goods; and during the coverture might be kept in prison, unless her husband redeemed her at the rate of L.10 a month, or the third part of all his lands. And, lastly, as a *femme couverte* (married woman) recusant might be imprisoned, so all others must, within three months after conviction, either submit, and renounce their errors, or, if required so to do by four justices, abjure and renounce the realm; and if they did not depart, or if they returned without the king's licence, they should be guilty of felony, without benefit of clergy. There was also an inferior kind of recusancy, (refusing to make the declaration against popery enjoined by Act 30 Car. II. cap. 2, when tendered by the proper magistrate,) which, if the party resided within ten miles of London, made him an absolute recusant convict; or, if at a greater distance, suspended him from having any seat in Parliament, keeping arms in his house, or any horse above the value of L.5.

III. Popish priests were placed in a still more slavish situation. For, by statute 11 and 12 Wil. III. c. 4, popish priests or bishops celebrating mass, and exercising any part of their functions in England, except in the houses of ambassadors, were liable to perpetual imprisonment. And by the statute 27 Eliz. c. 2, any popish priest born in the dominions of the crown of England, who should come hither from beyond sea, or should be in England without conforming, and taking the oaths, was guilty of high treason; and all persons harbouring him were guilty of felony without benefit of clergy.

The first amendment of these inhuman laws, which affix an everlasting stain on the British name, was effected by the statute 18 Geo. III. c. 60. With regard to such papists as should duly take the oath therein prescribed, of allegiance to his Majesty, abjuration of the Pretender, renunciation of the Pope's civil power, and abhorrence of the doctrines of destroying and not keeping faith with heretics, and deposing or murdering princes excommunicated by authority of the see of Rome, the statute 11 and 12 W. III. was repealed, so far as it disabled them from purchasing or inheriting, or authorized the apprehending or prosecuting of the popish clergy, or subjected them or any teachers of youth to perpetual imprisonment. By the statute 31 Geo. III. c. 32. all the restrictions and penalties above enumerated, were removed from those Catholics who were willing to comply with the requisitions of that statute, which were, that they must appear at some of the courts of Westminster, or at the quarter sessions held for the county, city, or place where they might reside, and make and subscribe a declaration that they professed the Roman Catholic religion, and also an oath exactly similar to that required by 18 Geo. III. c. 60. On this declaration and oath being duly made by any Roman Catholic, the officer of the court was authorised to grant him a certificate; and such officer was required yearly to transmit to the Privy Council lists of all persons who had thus qualified themselves within the year in his court. Roman Catholics thus qualified were not to be prosecuted under any statute for not repairing to a parish church, nor for attending or performing mass or other ceremonies of the Church of Rome. But no Roman Catholic minister was to officiate in any place of worship having a steeple and bell, or at any funeral in a churchyard, or was to wear the habits of his order, except in a place allowed by the statute, or in a private house where there should not be more than five persons besides the family. No person who had qualified was to be prosecuted for instructing youth, except in an endowed school, or in one of the English universities; or in the case of receiving into his school the child of any Protestant father; and no Roman Catholic was to keep a school until his or her name should be recorded as a teacher at the sessions.

But no religious order was to be established; and every endowment of a school or college by a Roman Catholic should still be superstitious and unlawful. And no person should thenceforth be summoned to take the oath of supremacy, and the declaration against transubstantiation. Nor should Roman Catholics who had qualified, be removable from London and Westminster; neither should any peer who had qualified be punishable for coming into the presence or palace of the king or queen. No papist whatever should be any longer obliged to register their names and estates, or to enrol their deeds and wills; and every Roman Catholic who had qualified, might be permitted to act as a barrister, attorney, or notary. Still, however, Roman Catholics could not sit in parliament, because every member of parliament was required to take the oath of supremacy, and repeat and subscribe the declaration against transubstantiation. Nor could they vote at elections for members of the House of Commons in Great Britain, because, before voting, they must have taken the oath of supremacy. But Roman Catholics in Ireland were permitted to vote at elections, though they could not sit in parliament.

Most of the remaining restrictions upon Roman Catholics were removed by the Act 10 Geo. IV. cap. 7, entitled, "An Act for the relief of his Majesty's Roman Catholic subjects," and passed 13th April 1829. By this act it was provided that all the preceding enactments (except as hereinafter excepted) should be repealed; and that from and after the commencement of the act, it should be lawful for any person professing the Roman Catholic religion, being a peer, or a member of the House of Commons, to sit and vote in either House, upon taking and subscribing the following oath, instead of the oath of supremacy, allegiance, and abjuration:

Oath t e taken Roma Cathol membe of Parliament

"I, A, B, do sincerely promise and swear, that I will be faithful, and bear true allegiance to his Majesty, King , and will defend him to the utmost of my power, against all conspiracies and attempts whatever, which shall be made against his person, crown, or dignity; and I will do my utmost endeavour to disclose and make known to his Majesty, his heirs and successors, all treasons and traitorous conspiracies which may be formed against him or them; and I do faithfully promise to maintain, support, and defend, to the utmost of my power, the succession of the crown, which succession, by an Act entitled, 'An Act for the further limitation of the Crown, and better securing the rights and liberties of the subject,' is, and stands limited to the Princess Sophia, Electress of Hanover, and the heirs of her body, being Protestants; hereby utterly renouncing and abjuring any obedience or allegiance unto any other person claiming or pretending a right to the crown of this realm: and I do further declare, that it is not an article of my faith, and that I do renounce, reject, and abjure the opinion, that princes excommunicated or deprived by the pope, or any other authority of the see of Rome, may be deposed or murdered by their subjects, or by any person whatsoever; and I do declare that I do not believe that the pope of Rome, or any other foreign prince, prelate, person, state, or potentate, hath or ought to have any temporal or civil jurisdiction, power, superiority, or pre-eminence, directly or indirectly, within this realm. I do swear that I will defend to the utmost of my power, the settlement of property within this realm, as established by the laws: and I do hereby disclaim, disavow, and solemnly abjure any intention to subvert the present church establishment, as settled by law within this realm; and I do solemnly swear that I will never exercise any privilege to which I am or may become entitled, to disturb or weaken the Protestant religion or Protestant government in the United Kingdom; and I do solemnly, in the presence of God, profess, testify, and declare, that I do make this declaration, and every part thereof, in the plain and ordinary sense of the words of this oath, without any evasion, equivocation, or mental reservation whatsoever. So help me God."

The other principal provisions of the Act are in substance as follows.

Roman Catholics, upon taking the oath above recited, shall be entitled to vote at elections for members of the House of Commons.

Roman Catholics may hold civil and military offices under his Majesty, except the office of Lord High Chancellor of Great Britain and Ireland, Lord Lieutenant of Ireland, or High Commissioner to the General Assembly of the Church of Scotland.

Roman Catholics to be eligible to become members of lay corporations, upon taking the oath hereby appointed, and such other oaths as may now by law be required of persons becoming members of such corporations; but such members are not to vote or join in the presentation or appointments to any ecclesiastical benefice.

No oath to be required from any Roman Catholic to enable him to hold any real or personal property, other than such as may be tendered to any other subjects; and the oath to be taken by Roman Catholic naval and military officers, to be taken at the same time, and in the same manner as the oaths now required by law from other subjects.

The Roman Catholic faith in Ireland is professed by more than four-fifths of the people, or, as ascertained in 1834, 6,427,712, out of a total population of 7,943,940; and in Great Britain, though the numbers are not precisely known, they are believed, according to the most moderate calculation, to fall little short of 1,000,000; by some they are even estimated at little short of 2,000,000; and according to the Catholic Directory, the number of Roman Catholic chapels in England and Wales, in 1839, amounted to 453; in Scotland, to 79; or, altogether in Great Britain, to 532. Of that number no less than 90 are in Lancashire alone, and 29 in Yorkshire; while Rutland and Huntingdon are the only counties of England where there is none. Besides numerous smaller seminaries, they possess ten colleges; viz. St. Edmund's, Old Hall Green, Ware, in Hertfordshire; Ushaw, Durham; St. Mary's, Birmingham; St. Peter's and St. Paul's, both at Prior Park, Bath; Stonyhurst, Lancashire; Ampleforth, York; St. Gregory's, Downside, Bath; German College, Broadway, Worcestershire; St. Mary's, at Blairs, on Deeside, Aberdeenshire; and a new college has been nearly finished at Sutton Coldfield, Lancashire. They already number eighteen nunneries and convents: Mecklegate bar, York; Hammersmith, Middlesex; Bishop's House, Winchester; Taunton Lodge, Somerset; New Hall, Chelmsford, Essex; Spettisbury House, Blandford; Stanbrook Hall, Worcester; Caverswall Castle, Staffordshire; Clare Lodge, Yorkshire; St. Mary's Priory, Leamington, Warwickshire; Ashton Hall, Staffordshire; Llanherne, South Cornwall; Carmel House, Darlington, Durham; Court House, Bridgewater, Somerset; Saleshouse, Westbury, Wiltshire; Hartbury Court, Gloucester; Presentation, Manchester; St. Margaret's, Edinburgh.

In Ireland the Roman Catholics have a regular hierarchy of archbishops, bishops, deans, &c., and have under them an establishment of upwards of 2000 parochial clergy. England is divided into four, and Scotland into three districts, each under the superintendence of a vicar apostolic, bearing the title of a bishop *in partibus ethnicorum*.

ROMANCE.

Romance.

Definition and origin of the word romance.

Dr. Johnson has defined Romance, in its primary sense, to be "a military fable of the middle ages; a tale of wild adventures in love and chivalry." But although this definition expresses correctly the ordinary idea of the word, it is not sufficiently comprehensive to answer our present purpose. A composition may be a legitimate romance, yet neither refer to love nor chivalry—to war nor to the middle ages. The "wild adventures" are almost the only absolutely essential ingredient in Johnson's definition. We would be rather inclined to describe a *Romance* as "a fictitious narrative in prose or verse; the interest of which turns upon marvellous and uncommon incidents;" being thus opposed to the kindred term *Novel*, which Johnson has described as "a smooth tale, generally of love;" but which we would rather define as "a fictitious narrative, differing from the romance, because the events are accommodated to the ordinary train of human events, and the modern state of society." Assuming these definitions, it is evident, from the nature of the distinction adopted, that there may exist compositions which it is difficult to assign precisely or exclusively to the one class or other; and which, in fact, partake of the nature of both. But the distinction will be found broad enough to answer all general and useful purposes.

The word Romance, in its original meaning, was far from corresponding with the definition now assigned. On the contrary, it signified merely one or other of the popular dialects of Europe, founded, as almost all these dialects were, upon the Roman tongue, that is, upon the Latin. The name of romance was indiscriminately given to the Italian, to the Spanish, even, in one remarkable instance at least,[1] to the English language. But it was especially applied to the compound language of France; in which the Gothic dialect of the Franks, the Celtic of the ancient Gauls, and the classical Latin, formed the ingredients. Thus Robert De Brunne:

> "All is calde geste Inglis,
> That en this language spoken is—
> Frankis speech is caled *Romance*.
> So sayis clerkis and men of France."

At a period so early as 1150, it plainly appears that the Romance language was distinguished from the Latin, and that translations were made from the one into the other; for an ancient romance on the subject of Alexander, quoted by Fauchet, says it was written by a learned clerk,

> "Qui *de Latin* la trest, et *en Roman* la mit."

The most noted romances of the middle ages were usually composed in the romance or French language, which was, in a peculiar degree, the speech of love and chivalry; and those which are written in English always affect to refer to some French original, which usually, at least, if not in all instances, must be supposed to have a real existence. Hence, the frequent recurrence of the phrase,

> "As in romance we read;"

Or,

> "Right as the romaunt us tells;"

and equivalent phrases, well known to all who have at any time perused such compositions. Thus, very naturally, though, undoubtedly by slow degrees, the very name of romaunt, or romance, came to be transferred from the language itself to that peculiar style of composition in which it was so much employed, and which so commonly referred to it. How early a transference so natural took place, we have no exact means of knowing; but the best authority assures us, that the word was used in its modern sense so early as the reign of Edward III. Chaucer, unable to sleep during the night, informs us, that, in order to pass the time,

> "Upon my bed I sate upright;
> And bade one rechin me a boke,
> A Romaunce, and it me took
> To read and drive the night away."

The book described as a romance contained, as we are informed,

> "———— Fables
> That clerkis had, in old time,
> And other poets, put in rhyme."

And the author tells us a little lower,

> "This book ne spake but of such things,
> Of Queens' lives and of Kings."

The volume proves to be no other than Ovid's *Metamorphoses;* and Chaucer, by applying to it the name of romance, sufficiently establishes that the word was, in his time, correctly employed under the modern acceptation.

Having thus accounted for the derivation of the word, our investigation divides itself into three principal branches, though of unequal extent. In the first of these we propose to inquire into the general history and origin of this peculiar species of composition, and particularly of romances relating to European chivalry, which necessarily form the most interesting object of our inquiry. In the second, we shall give some brief account of the history of the romance of chivalry in the different states of Europe. Thirdly, we propose to notice cursorily the various kinds of romantic composition by which the ancient romances of chivalry were followed and superseded, and with these notices to conclude the article.

Gener history roman

I. In the views taken by Hurd, Percy, and other older authorities, of the origin and history of romantic fiction, their attentions were so exclusively fixed upon the romance of chivalry alone, that they appear to have forgotten that, however interesting and peculiar, it formed only one species of a very numerous and extensive genus. The progress of romance, in fact, keeps pace with that of society, which cannot long exist, even in the simplest state, without exhibiting some specimens of this attractive style of composition. It is not meant by this assertion, that in early ages such narratives were invented, in the character of mere fictions, devised to beguile the leisure of those who had time enough to read and attend to them. On the contrary, romance and real history have the same common origin. It is the aim of the former to maintain as long as possible the mask of veracity; and indeed the traditional memorials of all earlier ages partake in such a varied and doubtful degree of the qualities essential to those opposite lines of composition, that they form a mixed class between them; and may be termed either romantic histories, or historical romances,

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[1] This curious passage was detected by the industry of Ritson in *Giraldus Cambrensis*, "*Ab aquâ illa optima, quæ Scottice vocata est* Froth; *Brittanice*, Weird; Romane vero *Scotte-Wattre*." Here the various names assigned to the Frith of Forth are given in the Gaelic or Earse, the British or Welsh; and the phrase *Roman* is applied to the ordinary language of England. But it would be difficult to shew another instance of the English language being termed Roman or Romance.

e. according to the proportion in which their truth is debased by fiction, or their fiction mingled with truth.

A moment's glance at the origin of society will satisfy the reader why this can hardly be otherwise. The father of an isolated family, destined one day to rise into a tribe, and in further progress of time to expand into a nation, may, indeed, narrate to his descendants the circumstances which detached him from the society of his brethren, and drove him to form a solitary settlement in the wilderness, with no other deviation from truth, on the part of the narrator, than arises from the infidelity of memory, or the exaggerations of vanity. But when the tale of the patriarch is related by his children, and again by his descendants of the third and fourth generation, the facts it contains are apt to assume a very different aspect. The vanity of the tribe augments the simple annals from one cause; the love of the marvellous, so natural to the human mind, contributes its means of sophistication from another; while, sometimes, the king and the priest find their interest in casting a holy and sacred gloom and mystery over the early period in which their power arose. And thus altered and sophisticated from so many different motives, the real adventures of the founder of the tribe bear as little proportion to the legend recited among his children, as the famous hut of Loretto bears to the highly ornamented church with which superstition has surrounded and enchased it. Thus the definition which we have given of Romance as a fictitious narrative turning upon the marvellous or the supernatural, might, in a large sense, be said to embrace

> ——— quicquid Græcia mendax
> Audet in historia,

or, in fine, the mythological and fabulous history of all early nations.

It is also important to remark, that poetry, or rather verse, rhythm at least of some sort or other, is originally selected as the best vehicle for these traditional histories. Its principal recommendation is probably the greater facility with which metrical narratives are retained in the memory, a point of the last consequence, until the art of writing is generally introduced; since the construction of the verse itself forms an artificial association with the sense, the one of which seldom fails to recall the other to recollection. But the medium of verse, at first adopted merely to aid the memory, becomes soon valuable on account of its other qualities. The march or measure of the stanza is gratifying to the ear, and, like a natural strain of melody, can be restrained or accelerated, so as to correspond with the tone of feeling which the words convey; while the recurrence of the necessary measure, rhythm or rhyme, is perpetually gratifying the hearer by a sense of difficulty overcome. Verse being thus adopted as the vehicle of traditional history, there needs but the existence of a single man of genius, in order to carry the composition a step higher in the scale of literature than that of which we are treating. In proportion to the skill which he attains in his art, the fancy and ingenuity of the artist himself are excited; the simple narrative transmitted to him by ruder rhymers is increased in length; is decorated with the graces of language, amplified in detail, and rendered interesting by description; until the brief and barren original bears as little resemblance to the finished piece, as the *Iliad* of Homer to the evanescent traditions, out of which the blind bard wove his tale of Troy Divine. Hence, the opinion expressed by the ingenious Percy, and assented to by Ritson himself. When about to present to his readers an excellent analysis of the old romance of *Lybius Disconius*, and making several remarks on the artificial management of the story, the Bishop observes, that "if an epic poem may be defined a fable related by a poet to excite admiration and inspire virtue, by representing the action of some one hero favoured by Heaven, who executes a great design in spite of all the obstacles that oppose him, I know not why we should withhold the name of *epic poem* from the piece which I am about to analyse."[1]

Yet although this levelling proposition has been laid down by Percy, and assented to by Ritson (writers who have few opinions in common,) and although, upon so general a view of the subject, the *Iliad*, or even the *Odyssey* of Homer, might be degraded into the class of romances, as *Le Beau Deconnu* is elevated into that of epic poems, there lies in ordinary speech, and in common sense, as wide a distinction between these two classes of composition, as there is betwixt the rude mystery or morality of the middle ages, and the regular drama by which these were succeeded. Where the art and the ornaments of the poet chiefly attract our attention; where each part of the narrative bears a due proportion to the others, and the whole draws gradually towards a final and satisfactory conclusion; where the characters are sketched with force, and sustained with precision; where the narrative is enlivened and adorned with so much, and no more, of poetical ornament and description, as may adorn, without impeding its progress; where this art and taste are displayed, supported, at the same time, by a sufficient tone of genius, and art of composition, the work produced must be termed an epic poem, and the author may claim his seat upon the high and honoured throne occupied by Homer, Virgil, and Milton. On the other hand, when a story languishes in tedious and minute details, and relies for the interest which it proposes to excite, rather upon the wild excursions of an unbridled fancy, than upon the skill of the poet; when the supernatural and the extraordinary are relied upon exclusively as the supports of the interest, the author, though his production may be distinguished by occasional flashes of genius, and though it may be interesting to the historian, as containing some minute fragments of real events, and still more so to the antiquary, from the light which it throws upon ancient manners, is still no more than a humble romancer, and his work must rank amongst those rude ornaments of a dark age, which are at present the subject of our consideration. Betwixt the extremes of the two classes of composition, there must, no doubt, exist many works, which partake in some degree of the character of both; and after having assigned most of them, each to their proper class, according as they are distinguished by regularity of composition and poetical talent, or, on the contrary, by extravagance of imagination, and irregularity of detail, there may still remain some, in which these properties are so equally balanced, that it may be difficult to say to which class they belong. But although this may be the case in a very few instances, our taste and habits readily acknowledge as complete and absolute a difference betwixt the epopeia and romance, as can exist betwixt two distinct species of the same generic class.

We have said of romance, that it first appears in the form of metrical history, professes to be a narrative of real facts, and is, indeed, nearly allied to such history as an early state of society affords; which is always exaggerated by the prejudices and partialities of the tribe to which it belongs, as well as deeply marked by their idolatry and superstition. These it becomes the trade of the romancers still more to exaggerate, until the thread of truth can scarce be discerned in the web of fable which involves it; and we are compelled to renounce all hope of deriving serious or authentic information from the materials upon which the compounders of fiction have been so long at work, from one generation to another, that they have at length obliterated the very shadow of reality or even probability.

The view we have given of the origin of romance will be found to agree with the facts which the researches of so many active investigators of this curious subject have been able to ascertain. It is found, for example, and we will produce instances in viewing the progress of romance in particular countries, that the earliest productions of this sort, known to exist, are short narrations or ballads, which were probably sung on solemn or festive occasions, recording the deeds and praises of some famed champion of the tribe and country, or perhaps the history of some remarkable victory or signal defeat, calculated to interest the audience by the associations which the song awakens. These poems, of which very few can now be supposed to exist, are not without flashes of genius, but brief, rude, and often obscure, from real antiquity or affected sublimity of diction. The song on the battle of Brunanburgh, preserved in the *Saxon Chronicle*, is a genuine and curious example of this aboriginal style of poetry.

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[1] *Reliques of Ancient English Poetry*, III. xxvii. The Prelate is citing a discourse on epic poetry, prefixed to *Telemachus*.

Temporal and spiritual romances.

Even at this early period,[1] there may be observed a distinction betwixt what may be called the *Temporal* and *Spiritual* romances; the first destined to the celebration of worldly glory; the second to recording the deaths of martyrs and the miracles of saints; both which themes unquestionably met with an almost equally favourable reception from their hearers. But although most nations possess, in their early species of literature, specimens of both kinds of romance, the proportion of each, as was naturally to have been expected, differs according as the genius of the people amongst whom they occur leaned towards devotion or military enterprise. Thus, of the Saxon specimens of poetry, which manuscripts still afford us, a very large proportion is devotional, amongst which are several examples of the spiritual romance, but very few, indeed, of those respecting warfare or chivalry. On the other hand, the Norman language, though rich in examples of both kinds of romances, is particularly abundant in that which relates to battle and warlike adventure. The Christian Saxons had become comparatively pacific, while the Normans were certainly accounted the most martial people in Europe.

However different the spiritual romance may be from the temporal in scope and tendency, the nature of the two compositions did not otherwise greatly differ. The structure of verse and style of composition was the same; and the induction, even when the most serious subject was undertaken, exactly resembled that with which minstrels introduced their idle tales, and often contained allusions to them. Warton quotes a poem on the Passions, which begins,

> I hereth one lutele tale, that Ich eu wille telle,
> As wi vyndeth hit invrite in the godspelle,
> Nuz hit nouht of Carlemeyne ne of the Duzpere,
> Ac of Criste's thruurynge, &c.

The temporal romances, on the other hand, often commenced by such invocations of the Deity, as would only have been in place when a much more solemn subject was to be agitated. The exordium of the Romance of *Ferumbras* may serve as an example of a custom almost universal;

> God in glorye of mightis moost
> That all things made in sapience,
> By virtue of Word and Holy Gooste,
> Giving to men great excellence, &c.

The distresses and dangers which the knight endured for the sake of obtaining earthly fame and his mistress's favour, the saint or martyr was exposed to for the purpose of securing his rank in heaven, and the favour of some beloved and peculiar patron saint. If the earthly champion is in peril from monsters, dragons, and enchantments, the spiritual hero is represented as liable to the constant assaults of the whole invisible world, headed by the ancient dragon himself. If the knight is succoured at need by some favouring fairy or protecting genius, the saint is under the protection not only of the whole heavenly host, but of some one divine patron or patroness who is his especial auxiliary. Lastly, the conclusion of the romance, which usually assigns to the champion a fair realm, an abundant succession, and a train of happy years, consigns to the martyr his fane and altar upon earth, and in heaven his seat among saints and angels, and his share in a blessed eternity. It remains but to say, that the style and language of these two classes do not greatly differ, and that the composers of both employ the same structure of rhythm and of language, and draw their ideas and their incidents from similar sources; so that, having noticed the existence of the spiritual romance, it is unnecessary for the present to prosecute this subject farther.

Another early and natural division of these works of fiction seems to have arranged them into *Serious* and *Comical*. The former were by far the most numerous, and examples of the latter are in most countries comparatively rare. Such a class, however, existed, as proper romances, even if we hold the comic romance distinct from the *Contes* and *Fabliaux* of the French, and from such jocular English narratives as the *Wife Lapt in Moral's Skin*, *The Friar and the Boy*, and similar humorous tales; of which the reader will find many examples in Ritson's *Ancient English Poetry*, and in other collections. The scene of these *gestes* being laid in low, or at least in ordinary life, they approach in their nature more nearly to the class of novels, and may perhaps be considered as the earliest specimens of that kind of composition. But the proper comic romance was that in which the high terms and knightly adventures of chivalry were burlesqued, by ascribing them to clowns or others of a low and mean degree. Such compositions formed, as it were, a parody on the serious romance, to which they bore the same proportion as the antimasque, studiously filled with grotesque, absurd, and extravagant characters, "entering," as the stage direction usually informs us, "to a confused music," bore to the masque itself, where all was dignified, noble, stately, and harmonious.

An excellent example of the comic romance is the *Tournament of Tottenham*, printed in Piercy's *Reliques*, in which a number of clowns are introduced practising one of these warlike games, which were the exclusive prerogative of the warlike and noble. They are represented making vows to the swan, the peacock, and the ladies; riding a tilt on their clumsy cart horses, and encountering each other with ploughshares and flails; whilst their defensive armour consisted of great wooden bowls and troughs, by way of helmets and cuirasses. The learned editor seems to have thought this singular composition was like Don Quixote, with which he compares it, a premeditated effort of satire, written to expose the grave and fantastic manners of the serious romance. This is considering the matter too deeply, and ascribing to the author a more critical purpose than he was probably capable of conceiving. It is more natural to suppose that his only ambition was to raise a laugh, by ascribing to the vulgar the manners and exercises of the noble and valiant; as in the well-known farce of *High Life Below Stairs*, the ridicule is not directed against the manners described, but against the menials who affect those that are only befitting their superiors. The *Hunting of the Hare*, published in the collection formed by the late industrious and accurate Mr. Weber, is a comic romance of the same order. A yeoman informs the inhabitants of a country hamlet that he has found a hare sitting, and invites them to come to course her. They attend, accordingly, with all the curs and mastiffs of their village, and the unsportsman-like manner in which the inexperienced huntsmen and their irregular pack conduct themselves, forms the interest of the piece. It can hardly be supposed the satire is directed against the sport of hunting itself; since the whole ridicule arises out of the want of the necessary knowledge of its rules, incident to the ignorance and inexperience of the clowns who undertook to practise an art peculiar to gentlemen. The ancient poetry of Scotland furnishes several examples of this ludicrous style of romantic composition; as the *Tournament at the Drum*, and the *Justing of Watson and Barbour*, by Sir David Lindsay. It is probable that these mock encounters were sometimes acted in earnest; at least King James I. is accused of witnessing such practical jests; "sometimes presenting David Droman and Archie Armstrong, the king's fool, on the back of other fools, to tilt at one another till they fell together by the ears."—(Sir Anthony Weldon's *Court of King James*.)

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[1] The religious romances of *Barlaam* and *Jehosephat* were composed by John of Damascus in the eighth century.

In hastily noticing the various divisions of the romance, we have in some degree delayed our promised account of its rise and progress; an inquiry which we mean chiefly to confine to the romance of the middle ages. It is indeed true that this species of composition is common to almost all nations, and that even if we deem the *Iliad* and *Odyssey* compositions too dignified by the strain of poetry in which they are composed to bear the name of metrical romances; yet we have the pastoral romance of *Daphnis and Chloe*, and the historical romance of *Theagenes and Chariclea*, which are sufficiently accurate specimens of that style of composition. The *Milesian fables* and the romances of Antonius Diogenes, described by Photius, could they be recovered, would also be found to belong to the same class. It is impossible to avoid noticing that the Sybarites, whose luxurious habits seem to have been intellectual, as well as sensual, were peculiarly addicted to the perusal of the Milesian fables; from which we may conclude that they were not of that severe kind which inspired high thoughts and martial virtues. But there would be little advantage derived from extending our researches into the ages of classical antiquity respecting a class of compositions which, though they existed then, as in almost every stage of society, were neither so numerous nor of such high repute as to constitute any considerable portion of that literature.

Want of space also may entitle us to dismiss the consideration of the Oriental romances, unless in so far as in the course of the middle ages they came to furnish materials for enlarging and varying the character of the romances of knight-errantry. That they existed early, and were highly esteemed both among the Persians and Arabians, has never been disputed; and the most interesting light has been lately thrown on the subject by the publication of *Antar*, one of the most ancient, as well as most rational, if we may use the phrase, of the Oriental fictions. The Persian romance of the *Sha-Nameh* is well known to Europeans by name, and by copious extracts; and the love-tale of *Mejnoun and Leilah* is also familiar to our ears, if not to our recollections. Many of the fictions in the extraordinary collection of the *Arabian Tales* approach strictly to the character of romances of chivalry; although in general they must be allowed to exceed the more tame northern fictions in dauntless vivacity of invention, and in their more strong tendency to the marvellous. Several specimens of the comic romance are also to be found mingled with those which are serious; and we have the best and most positive authority that the recital of these seductive fictions is at this moment an amusement as fascinating and general among the people of the East, as the perusal of printed romances and novels among the European public. But a minute investigation into this particular species of romance would lead us from our present field, already sufficiently extensive for the limits to which our plan confines it.

The European Romance, wherever it arises, and in whatsoever country it begins to be cultivated, had its origin in some part of the real or fabulous history of that country; and of this we will produce, in the sequel, abundant proofs. But the simple tale of tradition has not passed through many mouths, ere some one, to indulge his own propensity for the wonderful, or to secure by novelty the attention of his audience, augments the meagre chronicle with his own apocryphal inventions. Skirmishes are magnified into great battles; the champion of a remote age is exaggerated into a sort of demi-god; and the enemies whom he encountered and subdued are multiplied in number, and magnified in strength, in order to add dignity to his successes against them. Chaunted to rhythmical numbers, the songs which celebrate the early valour of the fathers of the tribe become its war-cry in battle, and men march to conflict hymning the praises and the deeds of some real or supposed precursor who had marshalled their fathers in the path of victory. No reader can have forgotten that when the decisive battle of Hastings commenced, a Norman minstrel, Taillefer, advanced on horseback before the invading host, and gave the signal for onset, by singing the *Song of Roland*, that renowned nephew of Charlemagne, of whom romance speaks so much, and history so little; and whose fall, with the chivalry of Charles the great in the pass of Roncesvalles, has given rise to such clouds of romantic fiction, that its very name has been for ever associated with it. The remarkable passage has been often quoted from the *Brut of Wace*, an Anglo-Norman metrical chronicle.

> Taillefer, qui moult bien chantout
> Sur un cheval qui tost alout,
> Devant le Duc alout chantant
> De Karlemaigne et de Rollant,
> Et d'Oliver et des vassals,
> Qui morurent en Rencevals.

Which may be thus rendered:

> Taillefer, who sung both well and loud,
> Came mounted on a courser proud;
> Before the Duke the minstrel sprung,
> And loud of Charles and Roland sung,
> Of Oliver and champions mo,
> Who died at fatal Ronçevaux.

This champion possessed the sleight-of-hand of the juggler, as well as the art of the minstrel. He tossed up his sword in the air, and caught it again as he gallopped to the charge, and showed other feats of dexterity. Taillefer slew two Saxon warriors of distinction, and was himself killed by a third. Ritson, with less than his usual severe accuracy, supposed that Taillefer sung some part of a long metrical romance upon Roland and his history; but the words *chanson*, *cantilena*, and *song*, by which the composition is usually described, seems rather to apply to a brief ballad or national song; which is also more consonant with our ideas of the time and place where it was chaunted.

But neither with these romantic and metrical chronicles did the mind long remain satisfied; more details were demanded, and were liberally added by the invention of those who undertook to cater for the public taste in such matters. The same names of kings and champions, which had first caught the national ear, were still retained, in order to secure attention, and the same assertions of authenticity, and of reference to real history, were stoutly made both in the commencement and in the course of the narrative. Each nation, as will presently be seen, came at length to adopt to itself a cycle of heroes like those of the *Iliad;* a sort of common property to all minstrels who chose to make use of them, under the condition always, that the general character ascribed to each individual hero was preserved with some degree of consistency. Thus, in the romances of *The Round Table*, Gawain is usually represented as courteous; Kay as rude and boastful; Mordred as treacherous; and Sir Launcelot as a true though a sinful lover, and in all other respects a model of chivalry. Amid the Paladins of Charlemagne, whose cycle may be considered as peculiarly the property of French in opposition to Anglo-Norman romance, Gan, or Ganelon of Mayence, is always represented as a faithless traitor engaged in intrigues for the destruction of Christianity; Roland as brave, unsuspicious, devotedly loyal, and somewhat simple in his disposition; Renaud, or Rinaldo, is painted with all the properties of a borderer, valiant, alert, ingenious, rapacious and unscrupulous. The same conventional distinctions may be traced in the history of the Nibelung, a composition of Scandinavian origin, which has supplied matter for so many Teutonic adventurers. Meister Hildebrand, Etzel, Theodorick, and the champion Hogan, as well as Chrimhelda and the females introduced, have the same individuality of character, which is ascribed, in Homer's immortal writings, to the wise Ulysses, the brave but relentless Achilles, his more gentle friend Patroclus, Sarpedon, the favourite of the gods, and Hector, the protector of mankind. It was not permitted to the invention of a Greek poet to make Ajax a dwarf, or Teucer a giant, Thersites a hero, or Diomedes a coward; and it seems to have been under similar restrictions respecting consistency that the ancient romancers exercised their ingenuity upon the materials supplied them by their predecessors. But, in other respects, the whole store of romantic history and tradition was free to all as a joint stock in trade, on which each had a right to draw as suited his particular purposes. He was at liberty not only to select a hero out of known and established names which had been the theme of others, but to imagine a new personage of his own pure fancy, and combine him with the heroes of Arthur's Table or Charlemagne's Court, in the way which best suited his fancy. He was permitted to excite new wars against those bulwarks of Christendom, invade them with fresh and innumerable hosts of Saracens, reduce them to the last extremity, drive them from their thrones, and lead them into captivity, and again to relieve their persons, and restore their sovereignty, by events and agents totally unknown in their former story.

In the characters thus assigned to the individual personages of romantic fiction, it is possible there might be some slight foundation in remote tradition, as there were also probably some real grounds for the existence of such persons, and perhaps for a very few of the leading circumstances attributed to them. But these realities only exist as the few grains of wheat in the bushel of chaff, incapable of being winnowed out, or cleared from the mass of fiction with which each new romancer had in his turn overwhelmed them. So that romance, though certainly deriving its first original from the pure fount of history, is supplied, during the course of a very few generations, with so many tributes from the imagination, that at length the very name comes to be used to distinguish works of pure fiction.

When so popular a department of poetry has attained this decided character, it becomes time to inquire who were the composers of these numerous, lengthened, and once admired narratives which are called metrical romances, and from whence they drew their authority. Both these subjects of discussion have been the source of great controversy among antiquaries; a class of men who, be it said with their forgiveness, are apt to be both positive and polemical upon the very points which are least susceptible of proof, and which are least valuable if the truth could be ascertained; and which, therefore, we would gladly have seen handled with more diffidence, and better temper, in proportion to their uncertainty.

The Minstrels.

The late venerable Dr. Percy, Bishop of Dromore, led the way unwarily to this dire controversy, by ascribing the composition of our ancient heroic songs and metrical legends, in rather too liberal language, to the minstrels, that class of men by whom they were generally recited. This excellent person, to whose memory the lovers of our ancient lyre must always remain so deeply indebted, did not, on publishing his work nearly fifty years ago, see the rigid necessity of observing the utmost and most accurate precision either in his transcripts or his definitions. The study which he wished to introduce was a new one; it was his object to place it before the public in an engaging and interesting form; and, in consideration of his having obtained this important point, we ought to make every allowance not only for slight inaccuracies, but for some hasty conclusions, and even exaggerations, with which he was induced to garnish his labour of love. He defined the minstrels, to whose labours he chiefly ascribed the metrical compositions on which he desired to fix the attention of the public, as "an order of men in the middle ages, who subsisted by the arts of poetry and music, and sung to the harp verses composed by themselves or others."[1] In a very learned and elegant essay upon the text thus announced, the reverend Prelate in a great measure supported the definition which he had laid down; although it may be thought that, in the first editions at least, he has been anxious to view the profession of the minstrels on their fairest and most brilliant side; and to assign to them a higher station in society than a general review of all the passages connected with them will permit us to give to a class of persons who either lived a vagrant life, dependent on the precarious taste of the public for a hard-earned maintenance, or, at best, were retained as a part of the menial retinue of some haughty baron, and in a great measure identified with his musical band.

The late acute, industrious, and ingenious Mr. Joseph Ritson, whose severe accuracy was connected with an unhappy eagerness and irritability of temper, took advantage of the exaggerations occasionally to be found in the Bishop's *Account of Ancient Minstrelsy*, and assailed him with terms which may be termed any thing but courteous. Without finding an excuse either in the novelty of the studies in which Percy had led the way, or in the vivacity of imagination which he did not himself share, he proceeded to arraign each trivial inaccuracy as a gross fraud, and every deduction which he considered to be erroneous as a wilful untruth, fit to be stigmatised with the broadest appellation by which falsehood can be distinguished. Yet there is so little room for this extreme loss of temper, that, upon a recent perusal of both these ingenious essays, we were surprised to find that the reverend editor of the *Reliques*, and the accurate antiquary, have differed so very little as, in essential facts, they appear to have done. Quotations are, indeed, made by both with no sparing hand, and hot arguments; and, on one side at least, hard words are unsparingly employed; while, as is said to happen in theological polemics, the contest grows warmer in proportion as the ground concerning which it is carried on is narrower and more insignificant. Their systems, in reality, do not essentially differ.

Ritson is chiefly offended at the sweeping conclusion in which Percy states the minstrels as subsisting by the arts of poetry and music, and reciting to the harp verses composed by themselves and others. He shows very successfully that this definition is considerably too extensive, and that the term minstrel comprehended, of old, not merely those who recited to the harp or other instrument romances and ballads, but others who were distinguished by their skill in instrumental music only; and, moreover, that jugglers, sleight-of-hand performers, dancers, tumblers, and such like subordinate artists, who were introduced to help away the tedious hours in an ancient feudal castle, were also comprehended under the general term of minstrel. But although he distinctly proves that Percy's definition applied only to one class of the persons termed minstrels, those, namely, who sung or recited verses, and in many cases of their own composition; the bishop's position remains unassailable, in so far as relates to one general class, and these the most distinguished during the middle ages. All minstrels did not use the harp, and recite or compose romantic poetry; but it cannot be denied that such was the occupation of the most eminent of the order. This Ritson has rather admitted than denied; and the number of quotations which his industry has brought together, rendered such an admission inevitable.

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[1] *Essay on Ancient Minstrels in England* prefixed to the first volume of Bishop Percy's *Reliques*.

Indeed, the slightest acquaintance with ancient romances of the metrical class, shows us that they were composed for the express purpose of being recited, or, more properly, chaunted to some simple tunc or cadence for the amusement of a large audience. Our ancestors, as they were circumscribed in knowledge, were also more limited in conversational powers than their enlightened descendants; and it seems probable, that in their public festivals, there was great advantage found in the presence of a minstrel who should recite some popular composition on their favourite subjects of love and war, to prevent those pauses of discourse which sometimes fall heavily on a company, even of the present accomplished age, and to supply an agreeable train of ideas to those guests who had few of their own. It is, therefore, almost constantly insinuated, that the romance was to be chaunted or recited to a large and festive society; and in some part or other of the piece, generally at the opening, there is a request of attention on the part of the performer; and hence, the perpetual "Lythe and listen lordings free," which in those, or equivalent words, forms the introduction to so many romances. As, for example, in the old poem of *Guy and Colbrand*, the minstrel speaks of his own occupation:

> When meat and drink is great plentye,
> Then lords and ladyes still will be,
> And sit and solace lythe;
> Then it is time for mee to speake,
> Of kern knights and kempes greate,
> Such carping for to kythe.

Chaucer, also, in his rhyme of Sir Thopas, assigns to the minstrels of his hero's household the same duty of reciting romances of spiritual or secular heroes. for the good knight's pastime while arming himself for battle:

> "Do cum," he sayd, "my minestrales,
> And jestours for to tellen tales
> Anon in min arming,
> Of romaunces that ben reales,
> Of popes and of cardinales,
> And eke of love-longing."

Not to multiply quotations, we will only add one of some importance, which must have escaped Ritson's researches; for his editorial integrity was such, as rendered him incapable of suppressing evidence on either side of the question. In the old romance or legend of *True Thomas and the Queen of Elfland*, Thomas the Rhymer, himself a minstrel, is gifted by the Queen of the Faery with the faculties of music and song. The answer of Thomas is not only conclusive as to the minstrel's custom of recitation, but shows that it was esteemed the highest branch of his profession, and superior as such to mere instrumental music:

> "To harp and carp Thomas wheresoever ye gon,
> Thomas take the these with the"——
> "Harping," he said, "ken I non,
> For tong is chefe of Mynstralse."[1]

We, therefore, arrive at the legitimate conclusion, that although, under the general term minstrels, were comprehended many who probably entertained the public only with instrumental performances, with ribald tales, with jugglery, or farcical representations, yet one class amongst them, and that a numerous one, made poetical recitation their chief, if not their exclusive occupation. The memory of these men was, in the general case, the depository of the pieces which they recited; and hence, although a number of their romances still survive, very many more have doubtless fallen into oblivion.

That the minstrels were also the authors of many of these poems, and that they altered and enlarged others, is a matter which can scarcely be doubted, when it is proved that they were the ordinary reciters of them. It was as natural for a minstrel to become a poet or composer of romances, as for a player to be a dramatic author, or a musician a composer of music. Whatever individual among a class, whose trade it was to recite poetry, felt the least degree of poetical enthusiasm in a profession so peculiarly calculated to inspire it, must, from that very impulse, have become an original author, or translator at least; thus giving novelty to his recitations, and acquiring additional profit and fame. Bishop Percy, therefore, states the case fairly in the following passage: "It can hardly be expected that we should be able to produce regular and unbroken annals of the minstrel art and its professors, or have sufficient information, whether every minstrel or bard composed himself, or only repeated, the songs he chaunted. Some probably did the one and some the other; and it would have been wonderful indeed, if men, whose peculiar profession it was, and who devoted their time and talents to entertain their hearers with poetical compositions, were peculiarly deprived of all poetical genius themselves, and had been under a physical incapacity of composing those common popular rhymes, which were the usual subjects of their recitation."[2] While, however, we acquiesce in the proposition, that the minstrels composed many, perhaps the greater part of the metrical romances which they sung, it is evident they were frequently assisted in the task by others who, though not belonging to this profession, were prompted by leisure and inclination to enter upon the literary or poetical department as amateurs. These very often belonged to the clerical profession, amongst whom relaxation of discipline, abundance of spare time, and impatience of the routine of ceremonious duties, often led individuals into worse occupations than the listening to or composing metrical romances. It was in vain that both the poems and the minstrels who recited them were, by statute, debarred from entering the more rigid monasteries. Both found their way frequently to the refectory, and were made more welcome than brethren of their own profession; as we may learn from a memorable *Gest*, in which two poor travelling priests, who had been received into a monastery with acclamation, under the mistaken idea of their being minstrels, are turned out in disgrace, when it is discovered that they were indeed capable of furnishing spiritual instruction, but understood none of the entertaining arts with which the hospitality of their convent might have been repaid by itinerant bards.

Nay, besides a truant disposition to a forbidden task, many of the grave authors may have alleged, in their own defence, that the connexion between history and romance was not in their day entirely dissolved. Some eminent men exercised themselves in both kinds of composition; as, for example, Maitre Wace, canon of Caen, in Normandy, who, besides the metrical chronicle of *Le Brut*, containing the earliest history of England, and other historical legends, wrote, in 1155, the *Roman de Chevalier de Lyon*, probably the same translated under the title of *Ywain* and *Gawain*. Lambert li Cors, and Benoit de Saint-Maur, seem both to have been of the clerical order; and, perhaps, Chretien de Troyes, a most voluminous author of romance, was of the same profession. Indeed, the extreme length of many romances being much greater than any minstrel could undertake to sing at one or even many sittings, may induce us to refer them to men of a more sedentary occupation than those wandering poets. The religious romances were, in all probability, the works of such churchmen as might wish to reconcile an agreeable occupation with their religious profession. All which circumstances must be received as exceptions from the general proposition, that the romances in metre were the composition of the minstrels by whom they were recited or sung, though they must still leave Percy's proposition to a certain extent unimpeached.

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[1] Jamieson's *Popular Ballads*, vol. ii. p. 27.

[2] *Essay on the Ancient Minstrels*, p. 30.

Another authority of ancient date, the *Chronicle* of Bertrand Guesclin, distinctly attributes the most renowned romances to the composition of the minstrels by whom they were sung. As the passage will be afterwards more fully quoted, we must here only say, that after enumerating Arthur, Launcelot, Godfrey, Roland, and other champions, he sums up his account of them as being the heroes

> De quoi cils minestriers font les nobles romans.

To explain the history of Romance, it is necessary to digress a little further concerning the condition of the minstrels by whom these compositions were often made, and, generally speaking, preserved and recited. And here, it must be confessed, that the venerable Prelate has, perhaps, suffered his love of antiquity, and his desire to ennoble the productions of the middle ages, a little to overcolour the importance and respectability of the minstrel tribe; although his opponent Ritson has, on the other hand, seized on all circumstances and inferences which could be adduced to prove the degradation of the minstrel character, without attending to the particulars by which these depreciating circumstances were qualified. In fact, neither of these excellent antiquaries has cast a general or philosophical glance on the necessary condition of a set of men who were by profession the instruments of the pleasure of others during a period of society such as was presented in the middle ages.

In a very early period of civilisation, ere the division of tribes had been generally adopted, and while each tribe may be yet considered as one great family, and the nation as an union of such independent tribes, the poetical art, so nearly allied to that of oratory or persuasion, is found to ascertain to its professors a very high rank. Poets are then the historians and often the priests of the tribe. Their command of language, then in its infancy, excites not merely pleasure, but enthusiasm and admiration. When separated into a distinct class, as was the case with the Celtic bards, and, perhaps, with the skalds of Scandinavia, they rank high in the scale of society, and we not only find kings and nobles listening to them with admiration, but emulous of their art, and desirous to be enrolled among their numbers. Several of the most renowned northern kings and champions valued themselves as much upon their powers of poetry as on their martial exploits; and of the Welsh princes, the Irish kings, and the Highland chiefs of Scotland, very many practised the arts of poetry and music. Llwarch Hen was a prince of the Cymraig, Brian Boromhe, a harper and a musician, and without resorting to the questionable authenticity of Ossian, several instances of the same kind might be produced in the Highlands.

But, in process of time, when the classes of society come to assume their usual gradation with respect to each other, the rank of professional poets is uniformly found to sink gradually in the scale, along with that of all others whose trade it is to contribute mere amusement. The professional poet, like the player or the musician, becomes the companion and soother only of idle and convivial hours; his presence would be unbecoming on occasions of gravity and importance; and his art is accounted at best an amusing but useless luxury. Although the intellectual pleasure derived from poetry or from the exhibition of the drama be of a different and much higher class than that derived from the accordance of sounds, or from the exhibition of feats of dexterity, still it will be found that the opinions and often the laws of society, while individuals of these classes are cherished and held in the highest estimation, have degraded the professions themselves among its idle, dissolute, and useless appendages. Although it may be accounted ungrateful in mankind thus to reward the instruments of their highest enjoyments, yet some justification is usually to be drawn from the manners of the classes who were thus lowered in public opinion. It must be remembered, that, as professors of this joyous science, as it was called, the minstrels stood in direct opposition to the more severe part of the Catholics, and to the monks in particular, whose vows bound them to practise virtues of the ascetic order, and to look upon every thing as profane which was connected with mere worldly pleasure. The manners of the minstrels themselves gave but too much room for clerical censure. They were the usual assistants at scenes, not merely of conviviality, but of license; and as the companions and encouragers of revelling and excess, they became contemptible in the eyes, not only of the aged and the serious, but of the libertine himself, when his debauch palled on his recollection. The minstrels, no doubt, like their brethren of the stage, sought an apology in the corrupted taste and manners of their audience, with which they were obliged to comply, under the true but melancholy condition that

> —they who live to please must please to live.

But this very necessity, rendered more degrading by their increasing numbers and decreasing reputation, only accelerated the total downfall of their order, and the general discredit and neglect into which they had fallen. The statute of the 39th of Queen Elizabeth, passed at the close of the sixteenth century, ranks those dishonoured sons of song among rogues and vagabonds, and appoints them to be punished as such; and the occupation, though a vestige of it was long retained in the habits of travelling ballad-singers and musicians, sunk into total neglect and contempt. Of this we shall have to speak hereafter; our business being at present with those romances, which, while still in the zenith of their reputation, were the means by which the minstrels, at least the better and higher class amongst them, recommended themselves to the favour of their noble patrons, and of the audiences whom they addressed.

It may be presumed, that, although the class of minstrels, like all who merely depend upon gratifying the public, carried in their very occupation the evils which first infected, and finally altogether depraved their reputation; yet, in the earlier ages, their duties were more honourably estimated, and some attempts were made to introduce into their motley body the character of a regular establishment, subjected to discipline and subordination. Several individuals, both of France and England, bore the title of king of minstrels, and were invested probably with some authority over the others. The serjeant of minstrels is also mentioned; and Edward IV. seems to have attempted to form a guild or exclusive corporation of minstrels. John of Gaunt, at an earlier period, established (between jest and earnest, perhaps) a court baron of minstrels, to be held at Tilbury. There is no reason, however, to suppose that the influence of their establishments went far in restraining the licence of a body of artists so unruly as well as numerous.

It is not, indeed, surprising that individuals, whose talents in the arts of music or of the stage rise to the highest order, should, in a special degree, attain the regard and affection of the powerful, acquire wealth, and rise to consideration; for, in such professions, very high prizes are assigned only to pre-eminent excellence; while ordinary or inferior practisers of the same art may be said to draw in the lottery something worse than a mere blank. Garrick, in his chariot, and whose company was courted for his wit and talent, was, after all, by profession, the same with the unfortunate stroller, whom the British laws condemn as a vagabond, and to whose dead body other countries refuse even the last rites of Christianity. In the same manner it is easy to suppose that, when in compliance with the taste of their age, monarchs entertained their domestic minstrels,[1] those persons might be admitted to the most flattering intimacy with their royal masters; sleep within the royal chamber,[2] amass considerable fortunes, found hospitals,[3] and receive rewards singularly over-proportioned to the perquisites of the graver professions;[4] and even practise in company with their royal masters the pleasing arts of poetry and music, which all are so desirous of attaining;[5] whilst, at the same time, those who ranked lower in the same profession were struggling with difficulty to gain a precarious subsistence, and incurring all the disgrace usually attached to a vagabond life and a dubious character. In the fine arts, particularly, excellence is demanded, and mere mediocrity is held contemptible; and, while the favour with which the former is loaded, sometimes seems disproportioned to the utility of the art itself, nothing can exceed the scorn poured out on those who expose themselves by undertaking arts which they are unable to practise with success. Self-conceit, however, love of an idle life, and a variety of combined motives, never fail to recruit the lower orders of such idle professions with individuals by whose performances, and often by their private characters, the art which they have rashly adopted can only be discredited without any corresponding advantage to themselves. It is not, therefore, surprising that, while such distinguished examples of the contrary appeared amongst individuals, the whole body of minstrels, with the romances which they composed and sung, should be reprobated by graver historians in such severe terms as often occur in the monkish chronicles of the day.

Charac nd sty he ro- nances hivalry

Respecting the style of their composition, Du Cange informs us, that the minstrels sometimes devoted their strains to flatter the great, and sing the praises of those princes by whom they were protected; while he owns, at the same time, that they often recommended to their hearers the path of virtue and nobleness, and pointed out the pursuits by which the heroes of romance had rendered themselves renowned in song.[6] He quotes from the romance of *Bertrand Guesclin*, the injunction on those who would rise to fame in arms to copy the valiant acts of the Paladins of Charles, and the Knights of the Round Table, narrated in romances; and it cannot be denied, that those high tales, in which the virtues of generosity, bravery, devotion to his mistress, and zeal for the Catholic religion, were carried to the greatest height of romantic perfection in the character of the hero, united with the scenes passing around them, were of the highest importance in affecting the character of the age. The fabulous knights of romance were so completely identified with those of real history, that graver historians quote the actions of the former in illustration of, and as a corollary to the real events which they narrate.[7] The virtues recommended in romance were, however, only of that overstrained and extravagant cast which consisted with the spirit of chivalry. Great bodily strength, and perfection in all martial exercises, was the universal accomplishment inalienable from the character of the hero, and which each romancer had it in his power to confer. It was also easily in the composer's power to devise dangers, and to free his hero from them by the exertion of valour equally extravagant. But it was more difficult to frame a story which should illustrate the manners as well as the feats of chivalry; or to devise the means of evincing that devotion to duty, and that disinterested desire to sacrifice all to faith and honour;—that noble spirit of achievement which laboured for others more than itself—which form, perhaps, the fairest side of the system under which the noble youths of the middle ages were trained up. The sentiments of chivalry, as we have explained in our article on that subject, were founded on the most pure and honourable principles, but unfortunately carried into hyperbole and extravagance; until the religion of its professors approached to fanaticism, their valour to frensy, their ideas of honour to absurdity, their spirit of enterprise to extravagance, and their respect for the female sex to a sort of idolatry. All those extravagant feelings, which really existed in the society of the middle ages, were magnified and exaggerated by the writers and reciters of romance; and these given as resemblances of actual manners, became, in their turn, the glass by which the youth of the age dressed themselves; while the spirit of chivalry and of romance thus gradually threw light upon and enhanced each other.

The romances, therefore, exhibited the same system of manners which existed in the nobles of the age. The character of a true son of chivalry was raised to such a pitch of ideal and impossible perfection, that those who emulated such renown were usually contented to stop far short of the mark. The most adventurous and unshaken valour, a mind capable of the highest flights of romantic generosity, a heart which was devoted to the will of some fair idol, on whom his deeds were to reflect glory, and whose love was to reward all his toils; these were attributes which all aspired to exhibit who sought to rank high in the annals of chivalry; and such were the virtues which the minstrels celebrated. But, like the temper of a tamed lion, the fierce and dissolute spirit of the age often shewed itself through the fair varnish of this artificial system of manners. The valour of the hero was often stained by acts of cruelty, or freaks of rash desperation; his courtesy and munificence became solemn foppery and wild profusion; his love to his lady often demanded and received a requital inconsistent with the honour of the object; and those who affected to found their attachment on the purest and most delicate metaphysical principles, carried on their actual intercourse with a license altogether inconsistent with their sublime pretensions. Such were the real manners of the middle ages, and we find them so depicted in these ancient legends.

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[1] Berdic *(Regis Joculator)*, the jongleur or minstrel of William the Conqueror, had, as appears from the Domesday record, three vills and five caracates of land in Gloucestershire without rent. Henry I. had a minstrel called Galfrid, who received an annuity from the abbey of Hyde.

[2] A minstrel of Edward I., during that prince's expedition to the Holy Land, slept within his tent, and came to his assistance when an attempt was made to assassinate him.

[3] The Priory and Hospital of Saint Bartholomew, in London, was founded in the reign of Henry I. by Royer or Raher, a minstrel of that prince.

[4] In 1441, the monks of Maxlock, near Coventry, paid a donation of four shillings to the minstrels of Lord Clinton for songs, harping, and other exhibitions, while, to a doctor who preached before the community in the same year, they assigned only sixpence.

[5] The noted anecdote of Blondel and his royal master, Richard Cœur de Lion, will occur to every reader.

[6] Ministelli dicti præsertim scurræ, mimi, joculatores, quos etiamnum vulgo *Menestreux* vel *Menestriers*, appellamus.——Porro ejusmodi scurrarum erat Principes, non suis duntaxat ludicris oblectare, sed et eorum aures variis avorum, adeoque ipsorum Principum laudibus, non sine assentatione, cum cantilenis et musicis instrumentis, demulcere.——Interdum etiam virorum insignium et heroum gesta, aut explicata et jucunda narratione commemorabant, aut suavi vocis inflectione, fidibusque decantabant, quo sic dominorum, cæterorumque qui his intererant ludicris, nobilium animos ad virtutem capessendam et summorum virorum imitationem accenderent: quod fuit olim apud Gallos Bardorum ministerium, ut auctor est Tacitus. Neque enim alios à *Ministellis*, veterum Gallorum *Bardos* fuisse pluribus probat Henricus Valesius ad 15. Ammiani.—*Chronicon* Bertrandi Guesclini:

> Qui veut avoir renom des bons et des vaillans,
> Il doit aler souvent à la pluie et au champ,
> Et estre en la bataille, ainsy que fu Rollans,
> Les quatre fils Haimon et Charlon li plus grans,
> Li Dus Lions de Bourges, et Guion de Connans,
> Perceval li Galois, Lancelot et Tristans,
> Alexandres, Artus, Godefroy li sachans,
> De quoy cils menestriers font les nobles Romans.

[7] Barbour, the Scottish historian, censures a Highland chief, when, in commending the prowess of Bruce in battle, he likened him to he Celtic hero, Fin Mac Coul, and says, he might in more mannerly fashion have compared him to Gaudifer, a champion celebrated in he romance of Alexander.

So high was the national excitation in consequence of the romantic atmosphere in which they seemed to breathe, that the knights and squires of the fourteenth and fifteenth centuries imitated the wildest and most extravagant emprises of the heroes of romance; and, like them, took on themselves the most extraordinary adventures to shew their own gallantry, and do most honour to the ladies of their hearts. The females of rank, erected into a species of goddesses in public, and often degraded as much below their proper dignity in more private intercourse, equalled in their extravagances the youth of the other sex. A singular picture is given by Knyghton of the damsels-errant who attended upon the solemn festivals of chivalry, in quest, it may reasonably be supposed, of such adventures as are very likely to be met with by such females as think proper to seek them. "These tournaments are attended by many ladies of the first rank and greatest beauty, but not always of the most untainted reputation. These ladies are dressed in party-coloured tunics, one-half of one colour and the other half of another; their lirripipes, or tippets, are very short; their caps remarkably little, and wrapt about their heads with cords; their girdles and pouches are ornamented with gold and silver; and they wear short swords, called *daggers*, before them, a little below their navels; they are mounted on the finest horses, with the richest furniture. Thus equipped, they ride from place to place in quest of tournaments, by which they dissipate their fortunes, and sometimes ruin their reputation."—(Knyghton, quoted in Henry's *History*, vol. viii. p. 402.)

The minstrels, or those who aided them in the composition of the romances, which it was their profession to recite, roused to rivalry by the unceasing demand for their compositions, endeavoured emulously to render them more attractive by subjects of new and varied interest, or by marvellous incidents which their predecessors were strangers to. Much labour has been bestowed, somewhat unprofitably, in endeavouring to ascertain the sources from which they drew the embellishments of their tales, when the hearers began to be tired of the unvaried recital of battle and tournament which had satisfied the simplicity of a former age. Percy has contended for the northern *Sagas* as the unquestionable origin of the romance of the middle ages. Warton conceived that the *Oriental fables*, borrowed by those minstrels who visited Spain, or who in great numbers attended the crusades, gave the principal distinctive colouring to those remarkable compositions; and a later system, patronised by later authors, has derived them, in a great measure, from the fragments of classical superstition, which continued to be preserved after the fall of the Roman empire. All those systems seem to be inaccurate, in so far as they have been adopted, exclusively of each other, and of the general proposition, that fables of a nature similar to the romances of chivalry, modified according to manners and state of society, must necessarily be invented in every part of the world, for the same reason that grass grows upon the surface of the soil in every climate and in every country. "In reality," says Mr. Southey, who has treated this subject with his usual ability, "mythological and romantic tales are current among all savages of whom we have any full account; for man has his intellectual as well as his bodily appetites, and these things are the food of his imagination and faith. They are found wherever there is language and discourse of reason; in other words, wherever there is man. And in similar stages of civilization, or states of society, the fictions of different people will bear a corresponding resemblance, notwithstanding the difference of time and scene."[1]

To this it may be added, that the usual appearances and productions of nature offer to the fancy, in every part of the world, the same means of diversifying fictitious narrative by the introduction of prodigies. If in any romance we encounter the description of an elephant, we may reasonably conclude that a phenomenon, unknown in Europe, must have been borrowed from the east; but whosoever has seen a serpent and a bird, may easily aggravate the terrors of the former by conferring on a fictitious monster the wings of the latter; and whoever has seen or heard of a wolf, or lion, and an eagle, may, by a similar exertion of invention, imagine a griffin or hippogriff. It is imputing great poverty to the human imagination, to suppose that the *speciosa miracula*, which are found to exist in different parts of the world, must necessarily be derived from some common source; and perhaps we should not err more grossly in supposing that the various kinds of boats, skiffs, and rafts, upon which men have dared the ocean on so many various shores, have been all originally derived from the vessel of the Argonauts.

On the other hand, there are various romantic incidents and inventions of a nature so peculiar, that we may boldly, and at once, refer them to some particular and special origin. The tale of *Flora and Blanchefleur*, for example, could only be invented in the east, where the scene is laid, and the manners of which are observed with some accuracy. That of *Orfeo* and *Heurodis*, on the contrary, is the classical history of Orpheus and Eurydice, with the Gothic machinery of the elves or fairies, substituted for the infernal regions. But notwithstanding these and many other instances in which the subjects or leading incidents of romance can be distinctly traced to British or Armorican traditions, to the tales and history of classic antiquity, to the wild fables and rich imagery of Arabia, or to those darker and sterner themes which were first treated of by the Skalds of the north, it would be assuming greatly too much upon such grounds to ascribe the derivation of romantic fiction, exclusively to any one of these sources. In fact, the foundation of these fables lies deep in human nature, and the superstructures have been imitated from various authorities by those who, living by the pleasure which their lays of chivalry afforded to their audience, were especially anxious to recommend them by novelty of every kind; and were undoubtedly highly gratified when the report of travellers, or pilgrims, or perhaps their own intercourse with minstrels of other nations, enabled them to vary their usual narrations with circumstances yet unheard in bower and hall. Romance, therefore, was like a compound metal, derived from various mines, and in the different specimens of which, one metal or other was alternately predominant; and viewed in this light, the ingenious theories of those learned antiquaries, who have endeavoured to seek the origin of this style of fiction in one of these sources alone, to the exclusion of all others, seem as vain as that of travellers affecting to trace the proper head of the Nile to various different springs, all of which are owned to be accessary to form the full majesty of his current.

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[1] Preface to Southey's edition of the *Morte D'Arthur*. Lond. 1817, 2 vols. 4to.

As the fashion of all things passes away, the metrical romances began gradually to decline in public estimation, probably on account of the depreciated character of the minstrels by whom they were recited. Tradition, says Ritson, is an alchemy, which converts gold into lead; and there is little doubt, that, in passing from mouth to mouth, and from age to age, the most approved metrical romances became gradually corrupted by the defect of memory of some reciters and the interpolations of others; since few comparatively can be supposed to have had recourse to the manuscripts in which some have been preserved. Neither were the reciters in the latter, as in the former times, supplied with new productions of interest and merit. The composition of the metrical romance was gradually abandoned to persons of an inferior class. The art of stringing together in loose verse a number of unconnected adventures, was too easy not to be practised by many who only succeeded to such a degree as was discreditable to the art, by shewing that mere mediocrity was sufficient to exercise it. And the licentious character, as well as the great number of those who, under the various names of glee-men, minstrels, and the like, traversed the country, and subsisted by this idle trade, brought themselves and their occupation into still greater contempt and disregard. With them, the long recitations formerly made at the tables of the great, were gradually banished into more vulgar society.

But though the form of those narratives underwent a change of fashion, the appetite for the fictions themselves continued as ardent as ever; and the prose romances which succeeded, and finally superseded those composed in verse, had a large and permanent share of popularity. This was, no doubt, in a great degree owing to the important invention of printing, which has so much contributed to alter the destinies of the world. The metrical romances, though in some instances sent to the press, were not very fit to be published in this form. The dull amplifications which passed well enough in the course of a half-heard recitation, became intolerable when subjected to the eye; and the public taste gradually growing more fastidious as the language became more copious, and the system of manners more complicated, graces of style and variety of sentiment were demanded instead of a naked and unadorned tale of wonders. The authors of the prose romance endeavoured, to the best of their skill, to satisfy this newly awakened and more refined taste. They used, indeed, the same sources of romantic history which had been resorted to by their metrical predecessors; and Arthur, Charlemagne, and all their chivalry, were as much celebrated in prose as ever they had been in poetic narrative. But the new candidates for public favour pretended to have recourse to sources of authentic information, to which their metrical predecessors had no access. They refer almost always to Latin, and sometimes to Greek originals, which certainly had no existence; and there is little doubt that the venerable names of the alleged authors are invented, as well as the supposed originals from which they are said to have translated their narratives. The following account of the discovery of *La tres elegante delicieux melliflue et tres plaisante Hystoire du tres noble Roy Perceforest* (printed at Paris in 1528 by Galliot du Pré,) may serve to show that modern authors were not the first who invented the popular mode of introducing their works to the world as the contents of a newly discovered manuscript. In the abridgment to which we are limitted, we can give but a faint picture of the minuteness with which the author announces his pretended discovery, and which forms an admirable example of the lie with a circumstance. In the year 1286, Count William of Hainault had, it is averred, crossed the seas in order to be present at the nuptials of Edward, and in the course of a tour through Britain, was hospitably entertained at an abbey situated on the banks of the Humber, and termed, it seems, Burtimer, because founded by a certain Burtimericus, a monarch of whom our annals are silent, but who had gained, in that place, a victory over the heathens of Germany. Here a cabinet, which was inclosed in a private recess, had been lately discovered within the massive walls of an ancient tower, and was found to contain a Grecian manuscript, along with a royal crown. The abbot had sent the latter to king Edward, and the Count of Hainault with difficulty obtained possession of the manuscript. He had it rendered from Greek into Latin by a monk of the abbey of Saint Landelain, and from that language it is said to have been translated into French by the author, who gives it to the world in honour of the blessed Virgin, and for the edification of nobleness and chivalry.

By such details, the authors of the prose romances endeavoured to obtain for their works a credit for authenticity which had been denied to the rhythmical legends. But in this particular they did great injustice to their contemned predecessors, whose reputations they murdered in order to rob them with impunity. Whatever fragments or shadowings of true history may yet remain hidden under the mass of accumulated fable, which had been heaped on them during successive ages, must undoubtedly be sought in the metrical romances; and according to the view of the subject which we have already given, the more the works approach in point of antiquity to the period where the story is laid, the more are we likely to find those historical traditions in something approaching to an authentic state. But those who wrote under the imaginary names of Rusticien de Puise, Robert de Borron, and the like, usually seized upon the subject of some old minstrel; and, recomposing the whole narrative after their own fashion, with additional characters and adventures, totally obliterated in that operation any shades which remained of the first, and probably authentic tradition, which was the original source of the elaborate fiction. Amplification was especially employed by the prose romancers, who, having once got hold of a subject, seem never to have parted with it until their power of invention was completely exhausted. The metrical romances, in some instances, indeed, ran to great length, but were much exceeded in that particular by the folios which were written on the same or similar topics by their prose successors. Probably the latter judiciously reflected that a book which addresses itself only to the eyes, may be laid aside when it becomes tiresome to the reader; whereas it may not always have been so easy to stop the minstrel in the full career of his metrical declamation.

Who, then, the reader may be disposed to inquire, can have been the real authors of those prolix works, who, shrouding themselves under borrowed names, derived no renown from their labours, if successful, and who, certainly, in the infant state of the press, were not rewarded with any emolument? This question cannot, perhaps, be very satisfactorily answered; but we may reasonably suspect that the long hours of leisure which the cloister permitted to its votaries, were often passed away in this manner; and the conjecture is rendered more probable, when it is observed that matters are introduced into those works which have an especial connection with sacred history, and with the traditions of the Church. Thus, in the curious romance of *Huon de Bourdeaux*, a sort of second part is added to that delightful history, in which the hero visits the terrestrial paradise, encounters the first murderer Cain, in the peformance of his penance, with more matter to the same purpose, not likely to occur to the imagination of a layman; besides, that the laity of the period were in general too busy and too ignorant to engage in literary tasks of any kind. The mystical portion of the romance of the *Round Table* seems derived from the same source. It may also be mentioned, that the audacious, and sometimes blasphemous assertions, which claimed for these fictions the credit due even to the inspired writings themselves, were likely to originate amongst Roman Catholic churchmen, who were but too familiar with such forgeries for the purpose of authenticating the legends of their superstition. One almost incredible instance of this impious specious of imposture occurs in the history of the *Saint Graal*, which curious mixture of mysticism and chivalry is ascribed by the unfearing and unblushing writer to the second person of the Trinity.

Churchmen, however, were by no means the only authors of these legends, although the *Sires Clercs*, as they were sometimes termed, who were accounted the chronicles of the times in which they lived, were usually in orders; and although it appears that it was upon them that the commands of the soveregins whom they served often imposed the task of producing new romances under the usual disguise of ancient chronicles translated from the learned languages, or otherwise collected from the ruins of antiquity. As education became improved, and knowledge began to be more generally diffused, individuals among the laity, and those of no mean rank, began to feel the necessity, as it may be called, of putting into a permanent form the "thick-coming fancies" which gleam along the imagination of men of genius. Sir Thomas Malony, who compiled the *Morte D'Arthur* from French originals, was a person of honour and worship; and Lord Berners, the excellent translator of Froissart, and author of a romance called *The Chevalier de la Cygne*, is an illustrious example that a nobleman of high estimation did not think his time misemployed on this species of composition. Some literary fame must therefore have attended these efforts; and perhaps less eminent authors might, in the latter ages, receive some pecuniary advantages. The translator of *Perceforest*, formerly mentioned, who appears to have been an Englishman or Fleming, in his address to the warlike and invincible nobility of France, holds the language of a professional author, who expected some advantage besides that of pleasing those whom he addressed; and who expresses proportional gratitude for the favourable reception of his former feeble attempts to please them. It is possible, therefore, that the publishers, these lions of literature, had begun already to admit the authors into some share of their earnings. Other printers, like the venerable Caxton, compiled themselves, or translated from other languages, the romances which they sent to the press; thus uniting in their own persons the three separate departments of author, printer, and publisher.

The prose romance did not, in the general conduct of the story, where digressions are heaped on digressions, without the least respect to the principal narrative, greatly differ from that of their metrical predecessors, being to the full as tedious and inartificial; nay, more so, in proportion as the new romances were longer than the old. In the transference from verse to prose, and the amplification which the scenes underwent in the process, many strong, forcible, and energetic touches of their original author have been weakened, or altogether lost; and the reader misses with regret some of the redeeming bursts of rude poetry which, in the metrical romance, make amends for many hundred lines of bald and rude versification. But, on the other hand, the prose romances were written for a more advanced stage of society, and by authors whose language was much more copious, and who certainly belonged to a more educated class than the ancient minstrels. Men were no longer satisfied with hearing of hard battles and direful wounds; they demanded at the hand of those who professed to entertain them, some insight into nature, or at least into manners; some description of external scenery, and a greater regard to probability both in respect of the characters which are introduced, and the events which are narrated. These new demands the prose romances endeavoured to supply to the best of their power. There was some attention shewn to relieve their story, by the introduction of new characters, and to illustrate these personages by characteristic dialogue. The lovers conversed with each other in the terms of metaphysical gallantry, which were used in real life; and from being a mere rhapsody of warlike feats, the romance began to assume the nobler and more artificial form of a picture of manners. It is in the prose folios of *Lancelot du Lac*, *Perceforest*, and others, that antiquaries find recorded the most exact accounts of fights, tournaments, feasts, and other magnificent displays of chivalric splendour; and as they descend into more minute description than the historians of the time thought worthy of their pains, they are a mine from which the painful student may extract much valuable information. This, however, is not the full extent of their merit. These ancient books, amid many pages of dull repetition and uninteresting dialogue, and notwithstanding the langour of an inartificial, protracted, and confused story, exhibit from time to time passages of deep interest, and situations of much novelty, as well as specimens of spirited and masculine writing. The general reader, who dreads the labour of winnowing out these valuable passages from the sterile chaff through which they are scattered, will receive an excellent idea of the beauties and defects of the romance from Tressan's *Corps d'Extraits de Romans de Chevalerie*, from Mr. Ellis's *Specimens of Early English Romances*, and Mr. Dunlop's *History of Fiction*.

These works continued to furnish the amusement of the most polished courts in Europe, so long as the manners and habits of chivalry continued to animate them. Even the sagacious Catherine of Medicis considered the romance of *Perceforest* as the work best qualified to form the manners and amuse the leisure of a young prince; since she impressed on Charles IX. the necessity of studying it with attention. But by degrees the progress of new opinions in religion, the promulgation of a stricter code of morality, together with the important and animating discussions which began to be carried on by means of the press, diverted the public attention from these antiquated legends. The Protestants of England, and the Huguenots of France, were rigorous in their censure of books of chivalry, in proportion as they had been patronized formerly under the Catholic system; perhaps because they helped to arrest men's thoughts from more serious subjects of occupation. The learned Ascham thus inveighs against the romance of *Morte D'Arthur*, and at the same time acquaints us with its having passed out of fashion: "In our forefathers' tyme, when papestrie, as a standyng poole, covered and overflowed all Englande, fewe bookes were read in our tongue, savyng certaine bookes of chivalrie, as they said for pastime and pleasure; which, as some say, were made in monasteries by idle monks, or wanton chanons. As, for example, *La Morte D'Arthur*, the whole pleasure of which booke standeth in two speciall poyntes, in open manslaughter, and bold bawdrye: in which booke they are counted the noblest knightes that do kill most men without any quarrell, and commit foulest adulteries by sutlest shiftes; as Sir Launcelote, with the wife of King Arthur his master; Sir Tristram, with the wife of King Marke his uncle; Sir Lamerocke, with the wife of King Lote, that was his own aunt. This is good stuffe for wise men to laughe at, or honest men to take pleasure at: yet I know, when God's Bible was banished the court, and *La Morte D'Arthur* received into the prince's chamber."[1]

The brave and religious La Noue is not more favourable to the perusal of romances than the learned Ascham; attributing to the public taste for these compositions the decay of morality amongst the French nobility. "The ancient fables whose relikes doe yet remain, namely, *Lancelot of the Lake, Pierceforest, Tristram, Giron the Courteous,* and such others, doe beare witnesse of this olde vanitie; herewith were men fed for the space of 500 yeeres, untill our language growing more polished, and our mindes more ticklish, they were driven to invent some nouelties wherewith to delight us. Thus came y^{e} bookes of *Amadis* into light among us in this last age. But to say y^{e} truth, *Spaine* bred thē, and *France* new clothed thē in gay garments. In y^{e} daies of *Henrie the Second* did they beare the chiefest sway, and I think if any man weuld then have reproved thē, he should have been spit at because they were of themselves playfellowes and maintainers to a great sort of persons; whereof some, after they had learned to amize in speech, their teeth watered, so desirous were they even to taste of some small morsels of the delicacies therein most livelie and naturally represented."[2] The gallant Marechal proceeds at considerable length to refute the arguments of those who contended that these books were intended as a spur to the practice of arms and honourable exercises amongst youth, and labours hard to shew that they teach dishonest practices both in love and in arms. It is impossible to suppress a smile when we find such an author as La Noue denouncing the introduction of spells, witchcrafts, and enchantments into these volumes, not because such themes are absurd and nonsensical, but because the representing such beneficent enchanters as Alquife and Urganda is, in fact, a vindication of those who traffic with the powers of darkness; and that those who love to read about sorceries and enchantments become, by degrees, familiarized with those devilish mysteries, and may at length be induced to have recourse to them in good earnest.

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[1] *Works* of Roger Ascham, p. 254. 4to. edition.

The romances of chivalry did not, however, sink into disrepute under the stern rebuke of religious puritans or severe moralists, but became gradually neglected, as the customs of chivalry itself fell into disregard; when, of course, the books which breathed its spirit, and were written under its influence, ceased to produce any impression on the public mind, and, superseded by better models of composition, and overwhelmed with the ridicule of Cervantes, sunk by degrees into utter contempt and oblivion.

Other works of amusement, of the same general class, succeeded the proper romance of chivalry. Of these we shall take some notice hereafter, since we must here close our general view of the history of romance, and proceed briefly to give some account of those peculiar to the various European nations.

Romances of the different countries of Europe.

II. We can here but briefly touch upon a subject of great interest and curiosity, namely, the peculiar character and tone which the romance of chivalry received from the manners and early history of the nations amongst whom it is found to exist; and the corresponding question, in what degree each appears to have borrowed from other countries the themes of their own minstrels, or to have made use of materials common to the whole.

Northern romance.

Scandinavia, as was to be expected, may be safely considered as the richest country in Europe, in ancient tales corresponding with the character of romance; sometimes composed entirely in poetry or rhythm, sometimes in prose, and much more frequently in a mixture of prose, narrative, and lyrical effusions. Their well-known Skalds or bards held a high rank in their courts and councils. The character of a good poet was scarcely second to that of a gallant leader, and many of the most celebrated champions ambitiously endeavoured to unite both in their own persons. Their earlier sagas or tales approach to the credit of real history, and were unquestionably meant as such, though, as usual at an early period, debased by the intermixture of those *speciosa miracula* which the love of the wonderful early introduces into the annals of an infant country. There are, however, very many of the sagas, indeed by far the greater number of those now known to exist, which must be considered as falling rather under the class of fictitious than of real narratives; and which, therefore, belong to our present subject of inquiry. The *Omeyinger Saga*, the *Heimskringla*, the *Saga* of Olaf Triggvason, the *Eyrbyggia Saga*, and several others, may be considered as historical; whilst the numerous narratives referring to the history of the Nibelungen and Volsungen are as imaginary as the romances which treat of King Arthur and of Charlemagne. These singular compositions, short, abrupt, and concise in expression, full of bold and even extravagant metaphor, exhibiting many passages of forceful and rapid description, hold a character of their own; and whilst they remind us of the indomitable courage and patient endurance of the hardy Scandinavians, at once the honour and the terror of Europe, rise far above the tedious and creeping style which characterised the minstrel efforts of their successors, whether in France or England. In the pine forests also, and the frozen mountains of the north, there were nursed, amid the reliques of expiring paganism, many traditions of a character more wild and terrible than the fables of classical superstition; and these the gloomy imagination of the skalds failed not to transfer to their romantic tales. The late spirit of inquiry which has been so widely spread through Germany, has already begun to throw much light on this neglected storehouse of romantic lore, which is worthy of much more attention than has yet been bestowed upon it in Britain. It must, however, be remarked, that although the north possesses champions and romances of its own, unknown to southern song, yet, in a later age, the inhabitants of these countries borrowed from the French minstrels some of their most popular subjects; and hence we find sagas on the subject of Sir Tristrem, Sir Percival, Sir Ywain, and others, the well-known themes of French and English romance. These, however, must necessarily be considered later in date, as well as far inferior in interest, to the sagas of genuine northern birth. Mr. Ritson has indeed quoted their existence as depreciating the pretensions of the northern nations to the possession of poems of high antiquity of their own native growth. Had he been acquainted with the *Norman-Kiempe-Datur*, a large folio, printed at Stockholm in 1737, he would have been satisfied, that out of the numerous collection of legends respecting the achievements of Gothic champions, far the greater part are of genuine Norse origin; and although having many features in common with the romances of southern chivalry, are, in other marked particulars, distinctly divided from that class of fictitious composition.

German romance.

The country of Germany, lying contiguous to France, and constantly engaged in friendly and hostile intercourse with that great seat of romantic fiction, became, of course, an early partaker in the stores which it afforded. The Minnesingers of the Holy Empire were a race no less cherished than the Troubadours of Provence, or the Minstrels of Normandy; and no less active in availing themselves of their indigenous traditions, or importing those of other countries, in order to add to their stock of romantic fiction. Gotfrit of Strasburg composed many thousand lines upon the popular subject of Sir Tristrem; and others have been equally copious, both as translators and as original authors, upon various subjects connected with French romance; but Germany possessed materials, partly borrowed from Scandinavia, partly peculiar to her own traditional history, as well as to that of the Roman empire, which they applied to the construction of a cycle of heroes as famous

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[1] *The Politicke and Militarie Discourses* of the Lord De La Nowe, pp. 87, 88. 4to. Lond. 1587.

in Teutonic song as those of Arthur and of Charlemagne in France and Britain.

As in all other cases of the kind, a real conqueror, the fame of whose exploits survived in tradition, was adopted as the central object, around whom were to be assembled a set of champions, and with whose history was to be interwoven the various feats of courage which they performed, and the adventures which they underwent. Theodorick King of the Goths, called in these romantic legends Diderick of Bern (*i. e.* Verona,) was selected for this purpose by the German Minnesingers. Among the principal personages introduced are Ezzel, King of the Huns, who is no other than the celebrated Attila; and Gunter, King of Burgundy, who is identified with a Guntacher of history who really held that kingdom. The good knight Wolfram von Eschenbach seems to have been the first who assembled the scattered traditions and minstrel tales concerning these sovereigns into one large volume of German verse, entitled *Heldenbuch*, or the Book of Heroes. In this the author has availed himself of the unlimited licence of a romancer; and has connected with the history of Diderick and his chivalry a number of detached legends which had certainly a separate and independent existence. Such is the tale of *Sigurd the Horny*, which has the appearance of having originally been a Norse saga. An analysis of this singular piece was published by Mr. Weber, in a work entitled *Illustrations of Northern Antiquities from the earlier Teutonic and Scandinavian Romances;* and the subject has been fully illustrated by the publications of the learned Von der Hagen in Germany, and those of the Hon. William Herbert.

It is here only necessary to say, that Theodorick, like Charlemagne and Arthur, is considered in the romance as a monarch more celebrated for the valorous achievements of the brotherhood of chivalry whom he has drawn around him, than for his own, though neither deficient in strength nor courage. His principal followers have each their discriminatory and peculiar attributes. Meister Hildebrand, the Nestor of the band, is, like the Maugis of Charlemagne's heroes, a magician as well as a champion. Hogan, or Hagan, begot betwixt a mortal and a sea-goblin, is the fierce Achilles of the confederation. It is the uniform custom of the romancers to conclude by a general and overwhelming catastrophe, which destroys the whole ring of chivalry whose feats they had commemorated. The ruin which Roncesvalles brought to the Paladins of Charlemagne, and the fatal battle of Camlan to the Knights of the Round Table, fell upon the warriors of Diderick through the revengeful treachery of Crimhilda, the wife of Ezzel; who, in revenge for the death of her first husband, and in her inordinate desire to possess the treasures of the Niflunga or Burgundians, brought destruction on all those celebrated champions. Mr. Weber observes that these German fictions differ from the romances of French chivalry, in the greater ferocity and less refinement of sentiment ascribed to the heroes; and also in their employing to a great extent the machinery of the Duergar, or dwarfs, a subterranean people to whom the *Heldenbuch* ascribes much strength and subtilty, as well as profound skill in the magic art, and who seem, to a certain extent, the predecessors of the European fairy.

Italian romance.

Italy, so long the seat of classical learning, and where that learning was first revived, seems never to have strongly embraced the taste for the Gothic romance. They received, indeed, the forms and institutions of chivalry, but the Italians seem to have been in a considerable degree strangers to its spirit, and not to have become deeply enamoured of its literature. There is an old romance of chivalry proper to Italy, called *Guerino the Wretched*, but we doubt if even this be of indigenous growth. Indeed, when they did adopt from the French the fashionable tales of Charlemagne and his Paladins, these did not attract the attention of the classical Italians, until Boiardo, Berni, Pulci, and, above all, the divine Ariosto, condescended to use them as the basis of their well-known romantic poems; and thus the fictitious narratives originally composed in metre, and afterwards rewritten in prose, were anew decorated with the honours of verse. The romantic poets of Italy did not even disdain to imitate the rambling, diffuse, and episodical style proper to the old romance; and Ariosto, in particular, although he torments the reader's attention, by digressing from one adventure to another, delights us, upon frequent perusals, by the extreme ingenuity with which he gathers up the broken ends of his narrative, and finally weaves them all handsomely together in the same piece. But the merits and faults of romantic poetry form themselves the fruitful subject of a long essay. We here only notice the origin of those celebrated works, as a species of composition arising out of the old romance, though surpassing it in regularity, as well as in all the beauties of style and diction.

Spani-
Portu
roman

With Spain the idea of romance was particularly connected; and the associations which are formed upon perusing the immortal work of Cervantes, induce us for a long time to believe that the country of Don Quixote must be the very cradle of romantic fiction. Yet, if we speak of priority of date, Spain was amongst the last nations in Europe with whom romance became popular. It was not indeed possible that, among a people speaking so noble and poetical a language, engaged in constant wars, which called forth at once their courage and their genius, there should not exist many historical and romantic ballads descriptive of their rencounters with the Moors. But their native poets seem to have been too much engaged with the events of their own age, and of that which had just preceded it, to permit of their seeking subjects in the regions of pure fiction; and we have not heard of a Spanish metrical romance, unless the poems describing the adventures of the Cid should be supposed to have any affinity to that class of composition. The Peninsula, however, though late in adopting the prevailing taste for romantic fiction, gave origin to one particular class, which was at least as popular as any which had preceded it. *Amadis de Gaul*, the production, it would seem, of Vasco de Lobeira, a Portuguese knight, who lived in the fourteenth century, gave a new turn to the tales of chivalry, and threw into the shade the French prose romances, which, until the appearance of this distinguished work, had been the most popular in Europe.

The author of *Amadis*, in order, perhaps, to facilitate the other changes which he introduced, and to avoid rushing against preconceived ideas of events or character, laid aside the worn-out features of Arthur and Charlemagne, and imagined to himself a new dynasty both of sovereigns and of heroes, to whom he ascribed a style of manners much more refined, and sentiments much more artificial, than had occurred to the authors of *Perceval* or *Perceforest*. Lobeira had also taste enough to perceive, that some unity of design would be a great improvement on the old romance, where one adventure is strung to another with little connection from the beginning to the end of the volume; which thus concluded, not because the plot was winded up, but because the author's invention, or the printer's patience, was exhausted. In the work of the Portuguese author, on the contrary, he proposes a certain end, to advance or retard which all the incidents of the work have direct reference. This is the marriage of Amadis with Oriana, against which a thousand difficulties are raised by rivals, giants, sorcerers, and all the race of evil powers unfavourable to chivalry; whilst these obstacles are removed by the valour of the hero, and constancy of the heroine, succoured on their part by those friendly sages, and blameless sorceresses, whose intervention gave so much alarm to the tender-conscienced De la Noue. Lobeira also displayed considerable attention to the pleasure which arises from the contrast of character;

and to relieve that of Amadis, who is the very essence of chivalrous constancy, he has introduced Don Galaor, his brother, a gay libertine in love, whose adventures form a contrast with those of his more serious relative. Above all, the *Amadis* displays an attention to the style and conversation of the piece, which, although its effects are now exaggerated and ridiculous, was doubtless at the time considered as the pitch of elegance; and here were, for the first time, introduced those hyperbolical compliments, and that inflated and complicated structure of language, the sense of which walks as in a masquerade.

The *Amadis* at first consisted only of four books, and in that limited shape may be considered as a very well conducted story; but additions were speedily made which extended the number to twenty-four; containing the history of Amadis subsequent to his obtaining possession of Oriana, and down to his death, as also of his numerous descendants. The theme was not yet exhausted; for, as the ancient romancers, when they commenced a new work, chose for their hero some newly invented Paladin of Charlemagne, or knight of King Arthur, so did their successors adopt a new descendant of the family of Amadis, whose genealogy was thus multiplied to a prodigious degree. For an account of *Esplandian, Florimond of Greece, Palmerin of England*, and the other romances of this class, the reader must be referred to the valuable labours of Mr. Southey, who has abridged both *Amadis* and *Palmerin*, with the most accurate attention to the style and manners of the original. The books of *Amadis* became so very popular, as to supersede the elder romances almost entirely, even at the court of France, where, according to La Noue, already quoted, they were introduced about the reign of Henry II. It was against the extravagance of these fictions in character and in style, that the satire of Cervantes was chiefly directed; and almost all the library of Don Quixote belongs to this class of romances, which, no doubt, his adventures contributed much to put out of fashion.

Fren Roma e.

In every point of view, France must be considered as the country in which chivalry and romance flourished in the highest perfection; and the originals of almost all the early romances, whether in prose or in verse, whether relating to the history of Arthur or of Charlemagne, are to be found in the French language; and other countries possess only translations from thence. This will not be so surprising when it is recollected, that these earlier romances were written, not only for the use of the French, but of the English themselves, among whom French was the prevailing language during the reigns of the Anglo-Norman monarchs. Indeed, it has been ingeniously supposed, and not without much apparent probability, that the fame of Arthur was taken by the French minstrels for the foundation of their stories in honour of the English kings, who reigned over the supposed dominions of that British hero; while, on the other hand, the minstrels who repaired to the coast of France, celebrated the prowess of Charlemagne and his twelve peers as a subject more gratifying to those who sat upon his throne. It is perhaps, some objection to this ingenious theory, that, as we have already seen, the battle of Hastings was opened by a minstrel, who sung the war-song of Roland, the nephew of Charlemagne; so that the Norman duke brought with him to England the tales that are supposed, at a much later date, to have been revived to soothe the national pride of the French minstrels.

How the French minstrels came originally by the traditional reliques concerning Arthur and Merlin, on which they wrought so long and so largely, must, we fear, always remain uncertain. From the Saxons we may conclude they had them not; for the Saxons were the very enemies against whom Arthur employed his good sword excalibar, that is to say, if there was such a man, or such a weapon. We know, indeed, that the British, like all the branches of the Celtic race, were much attached to poetry and music, which the numerous relics of ancient poetry in Wales, Ireland, and the Highlands of Scotland, sufficiently evince. Arthur, a name famous amongst them, with some traditions concerning the sage Merlin, may have floated either in Armorica, or among the half-British of the borders of Scotland, and of Cumberland; and thus preserved, may have reached the ear of the Norman minstrels, either in their newly conquered dominions, or through their neighbours of Brittany. A theme of this sort once discovered, and found acceptable to the popular ear, gave rise, of course, to a thousand imitations; and gradually drew around it a cloud of fiction which, embellished by such poetry as the minstrels could produce, arranged itself by degrees into a system of fabulous history, as the congregated vapours touched by the setting sun, assume the form of battlements and towers. We know that the history of Sir Tristrem, first versified by Thomas the Rhymer of Erceldoune, was derived from Welsh traditions, though told by a Saxon poet. In fact, it may be easily supposed, that the romancers of that early period were more eager to acquire popular subjects than delicately scrupulous of borrowing from their neighbours; and when the foundation-stone was once laid, each subsequent minstrel brought his contribution to the building. The idea of an association of knights assembled around one mighty sovereign, was so flattering to all the ruling princes of Europe, that almost all of them endeavoured to put themselves at the head of some similar institution, and the various orders of chivalry are to be traced to this origin. The historical foundation of this huge superstructure is almost imperceptible. Mr. Turner has shewn that the evidence rather inclines to prove the actual existence of King Arthur; and the names of Gawain, his nephew, and of Genuera, his faithful spouse, of Mordred, and Merlin, were preserved by Welsh tradition. To the same source may be referred the loves of Tristrem and Ysolde, which, although a separate story, has become, in the later romances, amalgamated with that of Arthur. But there can be little doubt that all beyond the bare names of the heroes owes its existence to the imagination of the romancers.

It might be thought that the romances referring to the feats of Charlemagne ought to contain more historical truth than those concerning Arthur; since the former relate to a well-known monarch and conqueror, the latter to a personage of a very doubtful and shadowy existence. But the romances concerning both are equally fabulous. Charles had, indeed, an officer named Roland, who was slain with other nobles in the field of Roncesvalles, fighting, not against the Saracens or Spaniards, but against the Gascons. This is the only point upon which the real history of Charlemagne coincides with that invented for him by romancers. Roland was prefect of Bretagne, and his memory was long preserved in the war-song which bore his name. A fabulous chronicler, calling himself Turpin, compiled, in or about the eleventh century, a romantic history of Charlemagne; but it may be doubted whether, in some instances, he has not availed himself of the fictions already devised by the early romancers, while to those who succeeded them his annals afforded matter for new figments. The personal character of Charlemagne has suffered considerably in the hands of the romantic authors, although they exaggerated his power and his victories. He is represented as fond of flattery, irritable in his temper, ungrateful for the services rendered him by his most worthy paladins, and a perpetual dupe to the treacherous artifices of Count Gam, or Ganelon, of Mayence; a renegade, to whom the romancers impute the defeat at Roncesvalles, and all the other misfortunes of the reign of Charles. This unfavourable view of the prince, although it may bear some features of royalty, neither resembles the real character of the conqueror of the Saxons and Lombards, nor can be easily reconciled with the idea, that he was introduced to flatter the personal vanity of the princes of the Valois race, by a portrait of their great predecessor.

The circumstance that Roland was a lieutenant of Brittany, and the certainty that Marie borrowed from that country the incidents out of which she composed her lays, seems to fortify the theory, that the French minstrels obtained from that country much of their most valuable materials; and that, after all that has been said and supposed, the history of Arthur probably reached them through the same channel.

The Latin writers of the middle ages afforded the French romancers the themes of those metrical legends which they have composed on subjects of classical fame.

The honour of the prose romances of chivalry, exclusive always of the books of Amadis, belongs entirely to the French, and the curious volumes which are now the object of so much research amongst collectors, are almost universally printed at Paris.

English romance.

England, so often conquered, yet fated to receive an accession of strength from each new subjugation, cannot boast much of ancient literature of any kind; and, in the department of which we treat, was totally inferior to France. The Saxons had, no doubt, romances (taking the word in its general acceptation); and Mr. Turner, to whose researches we are so much indebted, has given us the abridgment of one entitled *Caedmon,* in which the hero, whose adventures are told much after the manner of the ancient Norse Sagas, encounters, defeats, and finally slays an evil being called Grendel, who, except in his being subject to death, seems a creature of a supernatural description. But the literature of the Saxons was destroyed by the success of William the Conqueror, and the Norman knights and barons, among whom England was in a great measure divided, sought amusement, not in the lays of the vanquished, but in those composed in their own language. In this point of view, England, as a country, may lay claim to many of the French romances, which were written, indeed, in that language, but for the benefit of the court and nobles of England, by whom French was still spoken. When the two languages began to assimilate together, and to form the mixed dialect termed the Anglo-Norman, we have good authority for saying that it was easily applied to the purpose of romantic fiction, and recited in the presence of the nobility.

Robert de Brunne, who composed his *History of England* about this time, has this remarkable passage, which we give, along with the commentary of the editor of *Sir Tristrem,* as it is peculiarly illustrative of the subject we are inquiring into.

Als thai haf wryten and sayd,
Haf I alle in myn Inglis layd,
In symple speche as I couthe,
That is lightest in manne's mouthe.
I mad noght for no disours,
Ne for no seggours, no harpours,
Bot for the luf of symple men,
That strange Inglis cannot ken;
For many it ere that strange Inglis,
In ryme wate never what it is;
And bot thai wist what it mente,
Ellis methought it were alle schente.
I made it not for to be praysed,
Bot at the lewed men were aysed.
If it were made in ryme couwee,
Or in strangere, or enterlacé,
That rede Inglis it ere inowe
That couthe not haf coppled a kowe,
That outher in cowee or in baston
Sum suld haf ben fordon;
So that fele men that it herde
Suld not witte howe that it ferde.
I·see in song, in sedgeyng tale,
Of Erceldoun and of Kendale,
Non tham sayis as thai tham wroght,
And in ther saying it semes noght.
That may thou here in Sir Tristrem,
Over gestes it has the steem,
Over all that is or was,
If men it sayd as made Thomas.
Bot I here it no man so say,
That of some copple som is away.
So thare fayre saying here beforne,
Is thare travayle nere forlorne;
Thai sayd it for pride and nobleye,
That were not suylke as thei,
And alle that thai wild overwhere,
Alle that ilk wille now forfare.
Thai sayd it in so quainte Inglis,
That manyone wate not what it is.
Therfore heuyed wele the more
In strange ryme to travayle sore,
And my wit was oure thynne,
So strange speche to travayle in;
And forsoth I couth noght
So strange Inglis as thai wroght,
And men besoght me many a tyme
To turne it bot in light ryme.
Thai seyd, if I in strange ryme it turn,
To here it manyon suld skorne;
For in it ere names fulle selcouthe,
That ere not used now in mouthe.
And therfore, for the comonalté,
That blythely wild listen to me,
On light lange I it began,
For luf of the lewed man.

"This passage requires some commentary, as the sense has been generally mistaken. Robert de Brunne does not mean, as has been supposed, that the minstrels who repeated Thomas's romance of *Sir Tristrem,* disguised the meaning by putting it into *quainte Inglis;* but, on the contrary, that Kendal and Thomas of Erceldoune did themselves use such *quainte Inglis,* that those who repeated the story were unable to understand it, or to make it intelligible to their hearers. Above all, he complains that, by writing an intricate and complicated stanza, as '*ryme cowee, strangere,* or *entrelacé,*' it was difficult for the *diseurs* to recollect the poem; and of *Sir Tristrem,* in particular, he avers, that he never heard a perfect recital, because of some one '*copple*' or stanza, a part was always omitted. Hence he argues at length, that he himself, writing not for the minstrel or harper, nor to acquire personal fame, but solely to instruct the ignorant in the history of their country, does well in chusing a simple structure of verse, which they can retain correctly on their memory, and a style which is popular and easily understood. Besides which, he hints at the ridicule he might draw on his poem, should he introduce the uncouth names of his personages into a courtly or refined strain of verse. They were

Great names, but hard in verse to stand.

While he arrogates praise to himself for his choice, he excuses Thomas of Erceldoune and Kendale for using a more ambitious and ornate kind of poetry. They wrote, he says, for pride (fame) and for nobles, not such as these my ignorant hearers."[1]

If the editor of *Sir Tristrem* be correct in his commentary, there existed in the time of Robert de Brunne, minstrels or poets who composed English poetry to be recited in the presence of the great, and who, for that purpose, used a singularly difficult stanza, which was very apt to be mutilated in recitation. *Sir Tristrem,* even as it now exists, shows likewise that considerable art was resorted to in constructing the stanza, and has, from beginning to end, a concise, quaint, abstract turn of expression, more like the Saxon poetry, than the simple, bald, and diffuse details of the French minstrel. Besides *Sir Tristrem,* there remain, we conceive, at least two other examples of "gestes written in quainte Inglis" composed, namely, according to fixed and complicated rules of verse, and with much attention to the language, though the effect produced is far from pleasing. They are both of Scottish origin, which may be explained, by recollecting, that in the Saxon provinces of Scotland, as well as at the court, Norman was never generally used; and therefore it is probable that the English language was more cultivated in that country at an early period, than in England itself, where, among the higher orders, it was for a long time superseded by that of the French conquerors. These romances, entitled *Sir Gawain*, and *Sir Gologras*, and *Sir Galeran of Galloway*, have all the appearance of being original compositions, and display considerable poetical effort. But the uncouth use of words dragged in for the sake of alliteration, and used in secondary and oblique meanings, renders them extremely harsh in construction, as well as obscure in meaning.

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[1] *Sir Tristrem,* Introduction, pp. 61–65. Edin. 1804.

In England it would seem that the difficulties pointed out by De Brunne, early threw out of fashion this ornate kind of composition; and the English minstrels had no readier resource than translating from the French, who supplied their language at the same time with the phrases of chivalry which did not exist in English. These compositions presented many facilities to the minstrel. He could, if possessed of the slightest invention, add to them at pleasure, and they might as easily be abridged when memory failed, or occasion required. Accordingly, translations from the French fill up the list of English romance. They are generally written in short lines rhyming together; though often, by way of variety, the third and sixth lines are made to rhyme together, and the poem is thus divided into stanzas of three couplets each. In almost all of these legends, reference is made to "the romance," that is, some composition in the French language, as to the original authority. Nay, which is very singular, tales where the subjects appear to be of English growth, seem to have yet existed in French ere they were translated into the language of the country to which the heroes belonged. This seems to have been the case with *Hornchild*, with *Guy of Warwick*, with *Bevis of Hampton*, all of which appear to belong originally to England; yet are their earliest histories found in the French language, or at least the vernacular versions refer to such for their authority. Even the romance of *Richard*, England's own Cœur de Lion, has perpetual references to the French original from which it was translated. It must naturally be supposed that these translations were inferior to the originals; and whether it was owing to this cause, or that the composition of these rhymes was attended with too much facility, and so fell into the hands of very inferior composers, it is certain, and is proved by the highest authority, that of Chaucer himself, that even in his time these rhyming romances had fallen into great contempt. The *Rime of Sir Thopas*, which that poet introduces as a parody, undoubtedly, of the rhythmical romances of the age, is interrupted by mine host Harry Bailly, with the strongest and most energetic expressions of total and absolute contempt. But though the minstrels were censured by De Brunne, for lack of skill and memory, and the poems which they recited were branded as "drafty rhymings," by the far more formidable censure of Chaucer, their acceptation with the public in general must have been favourable, since, besides many unpublished volumes, the two publications of Ritson and Weber bear evidence of their populatity. Some original compositions doubtless occur among so many translations, but they are not numeroes, and few have been preserved. The poem of *Sir Eger* and *Sir Greme*, which seems of Scottish origin, has no French original; nor has any been discovered either of the *Squire of Low Degree*, *Sir Eglamour*, *Sir Pleindamour*, or some others. But the French derivation of the two last names renders it probable that such may exist.

The minstrels and their compositions seem to have fallen into utter contempt about the time of Henry VIII. There is a piteous picture of their condition in the person of Richard Sheale, which it is impossible to read without compassion, if we consider that he was the preserver at least, if not the author of the celebrated heroic ballad of *Chevy Chace*, at which Sir Philip Sidney's heart was wont to beat as at the sound of a trumpet. This luckless minstrel had been robbed on Dunsmore Heath, and, shame to tell, he was unable to persuade the public that a son of the Muses had ever been possessed of the sixty pounds which he averred he had lost on the occasion. The account he gives of the effect upon his spirits is melancholy, and yet ridiculous enough.

> After my robbery my memory was so decayde,
> That I colde neather syng, nor talke, my wytts wer so dismayde,
> My audacitie was gone, and all my myrry tawk:
> Ther ys sum heare have sene me as myrry as a hawke;
> But nowe I am so trublyde with phansis in my mynde,
> That I cannot play the myrry knave, accordyng to my kynd.
> Yet to tak thought, I perseve, ys not the next waye
> To bring me out of det, my creditors to paye.
> I may well say that I hade but well hape,
> For to lose about threscore pounde at a clape.
> The losse of my mony did not greve me so sore,
> But the talke of the pyple dyde greve me moch mor.
> Sum sayde I was not robde, I was but a lyeng knave,
> Yt was not possyble for a mynstrell so much mony to have.
> In dede, to say the truthe, that ys ryght well knowene,
> That I never had so moche mony of myn owene,
> But I had frendds in London, whos namys I can declare,
> That at all tyms wold lende me cc.lds. worth of ware,
> And sum agayn such frendship I founde,
> That thei wold lend me in mony nyn or tene pownde.
> The occasion why I cam in dete I shall make relacion,
> My wyff in dede ys a sylk woman be her occupacion,
> And lynen cloths most chefly was her greatyste trayd,
> And at faris and merkytts she solde sale-ware that she made;
> As shertts, smockys, partlytts, hede clothes, and othar thinggs,
> As sylk thredd, and eggyngs, skirrts, bandds, and strings.
>
> From *The Chant* of Richard Sheale,
> *British Bibliographer*, No. xiii. p. 101.

Elsewhere, Sheale hints that he had trusted to his harp, and to the well known poverty attached to those who used that instrument, to bear him safe through Dunsmore Heath. At length the order of English minstrels was formally put down by the act 39th of Queen Elizabeth, classing them with sturdy beggars and vagabonds; in which disgraceful fellowship they only existed in the capacity of fiddlers, who accompanied their instrument with their voice. Such a character is introduced in the play of *Monsieur Thomas*, as the "poor fiddler who says his songs." The metrical romances which they recited also fell into disrepute, though some of the more popular, sadly abridged and adulterated, continued to be published in *chap. books*, as they are called. About fifty or sixty years since, a person acquired the nickname of *Rosewal and Lilian*, from singing that romance about the streets of Edinburgh, which is probably the very last instance of the proper minstrel craft.

If the metrical romances of England can boast of few original compositions, they can show yet fewer examples of the prose romance. Sir Thomas Malory, indeed, compiled, from various French authorities, his celebrated *Morte d'Arthur*, indisputably the best prose romance the language can boast. There is also *Arthur of Little Britain;* and the Lord Berners compiled the romance of the *Knight of the Swan*. The books of Amadis were likewise translated into English; but it may be doubted whether the country in general ever took that deep interest in the perusal of these records of love and honour with which they were greeted in France. Their number was fewer; and the attention paid to them in a country where great political questions began to be agitated, was much less than when the feudal system still continued in its full vigour.

III. We should now say something on those various kinds of romantic fictions which succeeded to the romance of chivalry. But we can only notice briefly works which have long slumbered in oblivion, and which certainly are not worthy to have their slumbers disturbed.

Pastoral romance.

Even in the time of Cervantes, the pastoral romance, founded upon the *Diana* of George of Monte Mayor, was prevailing to such an extent as made it worthy of his satire. It was, indeed, a system still more remote from common sense and reality than that of chivalry itself. For the maxims of chivalry, high-strained and absurd as they are, did actually influence living beings, and even the fate of kingdoms. If *Amadis de Gaul* was a fiction, the Chevalier Bayard was a real person. But the existence of an Arcadia, a pastoral region, in which a certain fantastic sort of personages, desperately in love, and thinking of nothing else but their mistresses, played upon pipes, and wrote sonnets from morning to night, yet were supposed all the while to be tending their flocks, was too monstrously absurd to be long credited or tolerated.

Heroic romances.

A numerous, and once most popular class of fictions, was that entitled the heroic romance of the seventeenth century.

If the ancient romance of chivalry has a right to be called the parent of those select and beautiful fictions which the genius of the Italian poets has enriched with such peculiar charms, another of its direct descendants, the heroic romance of the seventeenth century, is, with few exceptions, the most dull and tedious species of composition that ever obtained temporary popularity. The old romance of Heliodorus, entitled *Theagenes and Chariclea*, supplied perhaps the earliest model of this style of composition; but it was from the romances of chivalry that it derives its most peculiar characteristics. A man of a fantastic imagination, Honoré d'Urfé, led the way in this style of composition. Being willing to record certain love intrigues of a complicated nature which had taken place in his own family, and among his friends, he imagined to himself a species of Arcadia on the banks of the Lignon, who live for love, and for love alone. There are two principal stories, said to represent the family history of D'Urfé and his brother, with about thirty episodes, in which the gallantries and intrigues of Henry IV.'s court are presented under borrowed names. Considered by itself, this is but an example of the pastoral romance; but it was so popular that three celebrated French authors, Gomberville, Calprenede, and Madame Scuderi, seized the pen, and composed in emulation many interminable folios of heroic romance. In these insipid performances, a conventional character, and a set of family manners and features, are ascribed to the heroes and heroines, although selected from distant ages, and various quarters of the world. The heroines are, without exception, models of beauty and perfection; and, so well persuaded of it themselves, that to approach them with the most humble declaration of love, was a crime sufficient to deserve the penalty of banishment from their presence; and it is well if the doom were softened to the audacious lover, by permission, or command to live, without which, absence and death were to be accounted synonymous. On the other hand, the heroes, whatever kingdoms they have to govern, or other earthly duties to perform, live through these folios for love alone; and the most extraordinary revolutions which can agitate the world, are ascribed to the charms of a Mandana, or a Statira, acting upon the crazy understanding of their lovers. Nothing can be so uninteresting as the frigid extravagance with which these lovers express their passion; or, in their own phrase, nothing can be more freezing than their flames, more creeping than their flights of love. Yet the line of metaphysical gallantry which they exhibited, had its date, and a long one, both in France and England. In the latter country they continued to be read by our grandmothers during the Augustan age of English; and while Addison was amusing the world with his wit, and Pope by his poetry, the ladies were reading Clelia, Cleopatra, and the Grand Cyrus. The fashion did not decay till about the reign of George I.; and even more lately, Mrs. Lennox, patronized by Dr. Johnson, wrote a very good imitation of Cervantes, entitled *The Female Quixote*, which had those works for its basis. They are now totally forgotten. (D. D. D.)

MODERN ROMANCE AND NOVEL.

We alluded in the commencement of this essay, to the division of fictitious narratives in prose, into two classes; the *romance*, in which the interest of the narrative turns chiefly on marvellous and uncommon incidents; and the *novel*, in which the events are accommodated to the ordinary train of human events, and the modern state of society.

Rise of novel writing in England.

The rise of this last department of fictitious composition in England, takes place about the commencement of the eighteenth century; and its coincidence with the decline of the drama is remarkable. The novel aspired, in fact, to perform for a reading and refined age, what the drama had done for a ruder and more excitable period; to embody the spirit of the times in pictures at once amusing and accurate, and in the form best calculated to awaken attention and interest in those to whom they are addressed. In the earlier periods of a national literature, while the poetical and imaginative spirit of the time takes the direction of the long prose romance, the task of painting manners, and satirizing follies, and displaying the comic oddities of character, is most efficiently performed by the drama. Its strength, terseness, and brevity, with the aid of action and scenery, present the manners living as they rise, with abundance of force at least, and probably, for a time, with sufficient fidelity. But as society becomes more decorous, and peculiarities of manners less marked, the pictures exhibited by the stage are apt to become less true; for dramatic effect appears to demand something more stimulating than reality affords; and hence the drama, with a pardonable leaning to the principle of stage effect, often continues to reproduce the manners, vices, and humours of a preceding age, long after they have ceased to exist, merely because they are found better adapted to that broad and strongly-coloured delineation in which it chiefly deals. Thus, though the age of Vanburgh, Congreve, and Wycherley, was probably not a very moral age, and the tone even of its polite conversation, would probably appear somewhat questionable to modern ears, there seems to be no reason to believe that the universal profligacy of manners, and boundless licence of conversation which are exhibited in the comedies of these writers, really characterised the period at which they wrote. Their Wildairs, Sir John Brutes, Lady Touchwoods, and Mrs. Frails, are conventional reproductions of those wild gallants and demireps which figure in the licentious dramas of Dryden and Shadwell. They represented the manners and the morals of an age gone by; and the audiences who tolerated these indecencies for the sake of the wit by which they were occasionally redeemed, would have been revolted by their exaggeration and incorrectness, if they had looked upon them as exhibitions of society as it existed. The drama, then, had ceased to be the mirror in which the age could contemplate itself, and exhibited the license of a masque, or the extravagance of a caricature, much more than the sobriety of actual life, or the fidelity of a portrait. Besides, there are many lesser traits of character, many sentiments and feelings, which are not at all dramatic, and which had therefore been overlooked by writers for the stage, yet in themselves highly interesting and curious, and capable, when judiciously employed, of exercising a strong influence on the feelings. These become more prominent, and stand out in brighter relief, as the restraints of civilization gradu-

The novel a substitute for the drama.

ally throw into the background the wilder passions and more stormy impulses of our nature, until they acquire an importance which not only justifies, but renders their introduction into any fictitious narrative which represents the peculiarities of the time, necessary; and for this purpose, the calm and even march of the novel, and the detailed development both of sentiment and incident which it allows, is found to be admirably adapted. It is in the works of our novelists, therefore, rather than our dramatists, and in those passages in our essayists of Queen Anne's time, in which they treat of past fashions, manners, whims, and humours, that we must look for the changes which society has undergone, and from which we must try to realize to ourselves the features which it exhibited at any particular period.

Fie of the vel wid than the ama.

The novel, then, affords a wider field for accurate and complete delineation of passions and feelings than the drama, and certainly one more in harmony with the dispositions of a modern public. In powerful effects no doubt it cannot compete with the stage. The whole range of novel or romance contains nothing, for instance, which in its tremendous impression, can be compared with the explosion of passion in the third act of Othello; but, on the other hand, it has greatly the advantage in the impression of verisimilitude which it leaves behind, produced by the accumulation of many particulars and minute traits of character; in pleasing interchanges of action and repose; in the delineation of emotions, which the drama, speaking only to the eye and the ear, cannot lay before us; in the descriptions of external scenery, which, in the hand of a writer of genius, are far more effective, when presented in words to the imagination, than when counterfeited to the eye upon the stage, even by all the united resources of the scene-painter and the mechanist; and which, from the strong connection which exists between the state of our feelings and external influences, are found in the hands of a judicious novelist, to afford powerful materials for deepening the pervading tone of sentiment which he aims to produce; just as in painting relief and effect are obtained by the tone and character of the background against which the figures are opposed. Another advantage obtained by the substitution of narrative fiction for the drama, was, that a much wider licence was obtained in the conduct of the plot. A good plot is no doubt as essential to the novel as the drama; but the kind of plot which may be used with effect in each, and the manner in which the incidents are to be conducted, differ materially. A play in which every scene does not grow out of the preceding, and lead directly into the next, with a visible progress of plot, is in that respect faulty. On the contrary, in the novel and romance, as in real life, much is admissible which is episodical, which does not directly help forward nor produce the catastrophe, but merely tends to bring out some point of character in the personages represented, or to increase the air of verisimilitude in the main story, by the appearance of minute and literal correctness in the details. In the novel or romance, too, it has been generally remarked that the catastrophe may be made to turn upon accident, but that this is inadmissible in the drama.[1] Thus the catastrophe in the *Bride of Lammermoor*, where Ravenswood is swallowed up by a quicksand, is singularly grand in romance, but would be inadmissible in a drama. And on the same principle, Schiller has, in his *Fiesco*, thought himself compelled to deviate from the actual truth of history, and to ascribe the Count's death, not to an accidental stumble from a plank, but to the hand of the republican Verrina. In a novel, the real catastrophe would have been far more impressive in its moral effect than the imaginary one; but Schiller held, and we think rightly, that in the drama nothing must be *accident*, but every thing *result.*

Blendin f the ovel an omance

Although, as compared with the romance, the term novel may be said to indicate a class of fictions dealing more with calm feelings, and with manners and humours, than with strong passions, and deriving its interest more from the probability than the marvellous nature of its incidents, this definition is not to be taken too literally; for there are many works which we might call novels, in as much as the scene is laid in modern times, and the general course of the incidents is that of every-day life, but in which the even tenor of the story is occasionally broken by scenes of powerful passion, or incidents of a mysterious and terrible character, elevating the composition for the time into the sphere of the romantic; so that perhaps the word tale, as a middle term between the others, would most appropriately describe them. It has been doubted whether, although such a union of the common-place with the extraordinary, be not unfrequently met with in the course of real life, a more cautious separation of these elements would not, on the whole, be most favourable to the effect of a narrative as a work of art; and whether the attempt to blend them, does not produce in fiction, something of that illegitimate effect which is the result of the melo-drama on the stage. It is certain, however, that the tendency for some time past, and particularly since the school of fiction introduced by Sir Walter Scott, has been towards a mixture of the novel and romance in the same composition, so that broad comedy is often found alternating with the pathetic, the gaiety of a ball-room with midnight murders upon lonely heaths, and the disclosure of some piece of fashionable scandal standing side by side with the discovery of some secret and fearful crime. In the hands of our great masters of fiction, we admit the fine effect which these occasionally produce. Judiciously arranged, these opposites are the light and shadow of the composition; but even in our greatest modern novelist, we could point out not a few instances in which this sort of contrast is carried too far; while in many of his imitators, it is so regularly and mechanically introduced, that, as in the case of Mr. Puff's stage arrangements, we can always predict that the discharge of cannon will be followed by soft music.

Mrs. Behn

Mrs. Heywood.

When the declining popularity of the pastoral and heroic romance of the seventeenth century, suggested the necessity of opening a new vein in fiction, it is probable that the stilted, unnatural, and exaggerated character of those effete compositions led the public taste, by a natural recoil of feeling, into the opposite extreme, viz. the selection of topics and characters from common, and even from vulgar life, and a literal adherence to nature, even at the risk of the sacrifice of art. For we pass over the tiresome and licentious love stories of Mrs. Aphra Behn, with the just remark of Sir Richard Steele, that the lady appears to have "understood the practical part of love better than the speculative," as well as those of her imitator, Mrs. Heywood, in which the struggle between the high sentimental character of the heroic romance, and the growing taste for a style of portraiture more true to the life, is very obvious, and come at once to the writer by whom the inspiration of reality was carried to its greatest perfection.

Defoe.

Defoe, (1661—1731) without high imagination, with no power of raising the passions, with little pathos and no eloquence, had yet that peculiar genius which enabled him to excel within the peculiar department which he chose for himself; that of counterfeiting homely truth by fiction, and forging, as it were, the handwriting of nature herself, with a dexterity which defied detection. Whether Defoe was led to the selection of his peculiar themes, by a real sympathy with roguery, (and his conduct in regard to the well-known imposture of Mrs. Veal's Ghost would justify us in believing him to be like Gil Blas, "tant soi peu fripon;") or by the influence of the Spanish romances of roguery, such as Lazaro de Tormes, Marcos de Obregon, and Gusman d'Alfarache, with some of which it is highly probable that he was acquainted through translations; or whether his strong vulgar likenesses of seafaring personages, half privateer, half mariner, and his fondness for the delineation of equivocal characters of all kinds, arose from his familiarity with the one class, through his residence at Limehouse, and his acquaintance with Dampier,—and with the other, from his long and frequent imprisonments;—it is certain that though he had no intention of favouring immorality, he yet enters upon the delineation of personages, and scenes of roguery, low profligacy and vice, with a degree of curiosity and complacency, and dwells upon them with a fondness and minuteness of detail, altogether uncommon, and not a little unaccountable in a person who in his opinions savoured of the puritan. This strange labour of love, and study of the morbid anatomy of society, has resulted in a series of night pieces from the haunts of crime, which, though sombre and gloomy in a high degree, and little suited to a cultivated taste, nay, indeed, frequently producing on the mind the painful effect of a real chapter from the *Newgate Calendar*, yet display the most wonderful invention and keeping in all their parts, and a coherence and dexterity of adaptation to each other, which render the ordinary tests by which we endeavour to discriminate a fictitious from a real narrative, inadequate or altogether inapplicable to these singular compositions of Defoe. Whatever might be the motive of his humility of choice, Defoe, like many of his favourite heroes, was perfectly contented to take up his abode in the back settlements of fiction, and was most at home in that Alsatia of Romance, the purlieus of which, by common consent, his more ambitious predecessors had sedulously avoided, as discreditable or dangerous. The transition from their refined Orondates' and Statiras', to the society of the *Captain Jack* and *Moll Flanders* of Defoe, is, to use a phrase of Sterne, like turning from Alexander the Great to Alexander the coppersmith. In his novels, we rarely meet with any thing more exalted or respectable, than masters of trading vessels, dealers in small wares, supercargoes, or, it may be, pickpockets, pirates, candidates for the plantations, or *emeriti* who have already obtained that distinction. In the foreground, we have the cabin, the night cellar, the haunts of fraud, or the round-house; in the distance, Newgate, or Execution Dock. There can be but one opinion, however, as to the wonderful air of veracity, resembling that of a deposition upon oath, which Defoe has imparted to his fictitious creations, and which his genius effects, mainly by accumulation of details, *non vi sed sæpe cadendo;* often even by the introduction of a multitude of irrelevant particulars and repetitions, just as in the conversation of uneducated persons in real life. Accordingly the result, as a simulacrum of reality, is one of magical deception. Lord Chatham, it is well known, took his *Memoirs of a Cavalier* for a real history; Dr. Mead believed his *Journal of the Plague* to be the work of a medical man, and his impudent but most plausible history of the apparition of Mrs. Veal, being received by many sober-minded persons as an actual apocalypse from the spiritual world, was the means, as is well known, of disposing of an unsaleable edition of Drelincourt upon death.

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[1] See some valuable papers on Art in Fiction, ascribed, we believe with justice, to Sir L. Bulwer. *Monthly Chronicle*, Nos. i. and ii.

Robinson Crusoe.

But notwithstanding this peculiar power of stamping the impression of reality upon the coinage of his imagination, which, to say the truth, was seldom of the finest metals, it may be safely affirmed, that but for his *Robinson Crusoe*, Defoe would scarcely now be remembered as a writer of fiction. The charm of that work, the first part of which appeared in 1719, is, that it emancipates us from those low haunts and questionable society with which his other novels make us acquainted. We escape from the fumes of tobacco and strong waters, to breathe a purer air on that lone island placed far amidst the melancholy main, where he has imprisoned his shipwrecked mariner; and while Defoe's unrivalled power of inventing a series of probable minutiæ, both in the way of reflexion and incident, enables him to conduct with consummate skill, what we may call the self-education of Crusoe in his solitude,—the process by which he adapts himself to his situation, and the gradual triumphs which, by his ingenuity and patience, he obtains over the difficulties and privations by which he is surrounded, till he changes desolation into comfort;—the imagination of the writer is visibly raised beyond its usual grovelling level by the romance of the situation which he describes. His genius imbibes the spirit of the place; it imparts to the cave of the sailor, something of the seclusion and purity of a hermitage; till the simple train of reflections which he puts into the mouth of his uneducated mariner, upon the sublimity and awfulness of solitude, impress the mind more than the most eloquent declamation. It is a fine proof how completely Defoe has succeeded in interesting us for the solitary being to whom he has given a poetical life, and attuned the mind of his readers to that sentiment of silence and unbroken repose which is breathed over the scene of his imprisonment,—"where all the air a solemn stillness holds,"—that after a time the least incident which threatens to disturb the security of the cave, or the solitude of the island, assumes importance in our eyes, and the groan of an old goat expiring in a cave, or the print of a man's foot in the sand, awaken a feeling of suspense and anxiety which many a writer has in vain laboured to excite by a prodigal expenditure of the machinery of terror.

That *Robinson Crusoe* may be considered in a great measure as a fortunate accident, and that its main charm arises from the more poetical and refined character which the nature of the story and its locality almost necessarily impressed upon it, is indeed evident from the visible inferiority of the second part, where the seclusion of the scene is broken in upon, and Defoe peoples the island with his usual retinue of planters and ship's captains; a production which scarcely rises above the level of his *Captain Singleton*.

The application of the same principle of producing effect by minuteness of detail rather than by grasp, or the selection of a few marking traits, is visible in our next great novelist, Richardson (1689–1761,) but the principle is applied in a different and higher way. Defoe was satisfied with weaving chains of probable incidents, which might be fitted to any character, or at least any character of a given class, such as a mariner or a merchant, a planter or a pickpocket. He did not care, at all events he did not labour, to individualize character. Crusoe, his most finished portrait, is still only the average representative of all shipwrecked mariners; his reflections and his struggles, embody the hopes, fears, and efforts, of all men left to maintain a solitary warfare with difficulties. So his Captain Jack, born a gentleman and bred a pickpocket, has nothing to separate him from other *enfans perdus* of the same class. But Richardson aspired to the creation rather of probable character than probable incident; and to this he applied the same system of accumulating minute traits of words, thoughts, and actions, and reiterating small touches, and minute lights and shadings, which Defoe had done to the creation of masses of coherent and plausible events. In the latter department, indeed, he is probably neither remarkable for success nor failure. Occasionally, and particularly in his *Sir Charles Grandison*, he outrages both patience and probability in no inconsiderable degree; and so little progress does the narrative make, that as Johnson remarked to Erskine, "Were you to read Richardson for the story, your impatience would be so fretted, you would go hang yourself." But even in the most successful portion of his plots, there is no chance of our mistaking fiction for fact; the artist does not disappear behind his creations as in the case of Defoe. The very form, too, in which his novels are cast, that of a series of correspondence, however favourable to the display of traits of character, and minute dissection of sentiment, is almost in itself fatal to the vraisemblance of incident. The affairs of private life we cannot help recollecting, are seldom managed to any great extent through the post-office, while in many cases it remains a mystery how such matters came to be committed to paper at all, and least of all under the circumstances in which they are supposed to be recorded by these persevering, and, in the existing state of the revenue laws, formidable correspondents.

There is in the mind of Richardson a very remarkable union of feminine tastes with masculine vigour. Early accustomed peculiarly to court the society of females; the depository of their gossip, the confident of their love secrets, the complete letter-writer of a little knot of young ladies when only thirteen years of age, the deference which he thus acquired for their tastes, and the insight he obtained into their habits of thinking, though probably springing, as Johnson believed, very much from his own vanity and love of praise, appear to have been of the utmost use to him in his novels, in which so much of the interest rests upon the female characters, and in the minute dissection and study of emotions and sentiments in which women are either the chief actors or sufferers. The traces of this influence appear constantly, and sometimes in excess, in the minute accuracy with which he dwells, in description, upon those little particulars of looks, and voice, and gesture, and turns of speech, which men in their correspondence generally overlook, but which women note with such care, and interpret with such sagacity; in the complacency with which he dwells on the details of robes and wedding dresses, which are conceived in the spirit of a waiting-woman, and executed with the learning of a man-milliner; and which, as in the minute description given by Lovelace of Clarissas' dress at the time of her elopement, are occasionally introduced in the worst place.

The more favourable results of these tastes are exhibited in the wonderful familiarity he evinces with the feelings and sympathies of women; for though, in his notions of perfection, either in manners or morals, we of another age often see cause to depart from Richardson's standard, we may trust implicitly to his accuracy, when he is delineating the movements of passion in the female breast, the revolutions of feeling, or the struggle between feeling and delicacy. In his female portraits even more than in his corresponding delineations of male character, we acknowledge the justice of the remark which Sir Walter Scott applies to his portraits generally, that "in his survey of the heart, he left neither head, bay, nor inlet behind him, until he had traced its soundings, and laid it down in his chart with all its minute sinuosities, its depths, and its shallows." This accuracy, indeed, constitutes at once his strength and his weakness; for not content with having surveyed the coast and taken its bearings, he still, from the very pride of discovery, insists on following the windings of the shore, and pointing out its landmarks, when those on board would have gladly seen him make his passage by the shortest course. It was the misfortune of Richardson, that, like nervous men in company, or like painters who go on retouching till the picture becomes loaded, he never knew when to have done, either with a character or a conversation. He was unskilful, as D'Israeli remarks, in the art of writing, and "could never lay his pen down while his inkhorn supplied it." Even as regards the description of sentiment, or the creation of characteristic dialogue, the field in which Richardson was most at home, it is certain that he carried his system, probably as much from this inability to leave off, as from choice, to extremes, particularly in his last novel, *Sir C. Grandison;* and unless the reader selects that work on the system of the old lady mentioned by Sir Walter Scott, who chose it because she could sleep for half an hour at any time during its perusal, and still find the personages just where she left them, conversing in the cedar parlour, he will probably think there is more justice than D'Israeli seems willing to admit in the cold remark of D'Alembert, "*La nature est bonne a imiter, mais non pas jusqu' a l'ennui.*"

It is not often that with this feminine character of intellect, a masculine vigour in painting scenes of a passionate and terrible cast is found united, and yet Richardson has proved his mastery over the higher passions, not less than his minute study of sentiment and manners, in the conclusion of *Clarissa Harlowe.* To apply to him the epithet of the Shakspeare of prose fiction, which has been done by D'Israeli, is extravagant. A solitary creation of this kind, highly pathetic and morally impressive as it is, is but a narrow basis on which to rest the claims of the novelist to such a title. But the conception of the noble character of Clarissa Harlowe, set off by such a foil as is afforded by that of Lovelace, perhaps the most finished picture of the self-possessed and insinuating libertine ever drawn, (and certainly as great an improvement on that of the Lothario from which it was drawn, as Rowes' hero had been on the vulgar rake of Massinger,) and the closing scenes of that novel, are at all events sufficient to place Richardson *among* the great writers of fiction; among the few who have formed a striking and original conception, which they have wrought out with a corresponding felicity and power. It is not the common-place idea of a woman of virtue foiling the schemes of a seducer, which Richardson has undertaken to illustrate: in the case of a lady like Clarissa, of birth, education, and good feelings, Mrs. Barbauld says truly, that would have been no triumph worthy of being recorded by such a pen; but it is the dignity, the deep interest, he has lent to the character, even in that situation of personal dishonour, with which, from whatever cause it has arisen, we are apt to connect the idea of degradation. "There is something," says Mrs. Barbauld,[1] "in virgin purity, to which the imagination willingly pays homage. In all ages something saintly has been attached to the idea of unblemished chastity, but it was reserved for Richardson to overcome all circumstances of dishonour and disgrace, and to throw a splendour round the violated virgin more radiant than she possessed in her first bloom. He has drawn the triumph of mental chastity; he has drawn it uncontaminated, untarnished, and incapable of mingling with pollution."

Clarissa Harlowe.

Pamela.

The other novels of Richardson, *Pamela,* and *Sir Charles Grandison,* are of an inferior order to *Clarissa. Pamela,* his first work, besides the questionable character of some of its highly coloured scenes, the license of which leads one to smile at the notions of morality entertained by that literary oracle who declared, "that if all other books were to be burned, Pamela and the Bible should be preserved," is justly liable to the objections pointed out by Mrs. Barbauld, that the heroine throughout her probation seems guided as much by worldly wisdom as by the love of virtue; that she acts like one who knows her price, and that her purity is protected more by the chance of securing a rich husband, and the prospect of "the gilded coach and dappled Flanders mares," which she sees in perspective, than by any idea that virtue is its own reward.

Sir Charles Grandison.

Least of all, is it possible to relish *Sir Charles Grandison,* a work written upon an entirely wrong plan; a system of pedantic morality put in action in the person of a formal, bowing, moralizing hero, "content to dwell in decencies for ever;" a hero whose worst trial, as Sir Walter Scott observes, is the embarrassment of choosing between two females, both handsome, accomplished, and in love with him; a gentleman who detests the theory of duelling on Christian principles, but reconciles the practice of it to his conscience, because his skill in swordsmanship always enables him to disarm his adversary without endangering the life of either; a principle which makes the morality not less than the prudence of fighting to depend upon a man's cunning of fence.

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[1] Richardson's *Life and Correspondence,* vol. i. Introduction.

Fielding.

Tom Jones

A strong contrast to the subtlety, the fine perception, and the power over the passions evinced by Richardson, is presented by his rival Fielding, (1707–1754,) who, with no command of the pathetic, no great share of wit, and no taste for that minute analysis of sentiment and wire-drawing of description in which our English Marivaux indulges, has yet maintained a more general and permanent popularity, by a combination of qualities well suited for the purpose. His grasp of observation led him to select with unerring sagacity, the leading traits of ordinary character, and to epitomize nature with skill, instead of transcribing her at full length. His field of delineation admits of such variety and contrast, that in fact it excludes none but the highest and most poetical elements, in which Fielding had neither power of observation or conception. His flow of animal spirits and healthy vivacity of manner, contrast strangely with the Dutch finishing of Richardson's pencilling, but are as well suited to the active, out-of-door scenes which Fielding loved to draw, in his pictures of imbroglios at ale-houses, and the stirring life of the road, as the pains-taking inventories of Richardson were to his still-life interiors, and the drowsy monotony of the occupations of their inhabitants. To these he added, at least in his great work, *Tom Jones*, the charm of a plot of unrivalled skill, in which the complex threads of interest are all brought to bear upon the catastrophe in a manner equally unexpected and simple, a grave humour, and power of quiet satire unmixed with caricature, in which he is equally superior to Richardson and to Smollett. And with his other requisites he combined a knowledge of English life, both in its better features and its deformities, by which we mean, of the essential qualities of men, as modified at that time by the accidents of situation, education, and pursuits,—the result, perhaps, of a long, and not always reputable experience,—to which Richardson, surrounded by a circle of female gossips, and weaving out his materials in his quiet back shop, purely from the stores of his imagination, can make but slender pretension.

Amelia.

Amelia, much as it was admired by Johnson, is greatly inferior to *Tom Jones*. If the tone of the latter be far from high, that of *Amelia* is creeping and vulgar in no ordinary degree. Booth has Jones' vices with an additional shade of meanness. Half the plot turns on the embarrassments of debt and contrivances to make both ends meet; and one or other of the characters is generally in a spunging house. Such, too, is the infirmity of human nature, that we really find it difficult to preserve a sufficiently romantic respect for the heroine, pretty and amiable as she is, when the saucepan is seldom out of her hand.

> " Nec tantum veneris quantum studiosa culinæ."

The finish is put to the whole by the accident which mars even the personal attractions of the heroine; for though the public were willing to regard Clarissa, after the outrage to her honour, with undiminished sympathy, it is certain they have not been equally indulgent to Amelia, after the misfortune of the broken nose.

We have already, however, in our biographical notice of Fielding, quoted so amply from Sir Walter Scott's critique upon his genius and works, that instead of pursuing an exhausted theme, we refer our readers to that article.

Smollett.

The name of Fielding always suggests that of his rival Smollett (1721–1724,) though, as writers of fiction, they rather admit of being contrasted than compared. They have, in fact, very few, if any, points in common; agreeing only perhaps in a preference for the delineation of the comic, or the common, over the impassioned and poetical. They chose different departments in novel writing, and they cultivated them by different means. As Fielding was the faithful and graphic painter of all the common features of character, so the extraordinary and the eccentric were the peculiar appanage of Smollett. He either did not feel sufficiently the charm of the natural in character, and its power of endless recombination in the hands of a great artist, or he doubted his own powers, at least in comparison with Fielding, of extracting novelty from such simple materials. But the sphere of humorous exaggeration appeared to be open to him, without the awe of a predecessor, or the dread of a rival; on that, therefore, he concentrated his powers of mind, neglecting in a great measure the other requisites of fiction; and undoubtedly with a success, which leaves him, within the province which he was the first to occupy, and with the occupation of which he was content, still the undisputed sovereign. No one has ever yet equalled him in the observation, or where that does not serve his purpose, the creation of oddities and exceptional characters which never did or could exist, but still with just enough of humanity about them, to give us an interest in their eccentric movements, or in the invention of combinations of burlesque incidents not always of the best odour, which his fertile fancy showers forth spontaneously as from a cornucopia; mistakes, rencounters, equivoques, whimsicalities of speech or action, all generally the best calculated to bring out in high raised and ludicrous relief the comic aberrations of the character represented, and to develope its latent madness; and never failing, at all events, to produce that result which Smollett seemed far more studious to attain than that of "purging the passions by pity or terror;" namely, the excitement of a broad-grin mirth, and " laughter holding both his sides." That the characters, where they have any decided features at all, are generally caricatures; for instance, that such commodores and lieutenants as Trunnion and Hatchway, never floated even under the primitive flag of Benbow; that the absurdities of Pallet are painted an inch thick; that by no human possibility could such an accumulation of comic disasters have befallen the characters of the tale, may, and indeed must be granted, even by Smollett's warmest admirers. But if, following Smollett's own example, we throw nature mainly out of the question, and look to what seems to have been his real aim, the objection of want of verisimilitude, while it may retain its truth, seems to lose half its force, and, we may add, wholly its power of conviction. It is in vain to point out the extravagance of the scene where Jolter, in an agony of terror, on hearing the direction given to put on the dead lights in the storm off Calais, goes through the steps of a mathematical proposition with infinite fervour, instead of a prayer; or to criticise the manœuvres of Trunnion, tacking his way to church on his wedding day in consequence of a head wind;—when the reader cannot see the force of the objection, through tears of laughter. In that consummation which he chiefly aimed at, and in which he rarely fails, Smollett has gained his end;—*solvuntur risu tabulæ;* the sense of the improbability of the conceptions is lost in the irrepressible merriment which they occasion.

Humour, then, was the quality in which Smollett felt himself strongest; character, incident, the excitement of the feelings, were obviously with him minor considerations. There is no difficulty in discriminating his style of humour from that of Fielding. Fielding's is calmer, chaster, perhaps of a higher kind than Smollett's, but it certainly has not its breadth, force, and felicity. As Smollett could hardly have created in its main features so gentle a humourist as Parson Adams, so he probably could have scarcely imagined a stroke of humour so delicate and appropriate to the character, as when the Parson offers to walk ten miles to fetch his sermon against Vanity, in order to convince his auditor of his total freedom from that vice. But neither, on the other hand, could he have imagined the feast after the manner of the ancients, the apparition of Pipes to the Commodore, the terrors of Pallet on learning the supposed conditions of his emancipation from the Bastille, or the ludicrous concatenation of mischances which beset the luckless inmates of the Inn in Flanders "doing or suffering." Some scenes of this sort, in which Fielding enters into competition with Smollett, such as those at the Inn at Upton, are among the least successful in his novels. The effort to raise the waters, the malice prepense in the preparation of the comic machinery, is too obvious; and after all, though he creates abundance of confusion, he raises but few smiles.

In another quality, though he has but rarely availed himself of his powers in this respect, Smollett far surpassed Fielding; we mean in his power of exciting the emotions of terror, or the sublime. From scenes of this kind, Fielding, knowing the prosaic turn of his own mind, and the limits of his invention, kept at a respectful distance; Smollett, who felt within himself the spirit of a poet, has occasionally ventured upon them, and with complete success. The robber scene in the old woman's hut in *Count Fathom*, though often imitated since, still remains one of the most impressive and agitating night pieces of its kind; and the sublimity of the situation on ship board, where Random sits chained to the poop during an engagement, covered with the blood and brains of the wounded, and screaming in delirium, has been often pointed out.

The morality of Smollett and Fielding is nearly on a par; with this difference, that the slight dash of generosity which is infused into the blackguardism of Tom Jones, while it renders him more natural, makes him at the same time more dangerous than the selfish and often ruffianly heroes of Smollett; whom we despise or dislike, even while laughing at the cruel frolics in which they indulge. The heroes of the latter are mere animals, good-natured or savage, as the fit strikes them; the heroines, with the exception perhaps of Aurelia Darnel in *Sir Lancelot Greaves*, the weakest of Smollet's works, have been justly described as objects rather of appetite than affection. In regard, indeed, to any thing like purity of morals, or gentlemanly feeling, the inferiority both of Smollett and Fielding to Richardson is obvious. Richardson sometimes mistook his means, but his aim was certainly always moral. On the contrary, both the theory and the practice of the justice were latitudinarian; and Smollett, though in real life a man of pure morals, had a boundless toleration in fiction for certain vices; for most, indeed, which did not imply want of spirit, courage, or pecuniary generosity.

In the unity of conception and coherence of incident which the plot of the novel, though more pliable than that of the drama demands, Fielding, in his two principal works (for *Joseph Andrews* was merely a parody on Richardson's *Pamela*) has a great advantage over Smollett, whose plots indeed in general scarcely deserve the name, being simply a series of strange accidents, odd rencontres, tricks and frolics, making little or no progress towards the only catastrophe which Smollett seems to have in view, namely, the marriage of his hero. In his *Roderick Random*, *Peregrine Pickle*, and *Count Fathom*, Smollett adopted the easy inartificial plan of *Gil Blas*, in which we are carried through a succession of scenes where the personages are constantly changing, and those who take part in the close of the story, are quite different from those by whom we are surrounded at its commencement. Fielding, on the contrary, both in his *Tom Jones* and *Amelia*, is singularly attentive to regularity of plan, and to the dexterous evolution and winding up of his plot, which he regarded as of vital importance. From the very commencement we perceive that he keeps his conclusion clearly in view, "and sees as from a tower the end of all." From this attention to symmetry, and tendency of all the incidents towards the catastrophe, his best work has been not inaptly ermed a prose epic; it is at all events a happy accommodaion of the principles of the epic, so far as they could be endered applicable, to the manner of the novel. One exeption ought perhaps to be made from this remark on the imperfection of Smollett's plots, in favour of that of *Humphrey Clinker*, in which the plot, though not of much art, is naturally evolved, and a quiet little family romance is gracefully combined with the usual gallery of oddities which Smollett never fails to lay before us. In all respects, this is the most pleasing of his performances. While Lesmahago may rank with the very best of his extravagances, there is more of character and less of caricature in the testy, yet kind-hearted, Matthew Bramble "frosty but kindly," than in any personage he has painted; and though the humour, as usual, is dashed with filth, without a *soupçon* of which indeed Smollett seems always to have thought it wanted pungency, the tale is entirely free from that indecency which deforms both *Roderick Random* and *Peregrine Pickle*. We rather think, too, that Smollett had the merit of originating in this novel that species of the humourous which arises from bad spelling, and which Sheridan afterwards applied to mistakes of words in his Mrs. Malaprop; a humble kind of humour no doubt in itself, yet capable, as Smollett has proved, of powerfully aiding the ludicrous effect.

Sterne.

Equal genius, though far more deformed by affectation, is visible in Sterne, (1713–1768) the first two volumes of whose *Tristram Shandy* appeared in 1759. If a regular progress of incidents towards a catastrophe, were an essential requisite in a novel, it would be difficult to bring the works of Sterne within the protection of that definition. Story he has none to tell; at all events he tells it not. But, "what is a plot good for," says Bayes, "except to bring in good things," and Sterne adopted the theory of the dramatist in its full license. At the conclusion of the eighth volume, Tristram is not emancipated from the nursery, and had Sterne lived to fulfil his threat of carrying on his work, by the aid of a vegetable diet, through as many more, the Tristrapædia, we fear, would still have made no material progress. Sterne's singular work owes its interest, as every one knows, not to the narrative, which is broken and interrupted by cross currents of the most wayward and whimsical description, far exceeding all the fair license of digression, but to his power of seizing on and bringing forward into distinct consciousness, as Coleridge says, some of those points on which every man is a humorist, and to the masterly manner in which he has brought out the characteristics of two beings of the most opposite natures, the elder Shandy and Toby, and surrounded them with a group of followers sketched with equal life and individuality: in the Corporal, the obstetric Doctor Slop; Yorick, the lively and careless parson; the widow Wadman, and Susannah.

The clue which Sterne chiefly follows through the mazes of character, is humour;—humour of a very high and peculiar kind, perfectly original, at least in English. For that species of riotous humour arising from comic peculiarities of person, and combinations of ludicrous mischances, Sterne has little taste; though the admirably painted scene, where Obadiah on the cart horse, careering round the corner like a comet, oversets Dr. Slop in a whirlpool of mud;—and the cross bills filed by the Doctor and Susannah against each other in applying the cataplasm, show, that if he had considered this the highest walk of humour, he might have revelled in it as easily as Smollett himself. But, like Fielding, he preferred the humour which arises from bringing out by light and happy touches, and as if unconsciously, the secrets of character; only with this difference in his favour, that with Sterne the humour is steeped in sensibility. Flowing, as it does, as much from the heart as the head, it speaks also to the affections; calm smiles ripple over the countenance as we read, but tears are in the next degree. Thus, in Sterne, humour and feeling heighten and set off each other; the pathetic rises in gentle relief out of the background of the comic, and sinks gracefully and imperceptibly back into it again. It is this, for instance, which gives so irresistible a charm to the story of Le Fevre, and the Corporal's account in the kitchen of the death of Tristram's elder brother, enforced by the eloquent stroke of dropping the hat, as if a lump of clay had been kneaded into the crown of it. There is nothing sneering, nothing unkindly, nothing that revolts the better feelings in his playful irony. *Circum præcordia ludit.* That of Swift and Voltaire is blighting like an east wind; the sympathies of the heart close themselves up against it; but beneath the genial and balmy humour of Cervantes and Sterne, they relax and blow like flowers expanding beneath the west wind in spring.

The wonderful resources of characteristic invention, and the very finest perception of the limits of true humour, are shown in the contrasted characters of the two brothers, the main personages in the history; the man of pure intellect, restless, nervous, eloquent, hair-splitting, half-crazed by learned theories, which he insists on carrying into action, craving sympathy, and yet courting discussion, as delineated in the elder Shandy; and the man of pure good nature and benevolence, as drawn in Toby; without learning, with no head for reasoning, but with a heart always in the right place; eloquent too, in his way, when his feelings are touched, or his favourite pursuits depreciated, (witness his animated and beautiful defence of his reasons for prolonging the war) chaste as a woman, gentle, harmless and credulous as a child; riding his hobby, in short, in so captivating a manner, that, if the truth were told, most of his readers are in their hearts inclined to mount along with him. There are few, we suppose, who have not been seduced into something of his own mania by the scene on the bowling green, when he discovers the ingenious invention by which Trim, having converted the jackboots into mortars, is directing a hot fire from these engines against the counterscarp of Lisle; when the tobacco pipes, withdrawn from the mouth of the corporal, are gradually insinuated into his own, merely to try them; and puff succeeds puff, till the enthusiast is swept into the torrent of a furious cannonade. Nothing, too, can be at once more humourous or characteristic than that scene where Toby mistakes the elder Shandy's quotation from Sulpicius' consolatory letter to Cicero, for a real account of his brother's trip to the Levant, a stroke of humour so natural in the circumstances, and yet so original, that it would of itself be sufficient to prove that Sterne was a man of genius.

The two great defects of Sterne, as noticed by Sir Walter Scott, are his affectation and his indefensible indecency. For his plagiarisms from other authors, we regard as of little importance. So ingeniously are they turned to account, and so much in general does Sterne improve what he borrows, that he may fairly claim in them that right of property which the civil law allowed in articles where the labour bestowed by the borrower exceeded the intrinsic value of the material on which it was bestowed. It must be confessed, however, that few writers have carried their coolness and assurance in this respect so far as Sterne has done, who, not content with denouncing the plagiarisms of authors, has actually stolen from Burton the passage in which he exposes the iniquities of his neighbours.

But the other objections less admit of defence. The affectation of Sterne is the more to be regretted, because his manner in its happiest moods is the very perfection of a lively, spirited, spoken style, idiomatic, imaginative, pliant, and varied. "Writing, when properly managed," he himself observes, "is but a different name for conversation." Unfortunately he did not always conform his practice to his precept. He is sometimes *fade* in his sentimentality, and aiming after a sort of false sublime in his imagery. Some portions of the story of Maria are examples of the first; the well-known personification of the recording angel in the close of Le Fevre, is an instance of the second. Still more unworthy of Sterne are those quackeries of the black page and the white one, the sudden transitions and affected openings of the chapters, with other harlequinades of authorship, which are carried to excess in *Tristram Shandy*.

The indecency of Sterne is more obtrusive and indefensible than that of either Fielding or Smollett; whose highly-coloured scenes seem to be the result of an unchecked imagination, running on heedless whether its course lie through purity or filth. Sterne, on the other hand, goes coldly and deliberately in search of impurity; seeks for it in books, refines upon it, mixes it up with his reflections, and is continually insinuating some equivoque or double entendre into scenes where we can ill bear with such adulteration.

Richardson, Fielding, Smollett, and Sterne, are the four great novelists of this period (the reign of George II.) which was pre-eminently the age of novel-writing in England. For though we should indeed be sorry to undervalue the merits of Goldsmith, or the charm of his *Vicar of Wakefield*, we cannot quite rank the powers displayed in that delightful little tale, which appeared in 1763, so highly as the varied invention displayed by the writers we have named, upon the broader canvass which they selected. To use his own words, it has many faults, and a hundred things might plausibly be said to prove them beauties. Fortunately, they lie more in the minor parts, than in the essentials of the tale. In fact, the improbability of the plot is only equalled by the wonderful truth, nature and keeping of the principal character, for the "limæ labor" which, in this instance, Goldsmith willingly bestowed upon his style, and on the creation and apposition of traits of character, he scrupled to waste upon the selection of his incidents. The real interest lies in the development in the character of the amiable Vicar, so rich in heavenly, so poor in earthly wisdom;—possessing little for himself, yet ready to make that little less, whenever misery appeals to his compassion;—with enough of literary vanity about him to shew that he shares the weaknesses of our nature,—ready to be imposed upon by cosmogonies and fictitious bills of exchange, and yet commanding, by the simple and serene dignity of goodness, the respect even of the profligate, and making "those who came to mock remain to pray." Doubtless, the probability and look of life which a character drawn with such quiet strokes of the pencil, and with such sobriety of colouring, possesses, is in some measure owing to the fact, that not a few of the incidents of which Goldsmith has availed himself, are drawn from circumstances in his personal history, such as the mistake of setting out to teach the French English, without recollecting that it was a necessary preliminary for the tutor to acquire a little French himself; but the skill which can make such trifles in real life subservient to the purposes of real fiction, is scarcely less worthy of praise than would have been their original invention. Perhaps there is no better proof of the broad and general truth of delineation which a novel possesses, than our being in the habit of resorting to it in conversation for cases in point, and comic illustrations of our opinions. In this respect the *Vicar of Wakefield* forms a storehouse of allusion. How naturally does any ridiculous investment in Mexican mines, or Spanish stock, recall to our recollection Moses' bargain for the gross of green spectacles? Who is there that has not been reminded of the aristocratic Miss Skeggs turning out to be no better than she should be, notwithstanding her intimacy with the Duchess, and her taste for Shakspeare and the musical glasses, by some case of the same kind within our own experience, where, reversing the denouement of the Double Arrangement, the Knight Templar of the company has sunk into the waiter? And for our own part, we must admit, that we have never been able to treat with due gravity any allusion to the learned speculations of Manetho, Berosus, or Sanconiathon, from their indissoluble connexion in our minds with the more finished cosmogony of Jenkinson.

In one respect Goldsmith rises conspicuously superior to his brethren; he has no passages, which, dying, he need have wished to blot, and his characters and his incidents are all calculated to call forth only the better feelings of our nature. *Virginibus puerisque* might have been his appropriate and uncontested motto.

The great novelists to whom we have alluded, and particularly Fielding, Smollett, and Sterne, had of course many imitators. But the minuteness of Richardson was found to be intolerable in any hands but his own, and his manner in this country at least, though not in France and Germany, was soon abandoned. Amongst the numerous imitations of Fielding's manner, most of which are now forgotten, the *Henry* of Cumberland (1752–1811), is probably the most respectable. Cumberland possessed that degree of talent which enabled him, both in dramatic composition, and in the novel, to produce performances which are read with pleasure, though they seldom rouse our interest, and never impress us with the idea of a creative genius. Accordingly, both his *Arundel* and his *Henry* have enjoyed a fair measure of popularity, particularly the latter, in which a story of tolerable interest is made the vehicle of displaying considerable acquaintance with English life in the lower ranks, derived from Cumberland's familiarity with such scenes in his early residence in Kent,—while the homeliness of these pictures is relieved by many rural landscapes perfectly English. The tale has the fault of *Pamela*, that aims at teaching virtue through scenes that border very closely on vice; while, as Sir Walter Scott remarks, Cumberland reverses the usual process of courtship, and "throws upon the softer sex the task of wooing, which is more gracefully as well as naturally the province of the man." The characters have little novelty; Cumberland was indebted for them to *Joseph Andrews*, and he took the idea of his plan and style from *Tom Jones*. Henry is another version of Joseph himself, which Cumberland somehow seems not to have perceived to be a caricature created in the mere spirit of parody; but the portrait of an amiable, enthusiastic, and yet absurd Methodist parson in *Ezekiel Daw*, has an air of originality, even when placed beside that of Parson Adams, by which it was obviously suggested.

The imitations of Smollett's manner were not numerous, and, with one exception, totally without merit. We allude to *The Adventures of a Guinea*, by Charles Johnstone, which appeared in 1761, in which a series of scenes and personages in different walks of life are brought before us through the somewhat inartificial method of making a coin, which shifts through the hands of successive proprietors, the historian of their follies and their vices; a contrivance very inferior indeed to the ingenious machinery by which Asmodeus unveils to Don Cleofas the secrets of Spanish life. In *The Adventures of a Guinea*, the author seems to have had before him both Le Sage and Smollett as models; but in the result he exhibits little of the gay good-humoured touch of the Frenchman, and nothing of the cordial merriment of the Scotchman. Where Le Sage painted follies, and Smollett frolics and absurdities, Johnstone, on whom some have conferred the high title of a prose Juvenal, delineated with a sarcastic and energetic brevity, the darkest vices and crimes of an age in which both political and domestic profligacy prevailed, and were paraded abroad with no ordinary degree of assurance. "In Johnstone's time," says Sir Walter Scott, "the reform which was introduced by the private virtues and patriotism of George III. had not commenced; and he might well have said, with such an ardent temper as he seems to have possessed, 'Difficile est satyram non scribere.' He has accordingly indulged his wit to the utmost, and as most of his characters were living persons, then easily recognised, he held the mirror to nature even when it reflects such horrible features. His language is firm and energetic; his power of personifying character striking and forcible, and the personages of his narrative move, breathe, and speak in all the freshness of life." This is high, and indeed we think, with deference, exaggerated praise. Who remembers or can name a single character which Johnstone has drawn, except perhaps his forcible but odious caricature of Whitefield? What scene of real interest or passion has he painted in such a manner as to give it a home in our memories, like the better scenes of Fielding or Le Sage? Not one: and indeed, bad as the age which he painted was, we believe he has greatly exaggerated its vices, or at least his one-sided views have led him to keep out of sight its redeeming points and countervailing virtues. Hence the impression the book leaves on the mind is one of oppression. It leads us along all the gloomy, and foul, and noisome passages of life, and we escape from it with the feeling of relief with which we would emerge from a vault in which the air was loaded with noxious vapour.

Mackenzie.

Sterne is perhaps the only one of our great novelists who has found an imitator of genius, in Mackenzie (1745–1831); for although in his *Man of the World*, and *Julia de Roubigne*, Mackenzie has deviated from the manner of Sterne, and formed a composite manner, in which the characteristics of several writers are blended with his own, yet there can be little doubt that the spirit of Sterne, in his pathetic passages, in a great measure inspired *The Man of Feeling*, and prompted that "illustration of the richer and finer sensibilities of the human breast," which Sir Walter Scott points out as the "key-note" on which he formed his tales of fictitious woe. In some obvious respects, no doubt, Mackenzie improved upon his model; as in rejecting the licentiousness of Sterne's wit, retrenching his episodical digressions, his numerous impertinencies, and intrusive buffoonery, and keeping the strain of feeling which he wishes to create more unbroken; but as writers of genius, there surely can be no comparison between them. Mackenzie has none of those charming touches which hover with such a fine ambiguity between the pathetic and the humorous,—like Toby's opening the window, and liberating the fly which had been buzzing about him all day,—and which operate, like spells, upon the heart. We fear, then, that the spirit of nationality, and the bias of private friendship, has led Sir Walter Scott somewhat to exaggerate the claims of Mackenzie, who, if he has less affectation in mere manner and style, seems to us to have more affectation of feeling than the author of *Tristram Shandy*. In fact, Mackenzie betrays in some passages of his novels a tendency towards that unhealthy sentimentalism which was afterwards carried to such a sickly excess by inferior imitators of Sterne. Such is certainly the case in what is commonly considered the most powerful, though, we think, the least pleasing of his works, *Julia de Roubigne*. No doubt, if the chief aim of fiction were "to send the hearers weeping to their beds," Mackenzie might claim the merit of having attained it. But though the distresses of the story may be in themselves naturally pourtrayed, the constant monotony of melancholy which it presents to us is not so; it is morbid and out of nature, and the feeling with which it is perused, which is that of exhaustion and uneasiness, shews that the writer has missed the great aim of fiction, which is to make even suffering minister to a soothing feeling of sympathy, and to leave upon the mind at the close a sentiment of consolation.

The Man of the World is exposed in some respects to the same objection. The suffering, the accumulation of misfortunes which are heaped upon the innocent Anneslеys, through the heartless villainy of Sindall, are too unmitigated. The story wants repose, relief, and sunshine. It is like an avenue of cypresses terminating in a tomb. *The Man of Feeling*, the first of Mackenzie's productions, is, after all, the best. It is more unlaboured than the others, has more of the first freshness of the author's mind about it; and its brief manner, and quicker succession of situations,—for they can hardly be called incidents, relieve it from that sombre uniformity which, in his larger novels, produces such a depressing effect.

Dr. Johnson.

The *Rasselas* of Dr. Johnson (1709–1783), though it wears the form of a tale, has but slender pretensions to be included amongst the class of novels, for it has neither progressive incident nor character. It is a series of dialogues and moral reflections, very solemnly and beautifully written, tinged with that tone of mournfulness and despondency so likely to be the prevailing feeling of his mind in the composition of a work intended to defray the expenses of a mother's funeral. *Rasselas* is, in fact, the *Vanity of human wishes* in prose; and its incidents, if such they may be called, have even less pretensions to connected interest than those of *Candide*, to which it may be regarded as a moral and philosophical antithesis.

Judging, indeed, from *Rasselas*, and from the other writings of Johnson, it may be safely assumed, that his success as a novelist would not have been much greater than as a dramatic poet. He has nowhere shewn the least power of creation, by stepping out of himself, and putting on by the force of imagination the nature of others. Through the disguise of all the successive characters which he is obliged to assume in the *Rambler*, the sturdy, controversial, and somewhat pompous moralist stands confessed; and whether he writes as a fine lady, a fop, a blood, or an elderly gentleman, still, like Puck, "we know the man by the Athenian garments he hath on." Independently of this, his views of life would certainly have been untrue, inasmuch as they were one-sided. Far from being disposed "to make the happiness he could not find," the tendency of his mind,—in consequence, perhaps, of a constitutional melancholy,—was rather to unmake and neutralise the elements of comfort by which human life, in the average, is surrounded. Had he devoted himself in earnest to fictitious composition, he would have lent his eloquence and power of forcible statement, to shape the world of romance according to the gloomy fashion which the reality presented to his eye; and in an inky coat, indeed, or a drab-coloured suit at best, very unlike the peach-blossom of his friend Goldsmith, he would in all probability have arrayed it.

Horace Walpole.

About 1769, we witness the revival, though in a new shape, of the old taste for Romance. The delineation of life as it actually existed, was found to afford too little scope to minds who aspired after the imaginative and poetical, and who could not see why natural delineation of character and manners might not be combined with striking events, and with the picture of the higher passions; why, as Walpole expresses it, in his preface to the *Castle of Otranto*, "the fancy might not be left to expatiate through the boundless realms of invention, and thence to create more interesting situations, while the mortal agents in the drama still conducted themselves according to the rules of probability." In the first shape, however, in which romance reappeared, after this temporary slumber, the delineation of character occupied, it must be owned, but a very subordinate place. A little more attention was given to verisimilitude of manners, and much was done to abbreviate the tedious style of the old prose romance, and to throw life and movement into the narrative by dialogue, and by the omission of unimportant incidents not bearing on the catastrophe; but the main efforts of our first modern romance writers were directed chiefly to the excitement of that feeling of love of the marvellous which exists more or less in every human breast. They chose for their favourite themes the varieties of the supernatural.

> "Somnia, terrores magicos, miracula, sagas,
> Nocturnos lemures portentaque."

We admit that the author of the *Castle of Otranto* did not trust exclusively to such materials of interest. But granting that the general outlines of "his feudal tyrant, his distressed damsels, his resigned yet dignified churchman," are sufficiently correct, we are at a loss to perceive in any of his characters that individuality which gives to such pictures their chief value. To us they seem light, sketchy, and somewhat vague, although we think it quite possible that the effect produced by greater truth and distinctness of feature in the mortal agents of the piece, might not have harmonised with the extravagant demands upon the imagination which the author makes by his supernatural machinery. We agree with Sir Walter Scott, in thinking Walpole acted with judgment in leaving his machinery without those attempts at explanation introduced by Mrs. Radcliffe, always inadequate, and even throwing an air of ridicule over the mysteries of the piece upon a second perusal. But we cannot concur with him in his toleration of the extent to which Walpole has carried the marvels and improbabilities of his romance. The apparition of Alfonso in the moonlight, dilated to a gigantic form, is impressive, and in certain moods of the mind even the skeleton ghost in the hermit's cowl may have its terrors. But Clara Reeve was certainly right in the protest which she enters in her preface against the introduction of such machinery as that of a sword so large as to require a hundred men to lift it; a helmet that, by its own weight, forces a passage through a court yard into an arched vault, and crushes a boy to death; or a picture walking out of its frame. The effect of such violent instruments of terror is suicidal; they destroy the very feeling they were intended to create, and give to the romance the air of a nursery tale. Indeed, were it not for the singular charm of the style, which, like all Walpole's compositions, is of the purest and most idiomatic English, and terse and condensed in a very high degree, we feel persuaded that the *Castle of Otranto*, although the first specimen of the modern romance, would at the present day find few admirers.

Clara Reeve.

In some respects, then, we think the *Old English Baron* of Clara Reeve was an improvement on the *Castle of Otranto*. For there the marvellous was brought within some limit of proportion; "the extravagant and erring spirit hied to his confine," and, consequently, so far as regarded the creation of an impression of superstitious terror, or giving an air of probability and keeping to her narrative, we must admit, that her ghost of Lord Lovel, who is always exhibited under the obscurity of a dim religious light, did, in our youthful days, produce upon us a certain species of awe. In other respects, we rather fear the apprehension which is expressed in her preface, namely, that in avoiding the defects of Walpole, the spirit of his wild composition might evaporate, was not altogether without foundation. The style of the narrative in her hands became heavy, often dry and vulgar, like the ancient chronicle she professes to follow; her dialogue is peculiarly flat and cumbrous, and the plot deformed, and rendered tedious by trifling incidents which now appear to us needlessly homely; and yet the strong interest with which, as we can state from experience, this romance is perused at an early age, is a proof that in the cardinal point of exciting curiosity, and a feeling of mysterious interest, the ruder narrative of Clara Reeve effects, in a great measure, what all the liveliness of style, the deeper antiquarian reading, and more creative fancy of Walpole, failed to attain.

Mrs. Radcliffe.

But this species of romance writing was probably carried to its perfection by Mrs. Radcliffe (1764-1823), who, in her own walk of fiction, has never been excelled, though opinions may differ as to the comparative rank which she holds among writers of fiction, and also as to the soundness of that principle of composition which led her systematically to unravel her own spells, and to attempt an explanation by natural means, of effects which we had at first been encouraged to refer to the agency of supernatural causes. Indeed, we might rather say, that, in regard to this last point, there is no room for doubt, and that this system of explanations is exposed to every possible objection;—as totally inadequate in general, to account for the effects ascribed to it; as running counter to the whole tone of sentiment created up to the period of explanation,—as disappointing the pride of the reader, who feels offended at the thought that he has expended so much anxiety and terror on a mere "painted devil," and a succession of mockeries; and is consequently annoyed at this common-place anticlimax, after his nerves have been tuned for grand wonders, instead of the discovery of paltry images of wax-work. Indeed, it is one of the strongest proofs of the redeeming genius which Mrs. Radcliffe has thrown into her tales, constructed, as they are, upon so unsatisfactory a plan, that they bear a second perusal at all; or that having discovered in one or two cases the inadequate and puerile nature of what appeared at first so appalling and formidable, we still feel eager for the solution of the remaining mysteries, and can hardly persuade ourselves but that something strange and fearful does lurk, after all, within her deserted chambers, and beneath her faded tapestry.

It is the more to be regretted that Mrs. Radcliffe adopted this principle, because all the excellencies of her peculiar genius might have been displayed with equal effect, if she had chosen a more satisfactory plan of composition. Why she should have hesitated to admit of an actual spiritual agency, it is difficult to discover. Fear, when its object is something corporeal, is no doubt the basest and vulgarest of feelings. But when its source lies in the invisible, and when we shrink at the thoughts of the visionary and the eternal, it puts on the character of sublimity. Standing, as we do, on the confines of a dim eternity, which we believe but cannot see, the feeling which prompts us to a communion with the world of spirits, and yet makes us shrink and tremble at our own daring, exists to such an extent in all minds, and not the least in the most heroic, as to afford a basis on which high imagination may always operate with effect, so as to justify the artful use of the supernatural. We say the *artful* use, for every thing depends on the skill with which such machinery is used, the address of the preparation, and the judgment with which the accessories and the background are selected. Who feels the slightest symptom of awe when the shade of Amphiaraus appears before the assembled people to forbid the banns between Eriphyle and Alcmæon, or that of Ninus emerges in broad day from the tomb, in Voltaire's *Semiramis?* Who does not,—at least in reading the play,—experience a pleasing thrill of fear, when, in the depth of a December night, with the sea moaning behind, and the bell then beating one, the majesty of buried Denmark advances with spectral stalk along the platform of Elsineur? We grant there has been few successful attempts in modern times to keep up the interest of a story turning upon machinery avowedly supernatural, but we are far from thinking that such an attempt might not, even yet, in our days of illumination, be made by a man of genius, so as to move the pulses of terror with complete success.

But besides the actual field of the supernatural, there are many equivocal phenomena in our nature, lying within that debateable land where mind and body meet, such as dreams, omens, and presentiments, which admit of being referred by he mind, in an excited state, to supernatural causes, and which may be employed with powerful effect by writers of fiction, without the possession of that creative genius and knowledge of the human heart which are required to present the sheeted dead in a shape and garb of terror calcuated to impress and awe the imagination. And such, in fact, is the diluted shape in which the supernatural is generally presented by our modern romance writers.

From all these sources of emotion, Mrs. Radcliffe has unfortunately excluded herself by her system of sufficient reason founded on natural causes. And yet it is wonderful what a magical power she exercises within the field to which she restricts herself. No one ever seems to have nderstood better the art of preparation, the attunement of the mind to the key of the supernatural, by a long train of half-heard sounds, and glimpses of sights, which the fancy, amidst night and silence, works up for itself into images of things which it fears to contemplate.

> Like one that on a lonesome road
> Doth walk in fear and dread;
> And having once looked round, walks on,
> And turns no more his head,—
> Because he knows a frightful fiend
> Doth close behind him tread.

And perhaps the strongest proof of her judgment is to be found in the economy and reserve with which she employs the talisman of terror. In her hands slight circumstances and half hints are made to produce all the effect of fearful witcheries or scenes of bloodshed and horror. The clang of a distant door, a footfall or a track of blood upon a staircase, a strain of music floating over a forest, a figure pacing a platform in silence, some wandering voice following us, "with airy tongue that syllables men's names," through the passages of a decaying chateau, the heaving of the tapestry of a bed in some deserted chamber, nay, at last a very rat behind the arras, become invested with a mysterious dignity, and work upon the imagination like spells. The disappearance of Ludovico, for instance, in the haunted apartment of Chateau Le Blanc, where he had undertaken to watch, prepared as it is by a train of little details which act upon the nerves, and by the masterly ghost story of *Bevys of Lancaster*, which he is represented as perusing, may be safely pointed out as a *coup de maitre* in the art of raising to its highest pitch, the feeling of curiosity and suspense.

Whether Mrs. Radcliffe possessed much power of painting character seems doubtful; it is at least certain she has shown but little. In such calculations of probability, we can only use Sebastian's words.—"What *had been* is unknown, what *is*, appears." She seems indeed to have borrowed a hint from Bayes, which like many other remarks of that worthy, have more good sense in them than was perhaps apparent to the noble parodist, and purposely to have "underwrit some parts in order to set off the rest:" in other words, she has systematically kept the delineation of her characters subordinate to her main object, the maintenance of a mysterious curiosity, which never *is*, but always *is to be* gratified. Her tales, indeed, would have probably gained little by greater discrimination in this respect, if in truth the species of interest produced by the natural would not have rather interfered with that arising from the marvellous. For her object, it was sufficient that as the representatives of classes, rather than individuals, her personages should be sketched spiritedly but lightly; that the straight-laced heroine in white satin, should be duly supported by the gossiping waiting woman in white muslin, and that the bandit chief of the Appenines, the hired robber, the scowling monk, or the chattering peasant should wear with a natural air the outward and conventional badges of their calling. The nearest approach she has made to character, is in her Schidoni, whose outward appearance is most picturesquely and impressingly described, while the inscrutable mystery which at first hangs over the inward man, the dark hints which are dropped concerning him by others, and the gradual revelation of his designs in his conversations with the Marchioness, powerfully stimulate our interest, and make us follow all his actions with an instinctive feeling of alarm. The misfortune is that even in this, the most finished of her portraits, the Schidoni of the second is really not the Schidoni of the first portion of the tale. When "the father softens," the confessor unfortunately can no longer "remain fixed;" when he ceases to be the mere evil spirit of the romance, puts on the look even of a guilty humanity, and turns out to be simply "a bold bad man," he loses his identity, and with that his influence over the imagination.

Mrs. Radcliffe may claim the merit of being the first to introduce landscape painting into her romances as a component part of the interest of the piece. The frequency of her pictures of external scenery, and their want of distinctness and local truth, have indeed been blamed by many who would willingly, on Puff's principle, have abridged her descriptions of the rising sun, and dispensed with a great deal about gilding the eastern hemisphere. But it is certain that these descriptions, though occasionally tedious, and sometimes too obviously brought forward upon a principle of melo-dramatic contrast, have a powerful effect in heightening the impression communicated by the incidents or the sentiments. Set off against the calm beauty of a summer evening, or the magnificent gloom of a thunder storm, her pastoral or banditti groupes stand out with double effect; while to the charge of vagueness of description, it may be answered, that Mrs. Radcliffe is by no means vague, where distinctness of imagery is, or ought to be her object; as any one may satisfy himself who recalls to his recollection her description of the lonely house by the Mediterranean, with the scudding clouds, the screaming sea-birds, and the stormy sea, the scene selected for the murder of Ellena;—or another picture, in the best manner of Salvator, of the first glimpse of the Castle of Udolpho rising over a mountain pass, with the slant sunbeam lighting up its ancient weather-beaten towers. Indeed, the whole description of that Appenine fastness, both without and within, is in the best style, not of literal indeed, but of imaginative painting—"fate sits on those dark battlements and frowns:" the very intricacy of its internal architecture, and its endless passages,—a mighty maze, and we fear without a plan,—only serve to deepen the impression of imprisonment and bewilderment and gloom.

Less, certainly, is to be said for those descriptions in verse with which her novels are rather profusely interspersed, and which are, of course, represented as emanating from some of the personages of her stories. Without denying the merit of some of her occasional verses, it is certain that she always shews more of the spirit of poetry in her prose. Indeed, independently of the mediocrity of many of these effusions, they often assume a ludicrous air from their contrast with the circumstances under which they are produced. Under all situations of alarm and anxiety, in the seclusion of convents, and in the castles of Condottieri, where drunken ruffians are brawling "along the corridor," paper, pencils, and poetical enthusiasm are never wanting to her heroines, and the sun is seldom suffered to rise or set without a tribute to his beams. Indeed, it is even observable that the poetical sensibilities of her heroines generally become more lively after any domestic calamity, such as the demise of a parent; as Beau Clincher's exuberance of spirits was accounted for by the fact, that he was in mourning for his father.

For a particular notice of the individual works of Mrs. Radcliffe, we refer to our biographical article on that subject. Two of them are now wholly and deservedly forgotten. Neither the *Castles of Athlin and Dunbayne*, nor the *Sicilian Romance*, crowded with violent yet ineffective incidents, gave any indication of that ability which she afterwards displayed. Of her remaining fictions, it may be said in a word, that the *Romance of the Forest*, founded on a French *cause celebre*, has the fewest faults; that the *Italian*, though extremely unequal, and in the third volume a comparative failure, contains the most striking and dramatic scenes; but that the *Mysteries of Udolpho* is on the whole, and justly, considered the best.

To be fully enjoyed, the Romances of Mrs. Radcliffe must be perused in youth. In after age, they appear too uniformly visionary, and the straight-laced stiffness of her heroines, who never manifest the least warmth except in poetry, "female punctuation not permitting them to do more," as Mrs. Malaprop observes, suggests the recollection of the pruderies of the pastoral and heroic romance. But when these tales are read in youth, and only remembered in manhood in their better portions, they leave upon the memory a pleasing impression of a varied pageant of gloomy castles and caves, moon-illumined streets and palaces, "dance and Provençal song and vintage mirth," aerial music floating over haunted forests, or the chant of monk or nun borne to the ear over the waters of some Italian lake, amidst the stillness and the shadows of evening.

We have devoted a larger space to Mrs. Radcliffe than some may think justly due to the rank in fiction which she occupies, but we have done so,—first, because we think justice has seldom been done to the real genius which she threw into the style of fiction she chose to adopt, whatever may be its precise order of precedence in the calendar of fiction; and, secondly, because, although that style became more universally popular, and more generally imitated than any which had preceded it, she herself, with two exceptions only, which we shall notice, remains the solitary writer of genius by whom it has been adorned. The truth is, that the sarcasms which have been directed against the puerile horrors of Mrs. Radcliffe ought justly to have been confined to the extravagances of her successors, who imitated her manner without either her imagination or her judgment, and conceived that the surest means of producing effect consisted in pressing the springs of the terrible as far as they would go. In the hands of these, "imitated imitators," the castles became twice as large and ten times as perplexing in their architecture; the heroine could not open an empty drawer without stumbling on a mysterious manuscript written by her father or mother; nor leave her room to take a twilight walk, of which heroines are always strangely fond, without stumbling on a nest of banditti; the gleam of daggers grew more incessant; the faces of the monks longer and more cadaverous, and the visits of ghosts so common-place, that they came at last to be viewed with the same indifference by the reader, as they were of old by honest Aubrey, or less honest Dr. Dee.

One word may be said in favour of the Romances of Mrs. Radcliffe and her school, addressed to those who think that every romance should embody the moral conveyed in the concluding couplet of the *Mourning Bride*. Their general tendency is moral, poetical justice is in most cases rigidly enforced, and crime punished, and virtue rewarded by some unexpected good fortune, even on this earth. "All this," says Mr. Dunlop, "may be very absurd, but life, perhaps, has few better things than sitting at the chimney corner in a winter evening, after a well-spent day, and reading such absurdities."

Lewis

The two exceptions from the general dullness and common place of the imitators of Mrs. Radcliffe, are *The Monk of M. G. Lewis*, which appeared in 1796, and *The Montorio of Maturin*, published in 1807, and among the last romances written on that now antiquated plan. Much injustice, we believe, was done to Lewis at the time. A single unfortunate remark of an irreligious tendency, and some descriptions of undue warmth, pardonable in a youth of twenty, and retrenched in the second edition, gave a blow to the popularity of this romance from which it never recovered. And yet the traces of considerable genius are visible both in its plan and in the execution of several of its powerful scenes. The mere hint of the story, that is to say, the general idea of the gradual corruption of a proud, and enthusiastic, and self-relying nature, was taken, as Lewis acknowledged, from that of the Santon Barsisa in the *Guardian;* the incident of the escape of the baroness from the banditti, was an expansion, executed with much skill, of the scene in the hut in *Count Fathom;* for the story of the bleeding nun, he was indebted to a German legend, while he has borrowed several hints for his wandering Jew from the incomprehensible Armenian of Schiller. But to these hackneyed materials he has given a force and look of novelty that are surprising; the escape, the conjuration scene, where the Jew, withdrawing the black ribband, unveils the burning cross on his forehead; the procession of St. Clare by torch-light, where the abbess is torn to pieces, once read are not easily forgotten. Lewis also avoided Mrs. Radcliffe's error; his ghosts are real, and his devil genuine, though, as is not uncommon, we believe, in practice, he takes the form of a woman, instead of appearing, as Defoe has it, "in all his formalities and frightfuls."

The *Montorio* of Maturin was also a boyish production, which the writer affected at a more advanced period of life to despise. Yet it appears to us to exhibit more genius, mingled, no doubt, with a deep vein of extravagance and false taste, than his more claborate attempts to picture real manners and passions in his *Woman.* There was originality even in the conception, hideous as it was, of the hero employing against the brother, who had deceived him, the agency of that brother's own sons, whom he persuades to parricide, by working on their visionary fears and by the doctrines of fatalism; and then, when the deed is done, discovering that the victims whom he had reasoned and persecuted into crime were his own children. And though Maturin's machinery in no respect differs from that of his brethren, though he labours to explain away in the close all that had appeared supernatural in the beginning, and of course with total want of success, yet the impression left on the mind by the perusal of the work, in the three thickest volumes we believe that modern romance has to boast of, though gloomy and unsatisfactory, is certainly that of an inventive genius in the author. Such was the effect it produced on Sir Walter Scott, who was the first to direct attention to it, by a criticism in the *Quarterly Review* for 1810. "We have strolled," says he in a lively introduction, "through a variety of castles, each of which was regularly called Il Castello; met with many captains of condottieri; heard various ejaculations of Santa Maria and Diabolo; read, by a decaying lamp, and in a tapestried chamber, dozens of legends as stupid as the main history; examined such suites of deserted apartments as might set up a reasonable barrack, and saw as many glimmering lights as would make a respectable illumination. Amidst these flat imitations of the *Castle of Udolpho*, we lighted unexpectedly upon the work which is the subject of the present article, and in defiance of the very bad taste in which it is composed, we found ourselves unusually involved in the perusal, and at times impressed with no common degree of respect for the powers of the author."

Of the Zelucco of Dr. Moore, which appeared about 1785, we have already spoken at some length in our Biographical article.

The influence of such works as Goethe's *Sorrows of Werther*, written seemingly with the view of reversing Pope's maxim, and proving that whatever is is wrong, becomes very obvious in our literature of fiction towards the close of the eighteenth century. For, in truth, such speculations, embodied in an imaginative form, were found highly congenial to that spirit of restlessness and discontent with political institutions which was every where abroad, perplexing nations with fear of change, and leading men of genius to dress up moral paradoxes in the shape of narrative, and to employ their eloquence in attacking those principles of society which tend to make men happy, or which keep them so. This tendency appears sufficiently obvious in the novels of Bage, a sceptic in religion, and a latitudinarian in morals, whose crude theories, we think, might have been allowed to repose in that oblivion to which they had been consigned, without being revived in such a work as the *Novelist's Library.* Their introduction at all into a work intended to embody only the classical works of fiction, seems unaccountable; nor is the singularity diminished by the fact that his best work, *Hermsprong, or Man as he is not*, is omitted, while three of inferior merit are re-published.

But the social and political theories of the time found an abler exponent in Godwin, whose first work, *Caleb Williams*, appeared in 1794, in which, throwing aside the stimulus of the marvellous, he has trusted the effect of his tale entirely to a picture of the workings of the mind on two beings of very opposite natures, who are driven, by a species of fatal instinct, into the relative positions of persecutor and victim. The doctrines of the *Political Justice* furnished avowedly the primary source of the inspiration of *Caleb Williams*, intended, to use the words of the preface, "to furnish a general review of the modes of domestic and unrecorded despotism, by which man becomes the destroyer of man;" that is to say, to shew that, under the maladministration of English law, liable to be perverted by influence and wealth, the chances are all in favour of the escape of the real criminal and the conviction of the innocent; a proposition notoriously untrue, and which is not even advocated with much art or plausibility in the series of persecutions to which Williams is exposed. Fortunately, however, for the real merit and permanent popularity of this singular work, the political design soon merges in a higher and more legitimate interest. The genius of the author kindles as he proceeds, and out of a hard and republican background brings forth the bright and chivalrous vision of the aristocratic Falkland, a being of a loving noble nature, the victim of false honour and morbid refinement of feeling. Few scenes in romance exceed in breathless and entrancing interest the description of the progress of suspicion in the mind of Williams, till he extorts from his master the fatal secret, on which hangs the whole of his future fate; the escape from prison in the grey dawn of a drizzling morning; and the last interview between Williams and his dying persecutor, sitting, corpse-like, to hear his secret disclosed to the world, and to suffer the agony of knowing that life and reputation are about to leave him together.

St. Leon.

In none of his other works did Godwin evince the same grandeur of conception, and in none of his subsequent personations, except Bethlehem Gabor, did he exhibit that power of presenting demoniacal characters, such as Tyrrell and Gines, in a light which renders them, unnatural as they are, actual objects of terror, like a serpent in the path. The tone of his next novel, *St. Leon*, is altogether more subdued than that of *Caleb Williams.* It has a mournful eloquence in harmony with the picture of desolation which it presents. Here, too, the author has imperfectly succeeded in working out the design which he announces he had in view; namely, that of proving that the happiness of mankind would not have been augmented by the gifts of immortal youth and inexhaustible riches; for, in order to illustrate his position, Godwin is under the necessity of laying the scene in a remote age, and making the persecutions of St. Leon arise from feelings of superstitious credulity, which we cannot help recollecting that the progress of intelligence has since exploded. The senior wrangler, who asked what *Paradise Lost* proved, would certainly therefore have been dissatisfied with Godwin's demonstration; but as the vehicle of a series of most touching and impressive scenes, his plot is far from deficient in interest, nor, granting its premises, in probability. "How minute," says an eloquent critic, "how pathetic, how tragical is the detail of the gradual ruin which falls on this weak devoted man, up to its heart-breaking consummation in the death of the noble Marguerite de Damville; how tremendous and perfect is the desolation, after voluntarily leaving his daughters, and cutting the last thread which binds him to his kind! How complete is the description of his escape from the procession of the auto da fé; of his entrance into the Jew's house, his fears, his decaying strength, just serving to make up the life-restoring elixir, the dying taper, the insensibility, the resurrection to new life, and the day-spring of his young manhood! How shall we speak of the old man, the bequeather of the fatal legacy to St. Leon, and his fearful words: 'Friendless, friendless! alone,

alone!' Alas! how terrible to imagine a being in possession of such endowments, who could bring himself to think of death!—able to turn back upon his path and meet immortal youth, to see again the morning of his day, and find, in renewed life and beauty, a disguise impenetrable to his former enemies; yet, in the sadness of his experience, so dreading the mistakes and persecutions of his fellow-men, as to choose rather to lie down with the worm and seek oblivion in the seats of rottenness and corruption."

Fleetwood.
Mandeville.
Cloudesley.

None of Godwin's other tales have been popular. "His man of feeling feels but for himself;" and, indeed, the character is in some points so unintelligible, and in others so odious, that notwithstanding many beauties of detail, we cannot wonder at the unpopularity of *Fleetwood.* The same sort of objections apply to the insane vindictiveness of *Mandeville.* *Cloudesley*, the child of Godwin's old age, is only remarkable for the gentle beauty of the style, and the contrast which the calmness of the story (turning, like *Caleb Williams*, on the discovery of a murder,) presents to the rapidity and sullen energy of his first production.

Brown.

No writer has come so near the manner of Godwin as Charles Brockden Brown, an American novelist, an imitator of the English author, but in a free and noble spirit of imitation. He certainly had not Godwin's power of mental analysis, and not much of that pathetic tenderness which, contrasted with the general sternness of his tone, shews like a rainbow against a troubled sky. He was altogether more prosaic; dealing, indeed, rather with the material than the moral sublime; producing his strong effects by scenes of sickness, danger, death, or the explosions of insanity; and often making his characters mere *phantasmata*, which interest us only as the means by which a series of agitating incidents are brought into connexion. But he had a good deal of the same eloquence, and the same dark and mysterious power of imagination; a certain intensity of portraiture, whether of mental emotion or things external; great skill in working up a chain of singular events that keep curiosity and suspense upon the stretch, or impress us with a sense of danger and anxiety, and of which he loves to furnish an explanation from those phenomena in our nature which are little understood, such as somnambulism, trances, spontaneous combustion, or ventriloquism. In these respects *Wieland, Ormond, Edgar Huntly*, and *Arthur Mervyn* have all nearly the same character, nor do they differ materially in point of merit. Brown has singular power in the delineation of solitude of all kinds, whether the silence of lonely forests, broken only by the howl of panthers, or of deserted mansions dropping to decay. There is one picture of this kind in *Arthur Mervyn*, of an empty house, evacuated during the yellow fever in Philadelphia, silent and dark in the day time, with the sunshine streaming in through the closed doors and shutters, and faintly discovering that every thing remained undisturbed since its desertion, which produces a strong feeling of awe, and oppresses the spirits with an unaccountable sadness.

Mrs. Shelley.

No other novelist of any ability can be said to have adopted the manner of Godwin with success, except his accomplished daughter, the authoress of *Frankenstein*, a production of much originality in its conception, though the execution of the work is unequal, and the whole portion which relates to the self-education of the monster, who is the creation of the new Prometheus, almost ludicrously improbable.

Several female novelists, towards the close of the eighteenth century, deserve notice, whose tales, though now little read, have the merit either of pathetic or humorous delineation. In the first of these classes are Mrs. Inchbald and Charlotte Smith; in the latter Madame D'Arblay, or to use the name by which she was best known, Miss Burney.

The fame of Mrs. Inchbald rests upon her *Simple Story.* The title perhaps is but of doubtful application to a novel, which is really complicated with strong and varied passions, which turns on the fate and fortunes of persons placed in very peculiar relations to each other, and like Shakspeare's *Winter's Tale*, unites two distinct stories relating to different personages, between the action of which "time has slid o'er sixteen years;" for the Perdita of Mrs. Inchbald's second part is the daughter of that Lady Elmwood, for whose misfortunes and indiscretions our sympathies had been engaged in the first, and who, almost in a sentence, is suddenly consigned to guilt, and to the grave. Dorriforth only remains the connecting link between the two portions of the tale. It is a proof of considerable merit in the novel, that so hazardous an experiment as that of transferring our sympathies to actors in a great measure new to the scene, has not been unsuccessful; that the interest is, notwithstanding, kept up, partly by the real pathos of some of the scenes, and the natural traits of passion in others, such as that where Lord Elmwood, receiving his deserted daughter as she falls into his arms, calls her by the maiden name of her guilty mother, as if all that passed since those days of innocence had faded from his mind like a dream; and partly by the dramatic nature of the situations which, though sometimes violent, are generally picturesque and agitating, and the movement of the dialogue, which every where shows the skill of a practical writer for the stage. Her second novel, entitled *Nature and Art*, has been generally and justly reckoned much inferior to the *Simple Story.*

Mrs. I
bald.
The Si
Story.

Charlotte Smith.

Charlotte Smith, (1749—1806) though her novels are extremely defective in plot, betraying marks of haste, and tinged with a melancholy easily to be accounted for from the depressing circumstances under which they were generally composed, cannot be confounded with the ordinary day-labourers for the circulating library, "who turn a Persian tale for half a crown." Sir Walter Scott, in one of those kindly notices by which he delighted to cheer the heart of struggling genius, or to do justice to the memory of talents which time was consigning somewhat too rapidly to oblivion, has given her credit for great powers of satire mixed with pathos, and characters sketched with "firmness of pencil and liveliness of colouring." The satire indeed seems to have been pretty indiscriminate, since it extends to her own husband, whose pecuniary improvidence and sanguine temperament are glanced at in the character of the projector, who hoped to make a fortune by manuring his estate with old wigs. But apart from satire, the *Old Manor House*, the only one of her novels with which we are acquainted, is really entitled to the character of an interesting and well-written tale. We have a lively recollection of the *Manor House* itself, its neighbourhood, its sea-side scenes, the strange domineering Lady of the Manor, Mrs. Rayland, whom Sir Walter Scott describes as a sort of Queen Elizabeth in private life, and the natural interest which she has succeeded in giving to the love story which is going on within the ancient walls.

Old Man
House.

Miss Bu-
ney.

The popularity once enjoyed by the novels of Miss Burney, appears now to have been somewhat overrated, at least we are at a loss to discover any thing in her first work, *Evelina*, except the extreme youth of the writer, then only eighteen, to account for that burst of approbation with which it appears to have been received in 1778 by such men as Burke, Reynolds, and Johnson. She wrote no doubt with sprightliness, with some humour of a broad and superficial kind, and undoubtedly possessed considerable talent in drawing bores and personages of low manners or odd habits from vulgar middle life; in imagining scenes of awkward mistakes in society, and exaggerating the teasing distresses thence arising to her heroines and other personages of more refined manners or higher pretensions. Indeed, to mimickry she appears, from her father's account, to have had a strong leaning from her childhood; but when she rises from mere manners and habits to paint feelings, we see little but indecision on one hand, or exaggeration on the other. Within the field where she excels too, she is much of a mannerist; the same characters under other names, the same incidents under a thin disguise, re-appear in *Evelina, Cecilia,* and *Camilla.* Even the graces of style which she had shewn in her earlier works, in a great measure forsook her in her last novel, the *Wanderer;* a tissue of improbable distresses and silly refinements of sensibility, conveyed in language which is neither good English nor good sense.

Miss Lee.

The *Canterbury Tales* deserve notice on account of the interesting and highly original story of Kruitzner, or the German's Tale, by Harriet Lee, on which Lord Byron founded his *Werner.* The tales contributed to the work by her sister Sophia, such as the Two Emilys, and the Clergyman's Tale, though less striking, are written with genuine feeling and tenderness.

Miss Austin.

It may be observed, however, in those female novelists to whom we have last adverted that, though the marvellous is thrown aside, and the characters are taken from common life, the sentiments and tone of feeling are yet decidedly strained beyond the natural pitch. The characters display a degree of romantic affection and a prodigal expenditure of sensibility for which the cares and distractions of real life, we fear, afford but little leisure. It remained for Miss Austin (1775-1817,) to shew what a charm might be imparted to truthful pictures of life, as we really see it around us in the quiet monotony of domestic arrangements, with its interchanges of poetry and prose, business and strong feeling, and dialogues at balls and parties alternating with the secret griefs of the heart; just such a picture, in short, as Asmodeus would present, could he remove the roof of many an English home, and place us beside the hearths of the Knightleys, Bennets, Woodhouses, and Bertrams by whom they are inhabited. No species of novel writing exposes itself to a severer trial, since it not only resigns all Bayes' pretensions "to elevate the imagination and bring you off in some extraordinary way," but by professing to give us pictures of our ordinary acquaintances, in their common garb, places its productions within that range of criticism, where all are equally judges, and where Crispin is entitled to dictate to Apelles. And yet with such fine perception and perfect truth of keeping has Miss Austin performed her task, that we never miss in her novels the excitement of uncommon events, and rarely feel her simple annals of English life to be tedious or unworthy of the dignity of fiction. In reading them, we have the feeling of being actually in company with a group of highly respectable persons, of no remarkable ability, though with good sense and a fair proportion of right feeling; with a sprinkling of fools, oddities, and village gossips; and the conversation, the little incidents, and displays of temper, and sallies of good humour or bad, and small plottings and counter-plottings among the guests, are exactly such as any contemplative Jaquez who should establish himself in an English country house or rectory for a fortnight, and watch the bye play of the society about him, might set down in his note book; only skilfully selected and arranged, the superfluities lopped off, the dullness thrown into the background, and the whole wrought up into a picture, painted indeed in sober hues, but with unequalled delicacy of touch, and an all-pervading harmony.

All the novels of Miss Austin closely resemble each other; but *Northanger Abbey,* and *Sense and Sensibility,* are of a more puerile cast than the others, and betray a more unformed taste. *Pride and Prejudice,* particularly in the characters of the Bennets, was an improvement on the two former, but *Emma, Mansfield Park,* and *Persuasion* are justly regarded as her most finished works. Some scenes in *Persuasion,* the last work of this gifted authoress, have always appeared to us models of unobtrusive tenderness.

Miss Edgeworth.

Some one has described the novels of Miss Edgeworth as a sort of essence of common sense; and the definition is not inappropriate, for she is the most anti-sentimental of novelists. The sway of the stronger passions she has almost excluded from her Tales. Love is indeed the only one which has found entrance, and to qualify him for admission, his wings have been sorely clipped and trimmed, and reason constantly placed as a gentleman usher over him. Miss Edgeworth has even less toleration for splendid faults or bursts of enthusiasm than Miss Austin. Her chief aim is to rebuke folly, by ridicule and comic humour; to unteach bad habits of mind, to substitute in their stead prudence, firmness, temper, perseverance, and habits of absolute truth, a process which she generally represents as effected by a gradual series of efforts and consequent ameliorations, which are within the power of all minds of ordinary resolution. Her favourite characters are either persons of well-balanced minds, with sound heads and a smattering of physical science, who act rightly and honourably, but always think twice before they act, and weigh in the scales of utility what are generally considered as matters of feeling, like the Percys: or they are personages who, spoiled by indolence and bad education, succeed by a course of self-discipline, in curing their intellectual or moral maladies, and becoming useful and honourable members of society, like the hero of *Ennui,* Lord Glenthorn. Miss Edgeworth brings to her task the results of much observation of character, particularly that of her countrymen; a quick perception of the humourous, a dramatic liveliness of dialogue, a high sense of all that is honourable and decorous, with a scorn of meanness and evasion, and that tone of good society, which her pictures, often drawn from fashionable life, demand. If her novels are at times too obviously monitory and didactic, and the ferule peeps out rather alarmingly behind the schoolmistress, this defect, we fear, is in a great measure inseparable from the very qualities which constitute the strength of her mind, and from the conception she had formed for herself of the ideal of novel writing.

It is singular that a novelist of this rationalizing spirit, and so intolerant of all moral marvels, should have so frequently admitted great improbabilities into her plots, where the catastrophe is often brought about either by some one very unlikely event, or by a concurrence of events, and fortunate accidents, the combination of which render the circumstance at the least passing strange. Miss Edgeworth is also fond of making the discovery of important events turn on little trifles of circumstantial evidence, which are too artificially prepared, and after all are not satisfactory.

The impression, however, which the perusal of her best novels, such as *Ennui* and the *Absentee,* leaves on the mind, is that of high respect for the sagacity, grasp of mind and rectitude of judgment of the author, whose power of dramatizing a moral lesson has not often been excelled. And it is gratifying to see that, in the last work of Miss Edgeworth, *Helen,* there appears no diminution of her powers. In wit it is equal to any of her former novels; in pathetic scenes, superior to most of them.

Sir Walter Scott.

At the period when Sir Walter Scott (1814), produced the first of that long file of romances which have since obtained a more than European reputation, the public taste, in regard to novel writing, seemed to have sunk to a low ebb. Miss Edgeworth indeed was popular; for the wit and good sense of her dialogue, and her happy pictures of Irish character, found favour in the sight even of the readers of circulating libraries; but the merits of Miss Austin's more unobtrusive pictures of life were comparatively unknown. At best she was confounded with the writers of Winters in London, or Winters in Paris, and shared a dubious favour with the romantic effusions of Francis Lathom and the other labourers of the *Minerva* press, so called, we presume, upon the *lucus a non lucendo* principle, from the goddess of wisdom having so little to do with its productions. Translations, too, from Augustus La Fontaine's homely but rather vulgar pictures of little German *Kräh-winkel* towns, or the broad and indecent extravagances of Pigault le Brun, tended still further to degrade and vulgarize the public taste. Every thing in fiction, in short, looked unpromising and exhausted. The appearance of a great writer, who should strike out a new path through this much trodden waste, seemed at that moment in the highest degree improbable. And yet this was at once effected by the Author of Waverley, in such a manner as to raise the romance from the lowest level to the very highest position in literature.

Nothing, we believe, could be more irksome or more useless than to enter on any formal criticism of the romances of Scott; and it may well be doubted whether the present generation be in a condition to judge of his merits with perfect impartiality, or to determine his precise rank as a writer of fiction. We at least shall not allow ourselves to be seduced into such a disquisition, but shall confine our observations to a few points on which we think it hardly probable that posterity will reverse the concurrent judgment of the present day.

The resemblance of Scott's mind to that of Shakspeare has been often remarked, and with some justice; for though even the most enthusiastic admirers of the romance writer, will hardly venture to claim for him an equality of powers with Shakspeare, there were strong kindred features in the character of their minds. In both we are struck with the same general and almost universal sympathies, leading to impartial and kindly views of all men and all opinions, the most remote from their own; a cheerful, healthful tone of feeling, which brightens existence about us, instead of dwelling on its evils; an avoidance of all moral casuistry, or treading on the borders of the forbidden, either in the creation of characters or of incidents; the feeling of the humourous as strongly developed as the sensibilities or the imagination; great self-possession, and a noiseless exertion of power, working out its end, not by sudden bursts, or high-wrought passages, but by a silent and steady progression, like the dawn brightening into the fulness of day.

The works of Scott produce their effect rather by the combination of many qualities than the predominance of any. In depth of feeling, we think he yields to the author of *Anastasius;* in invention of incident, and disposition of plot, he is equalled by many; his humour will hardly bear a comparison with that of Sterne, or the best parts of Fielding; and in the direct and forcible expression of the stronger passions, we should be inclined to give the preference both to Godwin and the author of *Valerius.* But his strength lies in the possession and harmonious adjustment of most of the qualities requisite to the novelist, none engrossing the whole mind, none excluding another, but all working together in kindly unison: learning arrayed in the most picturesque combinations; observation of life embodied not in abstractions, but in living forms; humour springing out of tenderness, like smiles struggling through tears; the spirit of ancient knighthood leavening the worldly wisdom of modern times; and the imagination of the poet adorning, without impairing the common sympathies and good-humoured sagacity of the man.

The department in which this combination of qualities has been most successfully displayed by Scott, was that of the historical romance,—a class of fictions which he may truly be said to have created. For although fictions bearing the title of historical romances, were by no means uncommon in English literature before the time of Scott, such as the *Recess* of Miss Lee, or the *Scottish Chiefs* of Miss Porter, it is apparent that they stand in a totally different class; not being, in fact, historical, except in the names of the characters. Obvious as the idea now appears, Scott was in truth, the first to show how much invention might gain by a union with reality; what additional probability, interest, and importance might be given to the fortunes of imaginary heroes, by interweaving their destinies with those of historical personages; nay, how much of romance in its finest forms lies in the characters and events of history itself invisible to the prosaic or merely philosophic observer, but obvious at once to the eye of imagination. He has carried the picturesque of history to its perfection; for without imparting to his portraits the deep and subtle traits by which Shakspeare so wonderfully individualizes the beings of his dramas, he never fails at least to present consistent and striking pictures of his historical personages in their habit as they lived, and to dispose the light and shadow about them with the most felicitous adjustment,—dress, look, gestures, manner, and the outward accompaniments of scenery, being all made important accessories, to heighten the effect of well-known peculiarities, or to hide the want of those over which Time has dropped a veil, which even Imagination can hardly raise.

In description, indeed, generally, Sir Walter Scott was unrivalled. Whatever he sees with the eye of the mind, shapes itself into words which enable us to see it too. His pictures combine in a singular way breadth and minuteness; for while he painted the details with sharpness and firmness, no one understood better the art of arrangement in masses; so that he never fails to give the spirit as well as the form of the spot, making us *feel* the solemnity and gloom of castles and druidical forests, the calm produced by the still beauty of a Highland lake, from which the morning mist is disappearing, or the healthy elevation of spirits with which we travel up some mountain height, whence we see far into the country beyond, and "feel the breath of heaven fresh blowing."

We offer no remarks upon his characters, except this, that making every allowance for repetitions, no writer of fiction since Shakespeare has enriched the portrait gallery of invention with more originals, of which we have a distinct conception; and that though his female characters have less variety and less truth than his male personages, we know no writer except Shakspeare to whom the same remark may not justly be applied.

The plots of Scott, speaking generally, are neither remarkable for excellence, nor the reverse. Examples may, in fact, be found, in the long list of his romances, both of skilful and defective plots. *Ivanhoe*, *Kenilworth*, and the *Bride of Lamermoor*, for instance, are proofs how artfully he could at times arrange his plan; the two latter having all the compactness and steady progression of the drama. Others, again, such as *The Monastery*, *St. Ronan's Well*, and *Rob Roy*, are in a high degree loose and inconsequential.

Fertile and inventive as was the genius of Scott, it cannot, we think, be denied, that during the latter half of his career as a writer of fiction, he appeared to less advantage. No wonder, indeed, when, in addition to the limits by which all invention is bounded, we consider under what depressing circumstances many of his later works were composed, that in these even the elasticity of genius itself should be somewhat outworn and deadened; that the conventional, both in character and incident, should occasionally supply the place of invention; and that mere imagery, and not always very appropriate illustration, should be substituted for the natural turns which at first enlivened the dialogue. "If there be a mental drudgery," to use his own words in his notice of Charlotte Smith, "which lowers the spirits and lacerates the nerves like the toil of the slave, it is that which is exacted by literary composition, when the heart is not in unison with the work on which the head is employed." When he breaks up new ground, as in *Nigel*, *Quentin Durward*, and *The Crusaders*, his genius indeed suffers little diminution; but in *Redgauntlet*, *Anne of Gierstein*, and *The Betrothed*, the practised skill of the mechanist, recomposing old materials in new shapes, is far more visible than the freshness and spontaniety of an original inspiration. With the publication of *Kenilworth*, indeed, the sun of his fame may be said to have "touched the highest point of all its greatness;" but like that luminary during a polar summer, it seemed for a time rather to revolve than to descend, and its rays continued to look bright and beautiful, long after it was journeying towards the west.

No writer ever exercised so great an influence over the public mind, or led to so much conscious or unconscious imitation. His influence on Italy, France, and Germany, we shall afterwards have occasion to notice. On the literature of Great Britain, we believe it to have exerted on the whole a most beneficial effect; not, indeed, that any professed imitation of his manner has yet appeared, which possesses great claims to genius, but that he has carried a higher spirit into novel writing; taught us how the simple feelings of peasants, and the homely pathos of humble life, and the relentings of feeling amongst the outcasts of society, might be made to blend with scenes of high imagination; that his writings are calculated to strengthen the ties of our common humanity; that they never tend to foster a bad, or to throw ridicule upon a good or generous feeling; while, speaking of them in a merely literary point of view, they taught lessons of simplicity, good taste, moderation, and skill in seizing the best points both of character and description, which have not been without their effect even on those by whom the mere manner of Scott, or his choice of subjects, have been studiously avoided.

The professed imitators of Scott have been numerous, but not successful. As usual, they have magnified his defects, urging his conventional personages, such as dwarfs, fools, gypsies, and bores, into caricature; multiplying instead of retrenching those similes which, even in the original, were so obtrusively frequent, as to remind us of Bayes' rule for writing dialogue, "ever make a simile when you are surprised;" and overlaying the plot with minute descriptions of dress and scenery, which the reader, after a little experience, is wise enough to avoid. In reading them we are constantly reminded of Boileau's description of a tedious poetical landscape painter:

> S'il rencontre un palais il m'en decrit la face
> Il me promene apres de terrasse en terrasse,
> Je saute vingt feuillets pour en trouver la fin,
> Et je me sauve a peine au travers du jardin.

es and
per.

The best imitation of Sir Walter Scott's manner with which we are acquainted is the anonymous romance of *Forman*, of which he speaks with respect in his criticism on Mrs. Radcliffe. The romances of Mr. James, too, though not indicating much depth, are pleasing, always written with good feeling, and with a plot which excites a sort of quiet interest, if it does not keep the mind in the chain of curiosity or suspense. The novels of Cooper, who is probably better known than any other of the imitators of Scott, seem to be considerably overrated. On shipboard, or on an Indian heath, he is striking and picturesque; but among civilized society, and, above all, in his attempts to catch the ease of fashion, we must regard him as singularly unsuccessful.

A strange contrast to the spirit of Scott's novels was exhibited in the sceptical and dreary tone of *Anastasius*. Without force of character-painting, with much languor in parts, and too prolonged a detail of heartlessness and villany, the work fascinates by its strength, and towards the close, when the character of the hero deepens, by its irresistible pathos. Commencing with the levity of a Greek Gil Blas, it modulates into a key of sadness and desolation of spirit, which reminds us of the close of *St. Leon*. Fiction has few pictures which will bear comparison with that of *Anastasius*, sitting on the steps of the lazaretto of Trieste, with his dying boy in his arms; and the whole conclusion of the romance, the sudden meeting and silent parting with Spiridion, the journey towards the north, the dream, the warning voice, which, in the dusky light of daybreak, tells him he has not far to go; the hopelessness, the resignation of his death, all leave on the mind that profound impression of the mutability and nothingness of existence, which Wordsworth has described:

> So fades, so languishes, grows dim and dies,
> All that this world is proud of. From their seats
> The stars of human glory are cast down,
> Perish the roses and the crowns of kings.

It is not our intention to pursue this sketch through the works of our living ornaments of the literature of fiction, or of some who have recently been taken from amongst us. We shall merely notice, that among those who have struck out an independent path for themselves, are the author of *Valerius* and *Adam Blair*, works of conspicuous originality, particularly the first, in which the difficult task of imparting a deep interest to a classical subject is performed with complete success; the author of the *Trials of Margaret Lindsay*, and the *Lights and Shadows of Scottish Life*, who, with the finest feeling of the dignity and poetry which lie within the humble rural life of Scotland, has performed for its more pathetic and elevated aspect, what Galt, in his *Annals of the Parish*, and his other tales, has done for its humours and its vulgarities; the authoress of *Marriage*, the *Inheritance*, and *Destiny*, and Sir E. L. Bulwer, who has given proof of very versatile ability, in a series of romances widely differing in character, from the levity of *Pelham* down to the earnestness of *Maltravers*, but the best of which we think his more matured taste and judgment may yet surpass.

Italian Romance.

No country has produced more novelists than Italy; but the Italian novel bears little analogy to what we understand by the term. Their novels were, in fact, originally prose versions of the same short tales, sometimes heroic, but more frequently turning on themes of gallantry or comic adventure, which formed the favourite subjects of the Trouveres. They were Fabliaux translated into Italian; and this character they retained for five centuries from Boccaccio to Gozzi. (1313—1786.) The incidents are generally briefly given; there is little development of character or sentiment; or, where these are found, they exhibit rather separate scenes from life than any thing having the interest of a compact whole. But if the incidents and characters have little development, the Italian novelists have indemnified themselves for this confinement, by indulging in the utmost license of a pompous, circuitous, and unmeaning style. The facile beauty of the Italian language, "Che spande di *parlar* si *largo* fiume," has been the bane of their novelists. Boccaccio, the first and by far the greatest of the Italian novelists, indeed manages to impart to it a sort of garrulous grace; but in the hands of his imitators the contrast between the poverty of the idea and the rich garb of words with which it is invested, assumes a ludicrous effect.

Never, perhaps, among so many novelists, was there so little of novelty. Instead of imitating nature, their avowed principle was to imitate Boccaccio, who, imparting to every thing a soft and rose-coloured glow, was himself not remarkable for the closeness of his adherence to it. And hence regarding the novel merely as a theme upon which they were to display all the brilliant variations of which the music of Italian speech was susceptible, they were contented to repeat in a great measure the same themes, to borrow, with a sort of easy impudence, their incidents from Boccaccio or from each other; and more anxious for the purity of their Tuscan than of their tales, of which by far the greater number turn on scenes of licentiousness or low humour, they seemed to think all other merits in the novel subordinate to that of being "written in very choice Italian."

Beyond the limits of Italy, Bandello (1554) and Cintio (whose *Hecatommithi* appeared in 1565,) are almost the only novelists whose names are known to foreigners, if we except the *Belphegor* of the versatile Macchiavelli; and the chief interest connected with these novelists consists in the hints or materials furnished by them to Shakspeare, Massinger, Beaumont and Fletcher, and our dramatic writers of the time of Elizabeth and James, to whom indeed these works, particularly those of Bandello, afforded a perfect storehouse for plots. Among the nine volumes of Bandello's works contained in the Novelliero, some interesting and a few pathetic tales may be pointed out; but Cintio's can have no interest in themselves except for those who love to sup full of horrors; for he was one of those wholesale dealers in the terrible, who thought that poetical effect was to be produced by a vigorous operation on the nerves rather than the feelings, and therefore piqued himself, like the schoolmaster in Gil Blas, on massacring all the personages of his tragedies, even to the prompter.

Towards the close of the last century, a taste for novels in a style somewhat resembling our own, appears to have gained ground, and several tales of a melancholy kind made their appearance. With these we do not profess to be acquainted; nor has any one which appeared prior to the *Promessi Sposi* of Manzoni, attained the least reputation beyond Italy, with the exception of the *Ultime Lettere di Jacopo Ortis*, an early production of Ugo Foscolo, (1802); and the result partly of a melancholy event occurring in his own family, and partly of the study of Goethe's *Werther*, by which the enthusiastic mind of Foscolo appears to have been very powerfully affected. Like *Werther*, it is a story of love and suicide, full of fervour, violence, and, to speak the truth, of absurdity; yet delivered with a species of eloquence, and a certain appearance of conviction, which, so far at least as regarded the expression of mental discomfort, and the misery arising from a total want of all fixed opinion, was perhaps sufficiently real. To the Italians, who knew little or nothing of Goethe, this stormy effervescence of an impassioned temperament, and all this eloquent "questioning of fate," possessed even an air of originality; and being the first successful attempt to introduce the sentimental romance of the school of Rousseau and Goethe into Italy, it naturally awakened a degree of enthusiasm which now appears somewhat disproportioned to its real merit.

The *Promessi Sposi* of Manzoni certainly approaches much more nearly to the idea of a good romance than any thing which Italy has yet produced; but, after all, it too is essentially an imitation. If we had had no Scott, we should have had no Manzoni. The idea of illustrating a subject connected with the Italian history of the commencement of the seventeenth century; the introduction of historical characters, such as that of Cardinal Borromeo, who is the *deus ex machina* of the piece; the antiquarian lore displayed in the way in which the bread-riot in Milan (a close parallel to the insurrection of the Liegeois in *Quentin Durward*), is wrought up; the account of the plague in the Milanese, in which Manzoni has tried to imitate at once Boccacio and Scott,—all concur to satisfy us, that Manzoni, though an able lyric poet, has no great share of original invention, and that though he can make a good use of materials furnished by others, he is one of those literary commercialists who require to borrow the main portion of the capital with which they are to trade. We are far, however, from denying the real merits of this performance of Manzoni, in which the characters of Cardinal Borromeo, and the peasant hero and heroine, Renzo and Lucia, are naturally and pleasingly drawn, and in which some of the scenes, such as the opening scene at Don Abbondio's house, the riot in Milan, the interview between the unknown and the Cardinal, and some of the incidents and descriptions connected with the plague, are of vivid interest.

Since the appearance of the romance of Manzoni, who has lately abandoned both fiction and poetry for religion, many attempts have been made by Rosini, D'Azeglio, Guerazzi, Tommaseo, Belmonte, and others, to transfer the historical romance to an Italian soil, and to give a romantic interest to the delineation of the Italian feudal history of the middle ages, or of periods somewhat later. The first, and we believe the best, of these appears to be the *Monaca de Monza* of Rosini, who has founded his story on an episode in the *Promessi Sposi*. Were we to form a judgment from a few of these attempts which we have read, as to the merits of those of which we remain ignorant, we should be inclined to say generally, that nothing is more remarkable than the total want of interest which Italian subjects possess in Italian hands; a result which appears the more singular, since at one time it was only necessary in our English romances to transfer the scene to Italy, to enlist at once our warmest sympathies in favour of the story. Now-a-days, we think, when the subject is almost entirely in the hands of native novel-writers, the very idea of embarking on an Italian story of the middle ages, seems to act upon the fancy as the most powerful refrigerative. Strangely enough, too, it is to be observed, that the Italian novelists of modern times never appear to greater advantage than in the description of the most furious battles, carried on with all the determination and bloody-mindedness of an Esplandian or a Bobadil, as in *Ettore Fieramosca*, by Massimo D'Azeglio, a son-in-law of Manzoni, or *L'Assedio di Firenze*, by Gualandi; an expenditure of valour on paper which we fear is scarcely justified by the fact, since, if we are to give credit to the accounts of Guacciardini, many of their most doughty encounters were as harmless in their results as the protracted passage of arms between Gymnast and Tripet, in *Rabelais*, as to which uncle Toby, after listening to an endless detail of the various complicated manœuvres, declared, that one home-thrust of the bayonet would have been worth them all.

Spanish romance.

In Spain, which, though not the birth-place, had certainly become by adoption pre-eminently the country of the chivalrous romance, and where, perhaps, its extravagances had been less redeemed by talent than any where else, it is well known that a revolution in taste was effected by the inimitable satire of Cervantes, (1547–1616), which Montesquieu, with amusing extravagance, describes as the single admirable book in the Spanish language which shews the absurdity of all the rest. So effectually, indeed, did that work (published in 1605) attain its end, or rather one of its ends, that after its appearance no romance of chivalry appeared in Spain, and the old ones so entirely ceased to be printed, that it is with difficulty that copies of them are now to be obtained. The "ultimus Romanorum," the last adherent of the good old romance, was Don Juan de Silva y Toledo, who published his *Don Policisnè de Boecia* in 1602, three years before the appearance of the *Don Quixote*.

Cervan Don Q ote.

But, had that book been solely devoted to the object of exploding the old romances of chivalry, it would probably have shortly been forgotten with the extravagances it exposed. The charm which has given a perennial life and continued popularity to *Don Quixote*, is the deeper idea which it contains of illustrating, in comic colours, the contest between imagination and reality; the danger, both to its possessor and to others, of all misdirected enthusiasm, whether it take the direction of reviving an extinct age of chivalry, or any other course plainly running counter to the current of society all around it, by means of which a constant collision is produced, in which, whatever becomes of the world, the visionary himself is sure to be the sufferer. For the fuller development of this idea, he has placed beside the knight, who represents the imagination without the common sense, a squire who is the type of the vulgar common sense without the imagination. Between these children of his brain, he parcels out the treasures of his mind, bequeathing to the knight his own high spirit and courage, his learning, his generosity, and his love of truth;

and to the squire the solid riches of his good sense, and his peculiar humour; that humour, which, as it exists in Cervantes, is among the rarest of human qualities,—the very poetry of the comic, founded on tender sympathy with all forms of existence, though displaying itself in sportive reflection; and issuing not in superficial laughter, but in still smiles, the source of which lies far deeper.

The characters and fortunes of these contrasted companions he has linked together in such a way, as to impress on the mind the feeling, how indispensable each is to each, as the complement of the other,—the learning, highmindedness, and strong imagination of the knight being indispensable as the creative and moving power in human life; the practical good sense, and even selfishness, of the squire as the controlling force; from the judicious union of which opposites arises the harmony, and from their separation the discords of society. He paints also, with great knowledge of human life, the effect which these reciprocal influences, constantly exerted on each other through vicinity and a common pursuit, have in modifying even the original character itself, and gradually making the enthusiast more rational, and the common-place man of the world more imaginative. The sound philosophy, the impartial and kindly spirit with which Cervantes has wrought out this conception, in which justice is done at once to the higher and the more common elements of our nature; the flood of humour with which he surrounded it,—which has tempted many a one since the days of Philip IV. to imitate the pantomime of the student on the banks of the Manzanares,—are as obvious to the least refined of readers, as they are models of art worthy of the admiration and profound study of every writer of fiction. Like human life itself, the story unites and harmonizes the opposite extremes of the pathetic and the ludicrous, the vulgar and the elevated,—for from the midst of the comic ground-work, the striking scenes in the Sierra Morena, the episode of Cardenio and Dorothea, the story of the captive, the sweet pastoral of Marcelia, the marriage of Camacho, and many other passages, rise up, rich in pathos, grandeur, or imagination; so that, in fact, there is no work in which, while the aim at first might appear to be to destroy the romance of life, passages of more purely romantic beauty are to be found. The truth is, that Cervantes, though anxious to explode a vicious taste in literature, was far enough from wishing to direct his satire against the creations of high imagination, or against the spirit of chivalry. The admiration he expressed for Amadis and Palmerin shews, that he was not insensible to the beauties by which even this branch of literature was occasionally redeemed. His own adventurous career of glory and misfortune had, no doubt, deeply impressed upon his mind the contrast between the dreams of imagination and the realities of life; he saw the poetical capabilities which such a contrast afforded,—and he has painted them with an unshrinking, and some may think a merciless hand. But, even beneath the veil of ridicule with which he has invested his crazed and battered hero, we perceive his own unextinguishable love of the exalted principles by which he is actuated; and the abiding impression which remains with us after the comic effect of the romance has passed away, is, that truth and nobleness of character will continue to command our love and veneration, though displayed in actions with which the world cannot sympathize, and placing their possessor in situations which excite our ridicule, even while his motives attract our admiration.

N elas E mpla- re

Cervantes seems to have intended his moral novels, *(Novelas Exemplares)*, to be to Spain what the short tales of Boccaccio and his followers had been to Italy, only with the advantage of a purer morality. They are unequal; some being mere satirical trifles, such as the *Licentiado Vidriera;* others, like the *Jealous Estremaduran*, (which English readers will recognize in the common farce of the Padlock), the *Gipsy*, and the *Spanish English Lady*, highly interesting in themselves, and characteristic of Spanish manners, laying open to us, as Sismondi says, the hearts and houses of its inhabitants. One novel, the *Tia fingida*, (Pretended Aunt,) though undoubtedly written by Cervantes, was not included in the original collection, probably from the disagreeable nature of the subject.

Persiles and Sigismunda.

The remaining work of fiction by Cervantes, the *Persiles* and *Sigismunda*, is only remarkable as the last work which he wrote, and as being quite as absurd and extravagant as any of those romances of chivalry against which his powerful satire had been directed. No work has occasioned a greater division of opinion. While some of the Spanish critics speak of it in terms of extravagant praise, it is described by Viardot, a French critic, as "a tissue of episodes interlaced with each other, like those of one of Calderon's intrigues, consisting of extravagant adventures, silly rencontres, astounding prodigies, preposterous characters, and extravagant sentiments." It retains little or nothing, indeed, of Cervantes, but the charm of his style. Yet, like Corneille placing his *Nicomede* before the *Cid*, or Milton his *Paradise Regained* before his *Paradise Lost*, Cervantes seems to have given the preference to this child of his old age over the master-piece of his manhood.

Lope and the Spanish novelists.

The fashion of short novels in the Italian taste, which had been introduced by Cervantes, was followed by Lope, Canizares, Zayas, Montalvan, and by a host of imitators, whose very names the Spanish critic Lampillas declares that he is unable to enumerate. The loss of the catalogue is little to be regretted; for even among the names which are known, it would be difficult to point out one, even including the great Lope, which rises above mediocrity. Nature, indeed, seems to have given Cervantes his revenge, for the triumph of his rival in the drama, by the failure of Lope as a novelist,—for in this department, the talent and rich invention which he displayed on the stage appeared in a great measure to desert him. The best of his novels is the *Fortunas de Diana*, (Fortunes of Diana), first printed in the Filomena in 1621; next to which we should place his *El Zeloso hasta Morir*, (Jealousy till death); but truth to say, neither are remarkable. Indeed, if we except Cervantes, the same remark which we have ventured to make on Lope is generally applicable to the Spanish novelists. Nearly in proportion to the success of the nation in the creation of an original drama, is its signal deficiency in original contributions to the literature of romance. It is not often, indeed, as Tieck remarks in his preface to Bulow's *Novellenbuch*,[1] that the dramatic and novellistic power are found combined in a national literature to the same extent as in England.

Romances in the Gusto Picaresco.

In fact, the only species of prose fiction, with the exception of *Don Quixote*, in which the Spaniards have displayed any thing like original invention, is in the novels written in what is called the *Gusto Picaresco*, or the romances of roguery, of which the first example of any merit, and, with one exception, the best of the whole series, was furnished by the *Lazaro de Tormes* of the celebrated Don Diego de Mendoza, and is said to have been written by him while a student at Salamanca, and first printed in 1553. It is rather singular, no doubt, to find a man of rank devoting himself to these pictures of want and miserable knavery, or a nation affecting so much external pomp and ceremony relishing these exposures of the real filth, meanness, or starvation which often lurked under the cloak of the whiskered Knight of Calatrava. But the Spanish character is distin-

Mendoza.

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[1] Das Novellenbuch, oder hundert Novellen nach alten Italienischen, Spanischen, Franzosichen, Lateinischen, Englischen, und Deutschen, bearbeitet von Eduard von Bulow. Leipzig, 1834. An excellent authology, from the shorter literature of romance in the above languages; and not a mere translation, but in many cases a dexterous rificciamento, true to the spirit, while avoiding the dullness or indecency of the original.

guished by a very peculiar vein of dry humour intermingled with a tinge of orientalism in their notions of birth and pride of ancestry and personal dignity, and hence the Spanish novelists seem to have been perfectly alive to the ridiculous features of their countrymen, while sharing very probably in the same exaggerated pretensions themselves. Accordingly, along with the adventures of rogues, and beggars, and gipsies, who, during the reigns of the Austrian Philips, appear to have literally swarmed in Madrid, are interspersed ample illustrations of this union of poverty and pride, and the stratagems with which many a pompous cavalier, walking the streets, as Lazaro says, like the Duke of Arcos, is occupied at home in order " to procure a crust of dry bread, and having eat it, to appear with due decorum in public, by the art of fitting on a ruffle so as to suggest the idea of a shirt, and adjusting a cloak in such a manner as to make it be believed there are clothes under it."[1] Mendoza's novel contains a sketch of one of these shirtless and famished hidalgos eagerly devouring some crusts which Lazaro had begged in the morning, on pretence of trying whether the bread was sufficiently wholesome, which gives an image of starvation, in which the painful is strangely blended with a sort of sombre gaiety.

Equal, if not superior to Mendoza's romance, is the *Gusman d'Alfarache* of Matteo Aleman (1599,) which, though dealing in the same gloomy pictures of want and misery, has more variety in its pictures, and a more severe and caustic character in its sarcasm. It has been erroneously supposed to have furnished many particulars to Gil Blas; in fact, it would be difficult to point out one, except the incident of the parasite who obtains a supper at the expense of the eighth wonder of the world. In the same taste is the *Gran Tacano of* Quevedo.

Espinel.

The merit of having supplied Le Sage with much of his materials, may be more plausibly claimed by Vicente Espinel, the author of the *Vida del Escudero Marcos de Obregon,* printed in 1618. Indeed, while the superior grace, spirit, and gay philosophy of Le Sage are apparent, it is impossible not to make a considerable deduction from his mere invention after reading the work of Espinel. The prologue, the adventure of the parasite, the dispersion of the company at Cacabelos by the muleteer, the adventure of the robber's cave, the surprise by the corsairs, the contributions levied by those pious hermits, Don Raphael and Ambrose de Lamela, the service with the Duke of Lerma, and many of the other incidents, have nearly an exact parallel in the ruder and drier work of Espinel. Even some of the witty points, which we might be disposed at first sight to believe were Le Sage's, turn out to be the property of the Spanish chaplain; such as Don Matthias de Silva's reply, when asked to fight a duel early in the morning, that he never rose before one, even for a party of pleasure, and could not be expected to rise at six to have his throat cut.

This much, however, must be said for Le Sage, that he shows no desire to conceal the source of his obligations, for one of his characters is termed Marcos Obrejon, and the Sangrado of his novel is, undisguisedly, the Sagredo of Espinel. Le Sage, however, knew that after every deduction was made on the score of invention, the merit of his novel would remain much the same. He threw lightness and sunshine into the mean and gloomy pictures of the Spaniards, taking care to efface the recollections of folly and knavery in his adventurers, by a cheerful and respectable termination of their career; and though the graduation of the fool into the knave, and the knave into the honest man, upon a mere principle of utility, be not perhaps in itself a very lofty moral, it is at all events far more agreeable than that of the Spanish novelists, where the rogue continues such to the last, and his only advancement is to a higher degree in the curriculum of knavery. A romance of a more pleasing and political cast than these tales of knavery, was the historical romance, the *Civil Wars of Granada*, by Gines Perez de la Heata, printed in 1604, turning on the dissensions of the Zagus and Abencerrages during the reign of Boabdil, and giving occasion, as might be expected, to many fine descriptions of tournaments, feasts of canes, Moorish palaces and gardens, and the contrast between the Christian and the Moorish chivalry. From this romance Florian has mainly borrowed the idea and materials of his *Gonsalvo of Cordova.*

One other work of fiction deserving notice, though partaking more of the nature of the satire than the novel, is the *Fray Gerundio* (Friar Gerund) of the Jesuit de l'Isla,—a severe, but rather tedious satire upon the absurdities and bad taste of the popular preachers of the time. In romantic literature the Spaniards at the present day seem to be entirely deficient. Translations of the popular French and English novels abound, but native talent or invention appear to be at an end.

French romances and novels.

In France the pastoral romances of D'Urfé and his imitators, and the heroic romances of Gomberville, Scudery, and Calprenede, whose object was "peindre Caton galant et Brutus dameret," were succeeded by an inundation of *contes des fees* and *voyages imaginaires*, appearing about the close of the seventeenth and the commencement of the eighteenth century. This species of nursery literature, which, like the character of the fair Arricidia in *Clelia*, was " furieusement extraordinaire et terriblement merveilleux," seemed peculiarly well suited to the frivolous tastes which then pervaded French society; and its temporary attraction was perhaps based in some degree upon the very want of reason and common sense, which rendered its permanent popularity impossible. When the sage Oglou in Voltaire asked the sultanas " comment preferez vous des contes que sont sans raison et que ne signifient rien," the answer of the sultanas was, " c'est precisement pour cela que nous les aimons."

Fairy tales.

Perrault.
D'Aulnoy.
Murat.
La Force.

The chief writers in this school of fiction, with whose compositions most of us have in our early days been rendered familiar, through the little gilded volumes of Mr. Newberry or his successors, were Perrault, the Countess D'Aulnoy, Madame Murat, and Mademoiselle de la Force, of whom Perrault is decidedly the best, his tales being distinguished by a simplicity and naivete of style indispensable in this style of writing, and in which the productions of the ladies are deficient. No great share of original invention is displayed by any of them. The chief storehouse from which they drew was the *Notti Piacevoli* of the Italian novelist Straparola, and the very remarkable Neapolitan collection by Giambattista Basile, entitled the *Pentamerone*, of which the first edition appeared in 1637.

A sightly different direction was given to this taste for marvels by the translation into French of the *Arabian Nights* by Galland, and of the *Persian Tales* by Petit de la Croix and Le Sage, which led to a host of oriental imitations. And the childishness and absurdity of the whole of this department of literature was exposed with great wit and liveliness by Count Antony Hamilton, in his *Fleur d'Epine*, and in his unfinished tale of the *Four Facardins.*

Marivaux.

But this same period was distinguished by the productions of some writers of a higher order: Marivaux, (1688—1763), Prevot, (1697—1763), and Le Sage, (1668—1746). Marivaux had a good deal of Richardson's power of delicate portrait painting, by an accumulation of miniature touches: nor is he deficient in the power of managing the interesting situations with which his *Mariamne* especially abounds. And certainly, if we except Mademoiselle La Fayette's pleasing romance of the *Princess of Cleves*, he may claim the merit of having been the first, in France, to reduce the novel from mere extravagance, both of incident and character, to the standard of natural feeling, and to present us with real beings, instead of fantastic creations of the imagination. His chief faults are his intolerable minuteness in trifles, and the affectation of the style, which is worthy of the society of the Hotel de Rambouillet. His best novel, too, the *Mariamne*, terminates abruptly and inartificially, with a conclusion like that of Zadig, "where nothing is concluded."

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[1] Dunlop's *History of Fiction*, vol. iii. p. 119.

evot.

Prevot had a much higher and more romantic imagination than Marivaux. He threw into the novel something of the gloom and grandeur of tragedy; and hence he has been termed by some of his countrymen the Crebillon of romance. A visionary disposition and an ardent temperament had hurried him through a restless and passionate life, in which good and evil, suffering and enjoyment, had been scarcely blended; so that to the task of composition he brought the results of a mournful experience in aid of the resources of the imagination. To use the expression of Voltaire, "Il n'etait pas seulement un auteur mais un homme, ayant connu et senti les passions." Prevot is not a great inventor of character; for to all his heroes, Cleveland, Patrice, even the Chevalier des Grieux, he appears to have lent much of his own feelings and his own peculiarities of mind. Though an extremely voluminous novelist, none of his works appear now to be read or recollected, except his painful but powerful story of *Manon L'Escaut*, a tale of crime and profligacy, strangely blended with generous feeling, which has been translated into English by Charlotte Smith. *Manon L'Escaut*, though little more than an episode, thrown off apparently with an easy negligence, bears the impress of genius, which it would be difficult to recognise in an authentic form in any of the larger productions of Prevot. Opening in the most unpromising manner, with what appears to be the common-place history of a vicious and discreditable connexion between Des Grieux and Manon, in which weakness of principle on the one side is made the dupe of profligacy and vanity, united with personal charms, on the other, the stream of feeling, at first polluted and turbid, works itself purer as it runs; and the scenes rise into elevation just as the character of Manon herself, the "fair mischief" of the romance, around whom Prevot has thrown no common fascination, changes from the selfish mistress into the faithful companion, following the fortunes of her husband, whom her charms had ruined, into disgrace and banishment, and dying by his side among the wilds of America.

Madame de Tcin.

Love also forms the subject of the novels of Madame de Tencin, (died 1749), the *Siege of Calais* and the *Count de Comminges*, which are admired for their tenderness and delicacy, qualities we should hardly have anticipated from a lady who stood in so confidential a relation to the cardinal Dubois, and who left her illegitimate child, d'Alembert, to the tender mercies of the public.

L Sage.

The greatest of the French novelists, however, is Le Sage. Even in his first romance, the *Diable Boiteux*, the plan of which has been suggested by the *Diablo Cojuelo* of Luis Velez de la Guevara, and which appeared in 1707, the wit, the graceful lightness, and the good-humoured sagacity of observation, which distinguished the character of Le Sage, were evident. The conception, in particular, of his esprit follet, a "diable bon-homme," with so much more gaiety than malice, that at times we are tempted to think him rather amiable than otherwise, was a great improvement on Guevara's; and the effect of the work was heightened by the skill with which he contrived to interweave with the story, if such it can be called, a multitude of contemporary allusions. Such indeed was its popularity and immediate sale, that two young men are said to have fought a duel in a bookseller's shop about their right to the only remaining copy; a well attested anecdote, so much in the spirit of those satirical traits in which Asmodeus indulges, that as Sir Walter Scott remarks, it deserved to be recorded by the demon himself.

The reputation as a novelist which these most amusing revelations of Asmodeus had founded, was brought to its height by the production of the first three volumes of *Gil Blas*, bringing the history down to the retirement to Lirias; a work, with the exception of *Don Quixote*, perhaps the most universally popular in fictitious writing, pleasing equally, whether read in youth, in manhood, or in age, and containing, as has been justly said, more "useful knowledge," than twenty scientific and moral treatises. Le Sage's celebrated novel represents the level of life as it appears in a large capital, without either its brightest lights or its darkest shadows. He exhibits the average state of feeling among such communities,—loving virtue and good conduct within due bounds, but, at the same time, with that natural toleration for selfishness, servility, vanity, or occasional deviations from the path of strict integrity, which in such society is certain to be engendered and countenanced. As he saw nothing like an elevated morality in the world with which he was best acquainted,—the Parisian public,—so he has not attempted to introduce any such exalted tone of feeling into his romance. His hero is an adventurer, to whom a hundred parallels might probably have been pointed out any evening among the audiences at the Foire, with fair abilities, with a kindly heart, and naturally good inclinations, but little moral firmness; by no means so enamoured of the straight road of right as not to turn aside occasionally when the deviation suits his purposes; duped at first by his own vanity, and then availing himself of his dear-bought experience to take his revenge on others in the same coin, but still with a gradually increasing preference for good conduct and virtue, and a secret determination, when a favourable opportunity offers, and his fortune is made, of becoming in due course an honest man.

To this conception of an agreeable rogue, refined partly by good feeling, and partly by calculation, into a better being, Le Sage has imparted a wonderful air of particular, combined with general truth; for though *Gil Blas* is the representative of so wide a class, that almost all must acknowledge at times some common, and perhaps not very flattering features of resemblance between ourselves and him, he preserves throughout his whole career the most distinct individuality of character. Nor are the other subsidiary agents of the novel deficient in distinctness and clearness of portraiture. Sangrado, Scipio, the sleek Ambrose de Lamela, the eloquent but apoplectic archbishop, are made to stand before us. The historical personages have the same look of truth. Lerma and Olivarez, in particular, are admirably painted; so much so, that some Spanish critics, like De l'Isla and Llorente, have zealously maintained that Le Sage merely translated from some unknown Spanish manuscript which he had plundered. These critics reason, in fact, in such an ingenious way, as to make the accuracy or inaccuracy of Le Sage's Spanish pictures equally available for their argument. If he be perfectly correct in his portraits of manners, and his allusions to Spanish customs, that part of the work, they maintain, could not have been written by any but a Spaniard. If he falls into mistakes, it is equally clear that these apparent slips were introduced by him on purpose to hide the source of his depredations, and to confuse, like Cacus, the traces of his retreat. It is needless to say that the statement, at least as made in this unqualified form, is totally incorrect. Le Sage had no doubt thoroughly imbued himself with the spirit of the Spanish humour, as it appeared in Cervantes, and the writers of the Picaresco school; and, as already said, he borrowed liberally incidents from *various* Spanish romances; but he lent to the whole a point, gaiety, and philosophy, which presented the old materials with all the appearance of novelty, and the charm of an original invention. "All is easy and good-humoured, gay, light, and lively; even the cavern of the robbers is illuminated with a ray of that wit with which Le

Sage enlightens his whole narrative. It is a work which renders the reader pleased with himself and with mankind; where faults are placed before him in the light of follies rather than vices; and where misfortunes are so interwoven with the ludicrous, that we laugh in the very act of sympathizing with them. All is rendered diverting, both the crimes and the retribution which follows them."[1]

Though Le Sage rightly considered his characters as his chief object, he was well aware of the pleasing relief which might be given to his story by the judicious combination of the repose of landscape painting with the bustle of incident; and though he does not succeed in bringing before us, with the vividness of Cervantes, the sombre and parched plains or rugged mountain scenery of Spain, his work contains some country pictures, in a style of placid beauty, which are models of stillness, comfort, and serenity. To whom, for instance, does not that modest demesne at Lirias, watered by the Guadalaviar, with its mansion-house of four little pavilions, its garden bordered with orange trees, and ornamented with its basin of white marble, and the quaint, respectable, old Moorish furniture of the apartments, not to mention the olla podridas of Master Joachim, and the revenue of five hundred ducats a-year, rise up before the mind's eye, as the very ideal of that happy rural retreat which, to each of us, is to be the Euthanasia of a life of carefulness and toil; making us long for the time when we may be able to say with its fortunate possessor,

> "Inveni portum; spes et fortuna valete
> Sat me lusistis, ludite nunc alios."

Crebillon the younger.

It is unnecessary to dwell long on the romances of the younger Crebillon, (1707—1777), as to which the only circumstance which is remarkable is, that so much frivolity of manner, and real poverty of invention, could have obtained a temporary popularity even by the licence in which they indulged; yet that they were very popular for a time, we know; for Sterne represents his fille de chambre inquiring, at a circulating library, for the *Egarements du Cœur et de l'Esprit*, in 1768. French writers, however, appear to recognise in his pictures some resemblance to the society of the time; for D'Alembert says of him, "he draws with a delicate and just pencil the refinement, the shades, and the graces of our vices."

Diderot.

Much higher talent, though, like Crebillon's, stained by a shameful association with licentious and profligate pictures, appears in the romances of Diderot, (1713—1784). His talent as a narrator, in particular, was scarcely inferior to Voltaire's. He had the picturesque particularity of Richardson, with a more condensed expression. It is not, however, in his larger and more notorious romances, such as the *Religeuse*, that this talent is displayed. In these the tedium is as conspicuous as the indecency and impiety. It is in such short tales as *l'Histoire de Mademoiselle de la Chaux*, or *Les Deux Amis de la Bourgoyne*, short popular simple histories, contrasting strongly with that air of false simplicity, in reality tricked out with sentimental fard and tinsel, which Marmontel (1719—1798) has given to his amusing, but not very moral tales.

Marmontel.

Voltaire's romances.

The romances of Voltaire, (1694—1778), such as *Zadig*, the *Princess of Babylon*, *Babouk*, and *Candide*, have but slender pretensions to the title. They are chiefly satirical fictions, or illustrations, in the form of a tale, of irreligious or antisocial opinions. Their wit, their biting irony, their familiarity with the baser parts of human nature, their power of rendering trifles pleasing by the art of narration, are undeniable; but we must not look in them for probable incident, for Voltaire generally chooses, as if on purpose, some extravagant oriental groundwork as his canvass, and borrows from Ariosto, from Gulliver, from the Arabian Nights, or any source which suits his purpose;—nor for the delineation of natural characters, for both the incidents and personages are merely made the instruments for working out the preconceived theorem. They produce their effect, such as it is, not by their fidelity to nature, but by the ingenious malice with which its features are distorted.

From the time of Marivaux downwards, the tendency of the French novel had been to narrow the province of incident, and to extend proportionally that of sentiment. With Rousseau, (1712—1778), this tendency reaches its height. The description of feelings, and particularly of such as, though often experienced, are seldom expressed in words, was his peculiar field. Invention, either of character or incident, he has none. To paint one strong passion, to invest vice with an air of insane but reasoning morality,

> "To make madness beautiful, and cast
> O'er erring deeds and thoughts a heavenly hue
> Of words like sunbeams, dazzling as they past;"—

this is the main aim of his *Julie*, and the only one in which Rousseau has been at all successful. Even in this respect, too, the declamatory tone, the continued delirium of feeling, the total want of repose, which characterise the work, combined with the pedantry of its dissertations, become painful and oppressive. "Ce sont des amans," said Rousseau himself, speaking of his characters, "et non pas des academiciens." Never was an apology more misplaced. The real fault of *Julie* and *St. Preux* is, that they have both too much of the academician in their composition, and too little of the lover, so far as the expression of natural passion in simple words is concerned. We have never been able, in reading the romance, to persuade ourselves that its real eloquence was not as dubious as its morality. It is not easy, indeed, in perusing Rousseau's apostrophes to purity and virtue, to avoid thinking of the strange commentary which his practice furnished to his theory. It was said of Sterne with severity, but perhaps with some justice, that he could bestow upon a dead ass the pity which he denied to a living mother. And the man of nature and of truth, who expends his trembling sensibilities on paper, suffers a fellow-servant to be punished for the theft he had himself committed, and provides for his natural children in the foundling hospital.

The total corruption of an exhausted society, tottering to its fall, with the external varnish of gaiety and wit by which it tried to gild its decay, are aptly represented in the licentious romances of Louvet and La Clos; its still more vulgar profligacy in the coarse and incoherent, but occasionally striking and original novels of Restif de la Bretonne, (1734—1806). The works of the two former writers are unfortunately but too well known; the numerous and hasty productions of the eccentric printer, who was accustomed often to set up his strange compositions in type, without a manuscript, as the ideas occurred to him, are now almost completly forgotten. Yet Schiller and several eminent German critics, have spoken with high approbation of the vigour and talent which they evince in some parts, however defective or revolting in others. "I have scarcely *imagined* any thing," says Restif, in his *Drame de la Vie*; "I have simply related; my life has been so full of events, that I have made four-and-twenty volumes out of it." Any one, indeed, who writes, as Laharpe says of Restif in his *Correspondence Russe*, under the persuasion, that all that he had seen, and thought, or learnt, deserved to be printed, and who acted faithfully on that principle, could hardly fail to produce compositions with very nearly the merits and demerits of the novels of Restif; that is to say, with the coarseness of feeling which was natural to the man, with the disjointed air which a set of unconnected incidents from life must present, and yet with that degree of freshness and truthfulness of painting, which sketches from life almost invariably possess, however humble or disagreeable may be the department from which they are drawn. His best novel is usually considered to be the *Paysan Perverti*, which appeared in 1776.

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[1] Sir Walter Scott's *Lives of the Novelists*—Le Sage.

Two writers may be pointed out, however, about this period, who were the representatives of a better taste and better feelings.

. Pierre. Bernardin de St. Pierre (1737—1814) may be regarded as the connecting link between the eighteenth and the nineteenth century: a graft of Fenelon upon Rousseau. His pathos no doubt often merges in a weakly sentimentalism; but the calm idyllic beauty of the *Paul and Virginia* and the *Indian Cottage* (1789—1792) was not without its use in restoring to French literature a feeling for nature and its simple enjoyments, and the acknowledgment of a Providence, a belief which both philosophy and fiction had for some time past been labouring to obliterate.

The defects of St. Pierre, with very little of his redeeming excellencies, appear in the *Atala*, *Rene*, and *Natchez* of Chateaubriand. He is, no doubt, in some departments an original thinker, and a man of a poetical imagination, though a degree of vagueness and mysticism mingles even with the best of his works; but as a novelist, his sickly sentiment and exaggeration of feeling are fatal to his success.

When the limbo of the Revolution, after its billowy heaving, began to settle again into something like a calm, under the despotism of the Consulate, the novel took the direction of broad and extravagant humour, derived from the gaieties and vulgarities of middle life, and, as might naturally be expected, liberally sprinkled with indecency, in the voluminous novels of Pigault Le Brun,—to whom it would be unfair to deny considerable powers of broad mirth, and a fertility in imaginary burlesque situations, which remind us of Smollett. But the questionable character of the novel-writing of this period is not universal. In the tales of Madame Cottin, the authoress of *Elizabeth* and *Mathilde*, a pure morality, and feminine tenderness, reappear; and though those of Madame de Staël, with all their eloquence, occasionally inculcate more doubtful lessons, her genuine admiration for pure and elevated feeling, prevents her from willingly lending her talents to the palliation of vice. The novels of Madame de Staël, however, are far more German in their character than French.

dier. The works of the literary veteran, Nodier, certainly owe their attractions more to the charms of a beautiful style than to their substance. Throughout his whole course he has been but an imitator, putting on successively the manner of other writers. The *Werther* of Goethe appears to have first given the tone to his novels, and the passionate energy and wild complaints of the German suicide were reproduced in his tale of *Therese Aubert*. To the influence of Goethe succeeded that of Byron, and the spirit of the *Corsair* and *Lara* were infused into the Bandit *Jean Sbogar*. From Byron he passed to Scott, whom he has imitated in his *Trilby, ou le lutin d'Argail*, a production, the effect of which, though meant to be serious and pathetic, is unintentionally of the most comic kind, for the "tricksy spirit" of Argyle in the hands of Nodier becomes one of the most absurd of supernatural conceptions. In his *Smarra* again, a Thessalian story in the manner of the sorceries and diableries in the Golden Ass of Apuleius, he seems to have been influenced by the German night pieces of the school of Hoffmann; and he certainly succeeds almost as well as his German master, in producing a strange ephialtic effect by a cloud of misty murky phantoms, which pass before us as if in a feverish and uneasy dream.

With the restoration of the Bourbons, some degree of external decency, at least, distinguished the productions of the French press, though still the license which its novelists permitted to themselves in their comic works, and the extravagant and terrible cast of their more tragic stories, indicated at once a looseness of morality, and a coarseness of taste, which might, in some measure, have prepared the world for that strange and revolting spectacle which the literature of fiction has presented in France, since the Revolution of 1830. The manner of Pigault le Brun, was imitated and improved upon by Paul de Koch; for, adopting his principle of drawing chiefly from middle life, and his love for the representation of comic mischances, he has thrown into the best of his novels, scenes of simple humour, of tenderness, and even of powerful passion, to which the novelist of the Revolution had made no pretensions. To sneer at him as a Parisian cockney, or as the romance writer of the Grisettes, is easy; but we are much mistaken if his tales, homely and even coarse as they may be, will not be read when the atrocities of Sue and Masson, and the delicate depravities of Balzac, are forgotten.

Victor Hugo. In the higher sphere of romance, we have, during the same period, the earlier productions of Victor Hugo, *Hans of Iceland*, and *Bug Jargal*. *Hans of Iceland*, wild and extravagant as it is, is evidently not the work of an ordinary writer. A stern, savage northern spirit is breathed into the romance. Spiagudry, Orugix, even the monster from whom the tale derives its name, strange and ghastly creations as they are, exercise a certain fascination over the mind; and the youthful poet has turned to great account the dreary wilds, gloomy lakes, stormy seas, and ruined fortresses of Scandinavia. *Bug Jargal* was decidedly inferior to *Hans of Iceland*. The essential improbability in the character of a negro passionately in love with a white woman, and yet tempering the wildest passion with the deepest respect, is obvious; nor is that improbability disguised by the art with which Hugo has framed his story. There was more of genius, we think, in his *Dernier Jour d'un Condamné*, in which Hugo, like Sterne, has taken a single captive, shut him up in his dungeon, and then "looked through the twilight of the grated door to take his picture." In this little work he has shown how a profound interest might be given to a mere register of sensations, and a dramatic movement imparted to a monologue, in which the scene shifts only from the Bicètre to the Conciergerie, the Hotel de Ville, and the Place de Grève. Hugo's great novel, *Notre Dame de Paris*, appeared in 1831. It is needless to speak of a work which has been more than once translated into English; and the characteristics of which, the mingled genius and extravagance, the poetical spirit in which it is conceived, and the want of nature in the characters which it pourtrays, resembling distorted and hideous masques rather than men, are now very generally and correctly appreciated.

The popularity of the romances of Scott led about the same time to a multitude of imitations, by Jacob and others, of which the *Cinq Mars* of Alfred de Vigny appears to be generally considered the most successful.

We have no idea of entering on that mass of revolting performances, equally offensive to good morals and good taste, with which the French press has teemed since 1830; and which we are but too happy to consider, with the French themselves, as a literature of transition. This school of blood and voluptuousness, funereal horrors and drunken orgies, the transitions in which remind one of the stage arrangement in the rehearsal,—"the coffin opens, and a banquet is discovered,"—we feel assured, can be of no long duration; and already we believe, that the French public begin to feel that they have had enough of the endless Balzac, and Janin, and Sue, and Soulie, and Masson, and the other labourers in this Montfaucon of fiction. As for Madame du Devant, or George Sand,—the Chevalier d'Eon of French literature,—a being whose sex it would be impossible to ascertain from her works, with the warm passions and headlong eloquence of the woman, and the audacious speculation of the man;—while the principles which she labours to inculcate, are of the most odious nature; and the cynical hardihood with which she paints scenes from which any woman would turn aside, is perhaps the very worst proof which French literature at present presents of a degraded standard of delicacy and right feeling among the female sex, we cannot deny that she appears to us to possess far greater talent, even genius, though misdirected, than any of the other ephemeral novelists to which we have alluded. In particular, she has an imagination singularly alive to natural beauty; her pictures of scenery are frequently captivating; and one evening landscape of Venice, in her *Dernier Aldini*, has the combined charm of deep sensibility and truth. By far the most pleasing of her novels, because it in a great measure keeps in the background her peculiar opinions, is *André*. And yet even the general purity and right feeling of the tale is marred and interrupted by some passages which English readers at least would wish to blot.

German novels and romances.

The field of the novel or romance is not that which has been cultivated in Germany with the most success. The labourers indeed have been many, the produce most abundant, but the quality of the harvest is at best equivocal. Down to the time of Goethe and Tieck, the German literature of fiction was almost entirely imitative, deriving both its form and spirit from other nations. Since their time, if it presents a greater air of originality, it has generally assumed a character so fantastic, so unreal, so unlike all that we have been accustomed to associate with the idea of a novel, that it is extremely difficult to comprehend what is really the conception of the word entertained in Germany.

As we have no very high idea of the German prose fictions, the space which we propose to devote to them will be extremely limited; for we shall confine ourselves to a mere indication of the successive phases which the German romance has presented. In doing so, it seems unnecessary to go back beyond the latter portion of the eighteenth century, or to revive the names of works and authors which even the Germans themselves have forgotten. The earlier part of the eighteenth century had been occupied with numerous imitations of the *Robinson Crusoe* of Defoe, or of the family pictures of Richardson, the merits of which are not of a nature to demand notice in the present sketch.

Wieland.

In the Greek romances of Wieland, (1763—1812), such as the *Agathon*, the *Aristippus*, *Peregrinus Proteus*, and *Agathadämon*, the same didactic tendency is observable which distinguishes those of Voltaire, but without their cynyical and mocking tone, and with a much greater power, if not of actually inventing character, at least of working up the scanty materials furnished by history into a consistent and plausible portrait of the historical personages of antiquity; as in his *Socrates*, and still more perhaps in his *Aristippus*. The main fault of his novels, besides this didactic tone, which pervades them all, is the frequent repetitions which they contain of the same views and personages. *Agathon* in one manner, and the *Abderites* in the other, contain the germ of almost all Wieland's other writings. The sceptical Hippias, for instance, only puts off the Athenian stole in Agathon, to assume the mantle of the Calendar; the Danæ of that novel revives again in Theoclea and Devidassi; the youth of Athagon, in Delphi, is the prototype of that of Peregrinus in Parium; and many such instances must occur to any one familiar with Wieland. He is a mannerist, in short, as to his matter, and the mannerism extends even to his style, which, though flowing and facile, has not a little of the solemn loquacity of Boccaccio. This diffuseness is less felt in his shorter tales, where his philosophy is not so obtrusively displayed; and for this reason we prefer his *Don Sylvio de Rosalva*,—the history of a quixotic believer in fairyism, gradually converted to common sense by the extravagant demands which are made upon his belief, assisted by the charms of a mortal beauty,—and his little romance of the *Salamander and the Statue*, to his more elaborate and aspiring compositions.

The influence of the novels of Richardson and of Fielding reappears about this time in a liberal effusion of family novels, some pourtraying the serious and sentimental, others the comic aspect of domestic life. Among the sentimental novelists, Augustus La Fontaine (1758—1831) may be considered as the most successful, and undoubtedly the most popular. He painted life as he had seen it in the little German towns, villages, and chateaux of respectable proprietors about him, or as he had witnessed it during his campaigns as army chaplain, without ornament or alteration, without any pretension to imagination; and though there is at times something vulgar and tawdry in his sentimentalism, there is also a great deal of quiet simple nature in such scenes of common life and domestic happiness as he has exhibited in his family of Haller; and a tone of frankness and good humour, which carries the reader pleasingly along through incidents and characters that in themselves are common-place enough.

La Fo taine.

The comedy of family life found numerous representatives, of whom Wetzel, Müller, Schulz, and Hippel, attracted some notice in their day and generation. Even yet the *Siegfried von Lindenberg* of Müller, which appeared about 1779, and of which many editions have appeared, may be admitted to be a natural and amusing performance.

Comic mances.

A union of the sentimental with the comic in these domestic pictures was attempted at a somewhat later date in the very singular novels of Richter, (1763—1825), a man of high powers, which he knew not how to use, and which were alloyed in no common degree by false taste, and an incurable affectation of singularity. His earliest novel, the *Grönländische Processe*, appeared in 1784. The tricks and claptraps to which Sterne occasionally descends, we find habitual with Richter. The very titles of some of his works, such as *Selections from the Papers of the Devil, or Recreations under the Cranium of a Giantess*, and the absurd devices by which he generally introduces his narration, as in the *Hesperus*, where a series of letters is represented as mysteriously conveyed to the author in letter-bags tied round the neck of a shock-dog, betray a mind anxious to astonish by fantastic conceits, and insensible to the beauty of simplicity. The constant recurrence of these instances of literary quackery, the want of connexion which his chaotic narrations exhibit, combined with the visionary cast of his views, justifying his own remark, that the empire of the Germans was peculiarly that of the air, has been fatal, and we think justly, to all attempts to naturalize Richter in this country. His pathos we think in the worst style of false, and often meaningless, effusions of sentimentality; but as a quiet humourist, blending good feeling with his satire, he is often very successful. In this respect we admit the truth of the observations of Mr. Carlyle, from whose estimate of Richter's genius we in other respects fundamentally differ: "It is on the strength of this, and its accompanying endowments, that his main success as an artist depends. His favourite characters have always a dash of the ridiculous in their circumstances, in their composition, perhaps in both. They are often men of no account, vain, poor, ignorant, feeble; and we scarcely know how it is that we love them; for the author all along has been laughing no less heartily than we at their ineptitudes. Yet so it is; his Fibel, his Fixlein, his Siebenkäs, even his Schmelzle, insinuate themselves into our affections; and their ultimate place is closer to our hearts than that of many more splendid heroes. This is the test of true humour; no wit, no sarcasm, no knowledge, will suffice; not talent, but genius, will accomplish the result."

Richter.

Feudal mances

A strong contrast to these pictures of ordinary life, whether serious or comic, was presented by the mass of romances connected with the feudal periods in Germany, which appeared from about 1780 to 1800, and formed the counterpart of the Ritter-stücken or chivalrous dramas, with which the stage had been inundated since the example had been set by Goethe's *Goetz of Berlichingen* and Babo's *Otho of Wittelsbach*. Cramer, Spiess, Schlenkert, and Veit Weber, (Leonhard Wächter), were the favourite writers of this turbulent school of fiction, which in all probability took its rise from the popularity of the romances of Mrs. Radcliffe. Their materials were the blood-stained period of Faustrecht and Vehm-Gerichte, feudal tyrants, suffering damsels, devoted knights, with abundance of single combats and splintering of lances, raising of trap-doors, escapes by sliding pannels, imprisonments in bottomless dungeons, murders, witchcraft, and apparitions; in short, all that apparatus of the terrible, which, even in such hands, has a certain fascination for the boy, but awakens only a feeling of the ridiculous in the man.

Another department of German fictions likewise dealing with the marvellous, but fortunately cultivated by writers of a very different order of talent, was the Mährchen, or legendary tale. Three different modes may be pointed out in which this class of subjects has been treated.

Musæus.

The first is exemplified in the *Volksmärchen*, or popular tales of Musæus, in which the groundwork of marvellous tradition which the writer has selected is treated, not in the spirit of belief, but of a laughing scepticism, and where the writer relies for effect, not so much upon the interest of his materials, as upon the wit, the satirical allusions, and the quaint description or broad drollery which he is able to infuse into the original legend. Whatever in such traditions bordered upon awe or terror, Musæus rejected; he viewed even these creations of the fancy in a prosaic light, and selected only such features as could be wrought into his ingenious mosaic of fanciful marvel, picturesque description, and sly and somewhat irreligious pleasantry, in the style of Voltaire. What he attempted, however, he accomplished with success. Some of his tales, such as *Stumme Liebe*, (Dumb Love), and *Melechsala*, might be cited as models of the art of combining the childish interest of a nursery tale with that shew of irony or philosophy which affords even to grave personages an apology for the perusal of popular tales.

Tieck.

In this semi-derisive style of treating the traditionary legends of his country, Musæus remains the solitary writer of talent. This natural tendency of the German mind towards earnestness and belief, even in the case of the marvellous, led to a very decided preference of the serious manner in the treatment of such themes. And undoubtedly at the head of this second mode of treating the legend stands Ludwick Tieck, (born 1773). Questionable as we think his claims are to the highest distinction, either as a poet or a novelist, in the proper sense of the term, his success in the management of traditional marvels in a poetical spirit is undeniable. He seems without an effort to throw himself back into the spirit of primitive and superstitious periods, when the agency of an invisible world formed an article of belief, and exercised the strongest influence over the conduct of life; a time of supposed prodigies, and omens, and secret charms, whose agency pervaded and controlled the course of nature. In reading the best of these legends of Tieck, such as *The Fair Eckbert*, *The Love Charm*, or *Peter of Abano*, we feel that he has the power of carrying us back in advanced age into the very realm of Fairyland, and subjecting us anew to the influences of childhood. "These legends have a freshness about them like that of the earliest morning, a sweetness as of wild flowers, and a calm beauty, caught as it were from a radiant sunset or a rising morn. The reader of the *Runenberg* is brought face to face with the presiding spirits of the animal and vegetable kingdoms; now he feels as if he were embosomed in luxurious vegetation, bathed in fertilizing dew, and fanned by balmy zephyrs, and now as if he were transported to cavern depths or darkest mines, where mountain spirits exercise an unholy influence. All the other legends, *The Fair Eckbert*, *The Fairies*, and *The Trusty Eckhart*, have the same beauty and significance; but it is impossible by mere description to give any idea of their peculiar nature. They must be studied and felt to be at all understood."[1]

We are here speaking of Tieck merely as the writer who has treated the traditional tale in the most poetical spirit. Within the domain of the novel, taking the term even in a very extensive sense, our estimate of his powers will be very different.

The mode of treating the legendary lore of Germany, of which the tales of Tieck had furnished the first example, as the most agreeable to the national character, soon found numerous, or, it might rather be said, numberless imitators. For the last thirty years, the example of Tieck has been implicitly followed, and all the legendary novelists of Germany have been melancholy and gentlemanlike, after the pattern of the Phantasus. Of these the writers best known to English readers, through translation, are the Baron de la Motte Fouque, the author of *Undine*, the *Magic Ring*, and *Sintram*; Chamisso, the author of *Peter Schlemihl*; and Apel, the author of the *Freyschütz*. It may be doubted whether better specimens of the German tale might not be selected from writers with which the English public is not familiar,—some of Henrich Steffens' short legendary stories in particular,—such as, the *Sleeping Bride*, (Die Schlafende Braut) and the *Nightly Betrothal in the Church of Rörwig*, (Die Nächtliche trauung im Kirche Rörwig), which have not yet found a translator, appear not undeserving of the attention of the lovers of the marvellous. In the wild productions of Achim von Arnim, such as the *Countess Dolores*, and *Isabella of Egypt*, traits of talent sparkle in the midst of absurdity. And from the works of Clemens Brentano, and of Zhokke, the author of *Abelino*, several interesting legends might be selected. In particular, we are surprised that the simple and beautiful legendary tale by the former, "The History of the Brave Kasperl and the Fair Annerl," is yet untranslated.

Hoffmann.

The third form in which the Mährchen was employed, but, at the same time, perverted from its proper purpose, and subjected to a more Mezentian union than it had submitted to even under the satirical despotism of Musæus, was in the fantastic or grotesquely terrible manner introduced by Hoffmann, and, since his death, so injudiciously and unsuccessfully imitated both in Germany and in France. Hoffmann's manner cannot be considered as entirely original, since an approach to it may be pointed out in the *Diable Amoureux* of Cazotte. It is singular, however, that his productions, such as the *Sandman*, the *Magnetizer*, the *Devil's Elixir*, and others of that class, deriving their whole interest and effect from their connexion with the peculiar nature and idiosyncrasy of the writer's mind, and so incapable of being imitated with the least success by any one not possessing the same anomalous mental conformation and physical irritability with the Prussian judge, should have exercised a very decided though temporary influence over the literature, not merely of Germany, but of Europe; and it proves that, notwithstanding the extravagances, there does reside in them some charm,—something which appeals successfully, not, indeed, to the mind in its calmer mood, but to the imagination when in a state of temporary excitement. Only in such a mind as Hoffmann's, moulded into its existing shape by an ill-omened union of influences, mental and bodily, habitually haunted with gorgons and presentiments, seeing traces, as it were, of the devil's hoof in the commonest paths of life, and starting and trembling at the chimæras with which his imagination peopled solitudes—could the phantoms bred in his eccentric brain, and nurtured amidst the fumes of a Berlin tavern, have ever assumed that appearance of reality and belief which could render their introduction into a work of fiction at all practicable. Only by a mind accustomed, from a painful experience, to brood over and dissect the origin and connexion of these strange phenomena, half mental half physical, which make "life a dream," but with a nightmare accompaniment, could the possible connexion of this phantasmagoria with real existence, in morbid minds, be rendered so far intelligible as to redeem them from the charge of the merest puerility. Hoffmann's tales, though they constantly suggest the idea that they have had their source in the inspiration of opium, seem really to be the only compositions in this style of grotesque horror, which can be said to possess the redeeming quality of genius. They remind us of the images of our dreams, calling up before us, as in sleep, long perspectives of gloomy vastness, broken here and there by the light of the strangest ignes fatui, along which are seen, flitting in antic movements, bands of the strangest creatures, such as those which, in the pictures of Teniers, disturb the solitude of St. Anthony, or which give a strange blending of the humorous and the horrible to the distempered sketches of Callot. Yet, as a proof that the talent of Hoffmann was by no means confined merely to the fantastic and the supernatural, we may notice his truthful and vigorous picture of the German burgher life of the middle ages, in his *Master Martin and his Apprentices*, and his *Mademoiselle de Scudery*, a tale of vivid and fascinating interest, founded on a historical groundwork, moving in the simplest and most direct manner towards its object, and exciting the feeling of curiosity and suspense even to the last.

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[1] *Germany*, by Bisset Hawkins, p. 126.

Heinse.

Some notoriety of an evil kind was obtained by a class of novels, in which the attempt was made to invest sensuality with the graces of art, or to merge art in sensuality. Such were the *Ardinghello* of Heinse (1749—1803), in which painting was made the apology for the introduction of voluptuous pictures, and his *Hildegard von Hohenthal*, in which music was made to minister to a similar purpose,—no unfit sequel to a literary life which commenced with a translation of Petronius. In truth, in the whole range of the German novels, the tendency to an undue license of this kind is observable. In those of Goethe, though veiled by an appearance of decency, it is sufficiently perceptible; nor does Tieck appear free from the common taint. Many passages in *Wilhelm Meister* are highly objectionable; and such a novel as the *Wahlverwandschaften* we regard as untranslateable into English.

Goethe.

Of Goethe's novels we have already expressed our opinion in our biographical article on Goethe himself. If the merits of a novel consisted, not in exhibiting an epitome of human life, more or less poetically conceived, according to the prosaic or imaginative turn of the writer's mind, but in speculating ingeniously on painting, agriculture, landscape, gardening, the rules of good composition, or the state of the theatre, connecting these speculations by a thread of mystical narrative, and introducing us to a set of beings without the least trace of reality about them, who all appear to be playing some theatrical part in a dreamy representation of life, which seems to have no intelligible object,—Goethe may be a great novelist. With an English public, demanding some firm basis of reality, instead of that unsubstantial cloud-land which envelopes us in the *Wilhelm Meister's Lehrjahre* and *Wanderjahre*, and accustomed to insist on a plain meaning as a preliminary to poetical embellishment, he never can be a favourite. A novel which does not explain its purpose without a commentary, seems to violate the essential laws of such compositions; but a novel, in regard to the object of which no two commentators agree, is an anomaly in literature. Most of the German critics, indeed, though professing a great admiration of these singular performances of Goethe, are careful to confine their observations, in regard to the meaning or object of the novels, to the merest generalities. They describe *Wilhelm Meister*, to use the congenial language of an English admirer, as a picture "of warm, hearty, sunny, human endeavour, a free recognition of life in its depth, variety, and majesty, *but as yet no divinity recognised there*." The latter portion of the sentence is intelligible, and is unfortunately true, but the rest reminds us of Mr. Dangle's remark, that the interpreter appears the harder to be understood of the two.

Tieck.

These observations apply, with slight modification, to the novels of Tieck, when he abandons the province of the traditional tale, and attempts subjects connected with real life; the characters, the incidents, the whole cast of the tale, appear so extravagant, that, but for the grave and laudatory criticism with which these effusions seem invariably to be received by his countrymen, it would be difficult to believe the author serious. His first romance, *William Lovel*, was a gloomy and revolting extravagance, and his later caprices, such as *Das Alte Buch*, (the Old Book), the *Vogelscheuche*, (Scarecrow), *Eigensinn und Laune*, (Self-will and Humour), *Wunderlichkeiten*, (Marvels), are utterly unworthy of a man of genius. Even the merits of his *Dichterleben*, (a Poet's Life), have been greatly exaggerated. Any tale, in which Marlowe and Shakespeare figure as actors, has a certain interest for a Briton; but beyond some eloquent disputations on the drama, and the formation of a poet's mind, in which Shakespeare and his companions are made to utter modern German theories, the most opposite to English notions of the sixteenth century, we cannot perceive wherein the peculiar merit of this much-lauded performance lies. Tieck has said absurdly and presumptuously of Sir Walter Scott, that "it is surprising how little he wants to be a poet, but how much that little outweighs all that he is." Let any one who has read Tieck's *Aufruhr in den Cevennen*, in which he has come in competition with the Scotch novelist on an historical subject, judge whether he has himself made a nearer approximation to that character.

The talent displayed by Schiller in his *Verbrecher aus Ehre*, and his fine fragment of the *Armenian, or the Ghost Seer*, excites regret that he did not give us less of philosophy, and more of fiction. It is an unfinished tale of mystery, of deep interest, the idea of which, it is supposed, was suggested by the juggleries of Cagliostro, and in which Schiller, though he never witnessed the scenery which he describes, has caught the spirit of silence and secrecy which seems to pervade Venice, with the same success as, in his *William Tell*, he has transported us into the mountain recesses of the Oberland. And Lord Byron has recorded the strong impression made upon his mind by the recollection of the incomprehensible Armenian, one of those conceptions which he was accustomed by anticipation to associate with the image of the city of the sea.

Schiller.

Several female novelists, too, have respectably supported the pretensions of their sex; such as Fanny Tarnow, the Baroness de la Motte Fouque, Johanna Schopenhauer, Henrietta Hanke, and Caroline Pichler, the able authoress of *Agathocles*. Many of their productions exhibit talent, grace, and facility of style, but we should be at a loss to name any for which the praise of genius could justly be claimed.

The class of romances called *Kriminal Geschichten*, turning on stories of secret guilt discovered by circumstantial evidence, has been a numerous one in Germany. At the head of this class of novelists stands Kruse, who certainly possesses in a high degree a power, which at the present day appears to be rather a rare one,—that of constructing an ingenious and complicated plot, keeping the curiosity constantly on the stretch, and defying conjecture as to the result, till the author himself chooses to furnish the solution. The *Ring, Oath and Conscience, Diodatis' Birth,* the *Dance of Death,* and the *Red Dragon,* are masterpieces in this style of invention, which, though of a sufficiently prosaic character, yet possesses, at least, this cardinal merit, that it is rarely tedious.

Historical romances have always been numerous in Germany; and after the appearance of those of Sir Walter Scott, they became still more so. Some of the chivalrous pictures of Tromlitz, Van de Velde, and Blumenhagen in this style are spirited, but in general the historical romance of Germany does not rise above mediocrity. "Sunt bona, sunt quædam mediocria, *sunt mala plura.*" Let us except the very remarkable tale of *Michael Kohlhaas,* by the unfortunate dramatist Kleist, (1776—1811). In all of Kleist's tales there is too much of a spectral and fatalistic character; he delighted to contemplate and to delineate life as necessitated by a mysterious and iron destiny. *Kohlhaas* is not entirely free from a tinge of the supernatural, which harmonizes ill with the deep, humble, human interest of the tale itself; and no where does the idea of a grim and unrelenting fate appear in more saddening colours. There is truth, therefore, in Goethe's remark as to this romance, that "it brings prominently into view a dissonant principle in nature, with which poetry ought not to meddle, with which it cannot reconcile itself, let the handling of the matter be never so exquisite." And yet this vigorous and truthful picture from the Lutheran times, must be to English readers an object of interest, from the contrast it exhibits to the usual style of the German novel; for it is told with a directness, a simplicity, a dramatic liveliness, and an absence of unnecessary reflection, which are qualities of rare occurrence beyond the Rhine.

(W.W.W.W.)

ROMAGNA, a province of Italy, in the pope's territories, bounded on the north by the Ferrarese, on the south by Tuscany and the duchy of Urbino, on the east by the gulf of Venice, and on the west by the Bolognese and a part of Tuscany. It is fertile in corn, wine, oil, fine fruits, and pastures. It has also mines, mineral waters, and salt-works, which make its principal revenue. Ravenna is the capital town.

ROMANIA or RUMELIA, an extensive province of the Turkish empire in Europe, called by the Turks the Ejelat Rumili, or the land of the Romans. In the more extended sense it comprehends the whole countries to the west and the north of the Bosphorus, but in a more peculiar sense it included the ancient Thrace, Bulgaria, Servia, and Greece, except a strip on the coast and the islands which are in the Pashalic of the Capudan Pascha, and one distinguished as the Ejalet Dscheseir. It is divided into 24 districts or sandgiacets, extends over 105,182 square miles, and probably contains 6,000,000 inhabitants. The capital of it, as of the empire, is Constantinople or Istambol.

ROMANO, GIULIO, a famous painter of the Roman school, was born at Rome in 1492. He was the favourite pupil of Raphael, who had such an affection for him, that he appointed him, with John Francis Penni, his heir. He first signalised himself by his Battle of Constantine, which he painted from a design of Raphael's, and which was particularly admired by Poussin.

When he had completed the hall of Constantine in the Vatican, from Raphael's designs, he went to Mantua, where the patronage of the Gonzaghi family excited him to those great works, and those magnificent plans by which Mantua and the palace Del T. have been so highly decorated. In the decorations of this palace, Julio prepared the cartoons, and had the pictures executed by his pupils; but he afterwards corrected and finished them. Modern pencils are said to have covered the touches of Julio, especially in the Fable of Psyche, the Allegories of Human Life, and the Giants Storming Heaven, where his composition and design are alone seen. In the fresco paintings of the old palace or corte of Mantua, which refer principally to the histories of the Trojan war, his peculiar merits are better perceived. Helen Asleep, Vulcan forging arms for Achilles, are considered beautiful, and Minerva slaying Ajax is regarded as sublime.

The most remarkable of the altar pieces of our artist are the three frescoes of St. Marco; and in the church of St. Christofero, the athletic figure of that saint supporting the infant Jesus. His Martyrdom of St. Stephen on the head altar of the church of St. Stephen at Genoa, is preferred to them all.

His conceptions were more extraordinary and more elevated than even those of his master, but not so natural. He was wonderful in the choice of attitudes; but did not perfectly understand the lights and shades, and is frequently harsh and ungraceful. The folds of his draperies, says Du Fresnoy, are neither beautiful nor great, easy nor natural, but all extravagant, like the fantastical habits of comedians. He was, however, superior to most painters, by his profound knowledge of antiquity; and, by conversing with the works of the most excellent poets, particularly Homer, he made himself master of the qualifications necessarily required in a great designer. Julio Romano was also well skilled in architecture. He was employed by Cardinal de Medicis, who was afterwards pope under the name of Clement VII.; he ultimately settled in Mantua, whither he was invited by Frederick Gonzago, marquis of that city, in order to avoid his being justly punished for having drawn at Rome the designs of twenty obscene plates, engraved by Mark Anthony, to which Aretine added the same number of sonnets. Julio Romano embellished the city of Mantua with many of his performances, both in painting and architecture, and died in that city in 1546, at 54 years of age.

ROMANS, a city of France, in the department of the Drome, and the arrondisement of Valence, situated on the right bank of the Isere. It has considerable manufactories of stockings, caps, hats, and silk goods, and makes large quantities of oil from wallnuts. The fruit, especially melons, is chiefly sent to Grenoble. It contained in 1836, 9285 inhabitants. Lat. 45. 6. Long. 4. 57. E.

ROMBLON or ROMBLINO, one of the smaller Philippine islands, about 30 miles in circumference. Long. 121. 58. E. Lat. 12. 40. N.

ROMAN HISTORY.

Rome, a city of Italy, formerly the capital of the greatest empire in the world, and still remarkable as the chief seat of the papal power, is situated on the river Tiber, in east long. 13°, and north lat. 41° 45′.

To trace, even briefly, the rise and progress of this mighty city towards universal empire, would demand a voluminous history, especially were we to enter into disquisitions respecting the views which have been adopted in this article; but as our limits forbid such an attempt, we must content ourselves in a great measure with the statement of general results, with such occasional references as may enable our readers to investigate the subject at greater length; and we think it fortunate, that many of the views which were held as mere paradoxes when first proposed by Niebuhr, may now be regarded as firmly established, and without hesitation followed as essentially correct.

For the history of the various tribes, which, when united under the Roman name, formed one mighty nation, we must refer to the different heads under which, in other parts of this work, they are mentioned. The chief of these were the Oscan, probably the most ancient race that inhabited Italy; the Pelasgian, under which designation may also be comprised the Tyrrhenian,[1] with its numerous branches; and the Etrurian, which was marked by various features distinguishing it from both the other races, being also probably less ancient than either. From all that appears in history or tradition, the Oscan, Opican, Auruncan, and Ausonian, were the same race of people, and the earliest inhabitants of that part of Italy contained between Oenotria and Tyrrhenia, or the country of the Etruscans;[2] in a word, they were the original stock whence sprung several of the most powerful nations of Italy, as the Sabines or Sabellians, the Samnites, and others. The Pelasgi[3] appear to have been a branch of that once mighty race of whom traces may be discovered from the river Strymon, along the coast of Ionia, throughout Greece and its islands, and along the maritime shores of Italy. It was from their Pelasgic ancestors that the Romans derived the radical affinities which are found to connect the Italian language with that of Greece, both having had, at some remote period, a common origin. The Pelasgi seem to have driven the Oscan nations from the sea-coast, back to the mountains, and in their turn to have been overpowered in part of their acquired territory by the Etruscans. The origin of this latter people is involved in obscurity hitherto impenetrable.[4] They display many traces of an oriental, or, as some think, of an Egyptian origin. We incline, for many reasons, to believe them of Phœnician extraction; not merely the peculiarities of their alphabet, but those also of their religious rites, bearing a very close resemblance to the most ancient forms of the Phœnician language and religion. It is probable that a careful investigation into the customs, laws, and religion of the ancient Etrusci, or rather Raseni, to use their own name, will ultimately prove them to have belonged to a race more ancient still than even the Phœnicians, that is, to the ancient oriental race whence the Phœnicians themselves derived their origin, their language, and religion.

Respecting the institutions of these primitive races, very little is known; yet from that little, important conclusions may fairly be drawn. Both the Osci and the Pelasgi seem to have lived under the patriarchal form of government; the origin of which is to be traced to the paternal sway which a father naturally exercises over his household, and the head of a tribe, or number of households, over the whole collectively. The Etrusci, on the other hand, appear to have adopted the system of *castes*, and especially to have been very much under the influence of a sacerdotal caste, which was of course hereditary, and which possessed almost unbounded influence over the rest of the nation. The effect of the combination of these nations, and their peculiar institutions, in forming the character of the Roman people, will soon appear.

Founda
of Rom
B.C. 7

Rome itself is said to have been founded in the year 753 B.C. This date, therefore, we shall assume as the most probable, if not absolutely authentic, and shall make it the basis of all subsequent chronological statements.[5] According to the fabulous accounts preserved by Livy, the founders and earliest inhabitants of Rome were of Trojan descent. Æneas is said to have led a colony of Trojans, after the destruction of Troy, through a series of perilous voyages and adventures, to the shores of Italy, near the mouth of the Tiber. Here he formed an alliance with Latinus, king of the adjoining country, received his daughter Lavinia in marriage, and built a town, called, from her name, Lavinium. A war, which soon afterwards arose between the new settlers and the Rutulians, terminated in the death of their king, Turnus, who was slain in battle by Æneas. Another war ensued between the Trojans and Mezentius, king of the Etruscans of Caere. In this war Æneas himself perished, having been drowned in the Numicius, into which he was forced in a disastrous battle, and was succeeded by his son Ascanius, or Iulus. On the banks of the river where he disappeared, an altar was built in honour of him, and he was worshipped under the name of Jupiter Indiges. Mezentius soon afterwards fell by the hand of Ascanius, who thus obtained undisputed possession of the territory formerly held by Latinus. The Trojan settlers became completely incorporated with the people of the land, and from king Latinus they derived the common name of Latins. The thirty years had now elapsed during which it had been predicted that the Trojan race were to inhabit their first town, Lavinium. They removed to a more propitious situation, and built a new town on a lofty ridge farther inland, which overlooks all the land around it, and to their new abode they gave the name of Alba Longa. Of the Latian confederacy, this became the chief city; and hither the thirty confederate cities of Latium resorted to offer common sacrifices to the gods of the Pelasgic nation.

The traditionary legends proceed to state, that Lavinia, fearing some injustice from Ascanius, had sought shelter in the woods, where she gave birth to a son, named from that circumstance, and from his father, Æneas Sylvius. Ascanius, however, took no unfair advantage of his position, and was succeeded by Sylvius. For an uncertain period, the sceptre was swayed by successive monarchs of the Sylvian race and name, till the death of Procas. This king left two sons, Numitor and Amulius, but by birthright the throne belonged to Numitor. Amulius, however, seizing the government in defiance of his brother's right, caused Numitor's only son to be put to death, and made his daughter Silvia a vestal virgin, by which she became bound to perpetual celibacy. According to the legend, this scheme proved abortive; for Silvia became pregnant by the god Mars, and was delivered of twin sons. Amulius ordered the infants to be thrown into the river, and their mother to be buried alive; the doom of a vestal virgin who should violate her vow of chastity. The river happened at that time to have overflowed its banks, so that the two infants were not carried into the middle of the stream, but drifted along the margin, till the basket which contained them became entangled in the roots of a wild vine, at the foot of the Palatine hill. At this time a she-wolf coming down to the river to drink, suckled the infants, and carried them to her den among the thickets hard by. Here they were found by Faustulus, the king's herdsman, who took them home to his wife Laurentia, by whom they were carefully nursed, and named Romulus and Remus.

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[1] See Niebuhr, vol. i. p. 38, *et seq.*

[2] Id. vol. i. p. 64, *et seq.*

[3] Id. vol. i. p. 29.

[4] Id. vol. i. p. 109, *et seq.*

[5] Id. vol. i. p. 262, *et seq.*

The two youths grew up, employed in the labours, the sports, and the perils of the pastoral occupation of their foster-father. But, like the two sons of Cymbeline, their royal blood could not be quite concealed. Their superior mein, courage, and abilities, soon acquired for them a decided superiority over their young compeers, and they became leaders of the youthful herdsman in their contests with robbers, or with rivals. Having quarrelled with the herdsmen of Numitor, whose flocks were accustomed to graze on the neighbouring hill Aventinus, Remus fell into an ambush, and was dragged before Numitor to be punished. While Numitor, struck with the noble bearing of the youth, and influenced by the secret stirrings of nature within him, was hesitating what punishment to inflict, Romulus, accompanied by Faustulus, hastened to the rescue of Remus. On their arrival at Alba, the secret of their origin was discovered, and a plan was speedily organized for the expulsion of Amulius, and the restoration of their grandfather Numitor to his throne. This was soon accomplished; but the twin brothers felt little disposition to remain in a subordinate position in Alba, after the enjoyment of the rude liberty and power to which they had been accustomed among their native hills. They therefore requested from their grandfather permission to build a city on the banks of the Tiber, where their lives had been so miraculously preserved. Scarcely had this permission been granted when a contest arose between the two brothers respecting the site, the name, and the sovereignty of the city which they were about to found. Romulus wished it to be built on the Palatine hill, and to be called by his name; Remus preferred the Aventine, and his own name. To terminate their dispute amicably, they agreed to refer it to the decision of the gods by augury. Romulus took his station on the Palatine hill, Remus on the Aventine. At sun-rise Remus saw six vultures, and immediately afterwards Romulus saw twelve. The superiority was adjudged to Romulus, because he had seen the greater number, against which decision Remus remonstrated indignantly, on the ground that he had first received an omen.[1]

Romulus then proceeded to mark out the boundaries for the wall of the intended city. This was done by a plough with a brazen plough-share, drawn by a bull and a heifer, and so directed that the furrow should fall inward. The plough was lifted and carried over the spaces intended to be left for the gates; and in this manner a square space was marked out, including the Palatine hill, and a small portion of the land at its base, termed *Roma quadrata.* This took place on the 21st of April, on the day of the festival of Pales, the goddess of shepherds. While the wall was beginning to rise above the surface, Remus, whose mind was still rankling with his discomfiture, leaped over it scornfully, saying, "Shall such a wall as that keep your city!" Immediately Romulus, or, as others say, Celer, who had charge of erecting that part of the wall, struck him dead to the ground with the implement in his hand, exclaiming, "So perish whosoever shall hereafter overleap these walls." By this event Romulus was left the sole sovereign of the city; yet he felt deep remorse at his brother's fate, buried him honourably, and when he sat to administer justice, placed an empty throne by his side, with a sceptre and crown, as if acknowledging the right of his brother to the possession of equal power.

Romulus, the first king.

To augment as speedily as possible the number of his subjects, Romulus set apart in his new city a place of refuge, to which any man might flee, and be protected from his pursuers. By this device the population increased rapidly in males; but there was a great deficiency of females; for the adjoining states, regarding the followers of Romulus as little better than a horde of brigands, refused to sanction intermarriages. But the schemes of Romulus were not to be so frustrated. In honour of the god Consus, he proclaimed games, to which he invited the neighbouring states. Great numbers came, accompanied by their families; and at an appointed signal, the Roman youth, rushing suddenly into the midst of the spectators, snatched up the unmarried women in their arms, and bore them off by force. This outrage was immediately resented, and Romulus found himself involved in a war with all the surrounding states. Fortunately for Rome, though these states had sustained a common injury, they did not unite their forces in the common cause. They fought singly, and were each in turn defeated; Cænina, Antemnæ, and Crustumerium, fell successively before the Roman arms. Romulus slew with his own hand, Acron, king of Cænina, and bore off his spoils, dedicating them as *spoila opima,* to Jupiter Feretrius. The third part of the lands of the conquered towns was seized by the conquerors; and such of the people of these towns as were willing to remove to Rome, were received as free citizens.

In the mean time, the Sabines, to avenge the insult which they had sustained, had collected together their forces under the command of Titus Tatius, king of the Quirites, or people of the Sabine town of Cures. The Romans were unable to meet so strong an army in the field, and withdrew within their walls. They had previously placed their flocks in what they thought a place of safety, on the Capitoline hill, which, strong as it was by nature, they had still further secured by additional fortifications. Tarpeia, the daughter of the commander of that fortress, having fallen into the hands of the Sabines, agreed to betray the access to the hill, for the ornaments they wore upon their arms. At their approach she opened the gate, and as they entered, they crushed her to death beneath their shields. From her the cliff of the Capitoline hill was called the Tarpeian rock. The attempt of the Romans to regain this place of strength brought on a general engagement. The combat was long and doubtful. At one time the Romans were almost driven into the city, which the Sabines were on the point of entering along with them, when fresh courage was infused into the fugitives, in consequence of Romulus vowing a temple to Jupiter Stator, and by a stream of water which rushed out of the temple of Janus, and swept away the Sabines from the gate. The bloody struggle was renewed during several successive days, with various fortune and great mutual slaughter. At length the Sabine women who had been carried away, and who were now reconciled to their fate, rushed with loud outcries, outspread hands, and dishevelled locks, between the combatants, imploring their husbands and their fathers to spare on each side those who were now to them equally dear. Both parties paused; a conference began, a peace was concluded, and a treaty framed, by which the two nations were united into one. The Sabines built a new city on the Quirinal and Capitoline hills, on the north and north-west of the Roman hill, the Palatine; and Romulus and Tatius became the joint sovereigns of the combined people. But though united, each nation continued to be governed by its own king and senate; and in all that respected their common interest they met in the valley between the Palatine and Capitoline hills, in a place from that circumstance called the Comitium.

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[1] According to the interpretation of the Etruscan augurs, the twelve vultures seen by Romulus portended that the duration of the city would extend to twelve centuries; and it may strike even an incredulous reader as remarkable, that the actual duration of Rome as a free and imperial city coincided very nearly with the time assigned by this augury. It ended in the 1229th year of the city, by the dethronement of the last emperor Romulus Augustulus.

See Niebuhr, vol. i. p. 224. See also Gibbon, vol. vi. p. 136, Milman's edition.

During the double sway of Romulus and Tatius, a war was undertaken against the Latin town of Cameria, which was taken and made a Roman colony, and its people admitted into the Roman state, as had been done with those whom Romulus previously subdued. Tatius was soon afterwards slain by the people of Laurentum, because he had refused to do them justice against his kinsmen, who had violated the laws of nations by insulting their ambassadors. The death of Tatius left Romulus sole monarch of Rome. He was soon again engaged in a war with Fidenæ, a Tuscan settlement on the banks of the Tiber. This people he likewise overcame, and placed in the city a Roman colony. This war extending the Roman frontier, led to a hostile collision with Veii, in which he was also successful, and deprived Veii, at that time one of the most powerful cities in Etruria, of a large portion of its territories, though he found the city itself was too strong to be taken.

B.C. 721.

The reign of Romulus now drew near its close. One day, while holding a military muster or review of his army on a plain near the lake Capra, the sky was suddenly overcast with thick darkness, the light of the sun was quenched, and a dreadful tempest of thunder and lightning arose. The people fled in dismay; and when the storm abated, Romulus, over whose head it had raged most fiercely, was no where to be seen. A rumour was circulated that during the tempest he had been carried to heaven by his father, the god Mars. This opinion was speedily confirmed by the report of Proculus Julius, who declared, that as he was returning by night from Alba to Rome, Romulus appeared to him in a form of more than mortal majesty, and bade him go and tell the Romans, that Rome was destined by the gods to be the chief city of the earth, that human power should never be able to withstand them, and that he would himself be their guardian god Quirinus.

So terminates what may be termed the legend of Romulus, the founder and first king of Rome. That no person, bearing any resemblance in name and actions, to what is recorded of him, ever existed, it would be perhaps too hazardous to affirm; while it is perfectly evident that the greater part of the narrative is entirely fabulous. The story of Æneas and his Trojans rests upon no better foundation, and has no better claim to be believed. Indeed the various accounts respecting the Trojan leader and colony, are so contradictory as completely to destroy the pretensions of any of them to credibility. All the accounts of the reigns of Ascanius and his successors at Alba Longa, are equally fabulous. The divine paternity, miraculous preservation, and early exploits of Romulus and Remus, are evident fables, of a daringly poetic cast. But that a small strength, a ῥώμη, may have been constructed on the Palatine hill, by some bold and skilful leader of a band of freebooters, about the period assumed for the foundation of Rome, is by no means improbable. A city so founded, by a band so formed, not only might, but evidently must, have passed through a series of contests with the neighbouring cities, similar to those related of Romulus and his people. There may, therefore, be perfect poetical truth, so to speak, in the narrative, though it should be in a great measure devoid of real historical truth. Discarding its miraculous passages, it is sufficiently natural and self-consistent to be received as a traditional account of the adventures, perils, and fluctuating fortunes of the early founders of Rome, of whatsoever race descended, and by whomsoever led.

Numa Pompilius.

Upon the death of Romulus an interregnum took place; during which the senate is reported to have divided itself into ten Decuriæ, each of which governed the state by turns, during periods of five days. At length it was agreed that a king should be chosen out of the Sabine part of the united people, but that the choice should be left to the Romans. Their choice fell upon Numa Pompilius, who is said to have been a citizen of Cures, of noble birth, and greatly distinguished for his wisdom and piety. Upon his election to the sovereignty, he refused to accept it till he had inquired by augury whether it were the will of the gods that he should be king. The omens being favourable, he next laid before the *comitia curiata* the proposal of an enactment by which he should be acknowledged as king, and intrusted especially with full military command. Having received this public and formal recognition of his sovereign power, he then applied himself to the consolidation of the new kingdom and people, by the enactment of laws, and the appointment of whatever pertained to religious worship. To him is ascribed the apportioning of the public territory which had been gained by conquest, to the new people who had become freemen of the Roman state. He determined the extent of the lands to be held by private citizens, marked their boundaries, and fixed them by landmarks consecrated to the god Terminus. Instead of endeavouring to extend the territory of the state, he assigned it also a fixed boundary, restrained the aggressive spirit of the warlike Romans, and strove to mollify them by the cultivation of the arts of peace, and especially by the exact and constant observance of religious rites. He instituted the orders of the priesthood, and determined their respective offices. To the Pontifex Maximus he gave the supreme authority in matters of religion. He appointed the flamens, or priests of the three great gods of the nation, Jupiter, Mars, and Quirinus. To the service of the goddess Vesta he consecrated four virgin priestesses, whose duty it was to tend the ever-burning fire in her temple. By him was formed the institution of the Salii, who honoured Mars Gradivus by solemn songs and dances on appointed festal days, and who were intrusted with the custody of the sacred shield *Ancile*, which fell down from heaven. To him is also ascribed the institution of the college of augurs, whom he himself instructed in the observation of the greater auspices, which were drawn from lightning, and other signs in the heavens.

But in the formation of these sacred institutions, Numa did not solely trust to his own wisdom. He was instructed, says the legend, by the nymph Egeria, who met him in a sacred grotto, and taught him the will of the gods. So highly did she honour, and so dearly did she love him, that she took him to be her husband. To confirm the authority of Numa, and to ratify the laws which he made, and the sacred rites which he taught, Egeria gave to the Romans a token and proof of their divine origin. While Numa was entertaining a party of distinguished citizens, with a meal of homely fare, and served on earthen vessels, Egeria, at his word, changed it into a feast of the most delicious viands in vessels of gold. But though a favourite of the gods, Numa was still mortal. He died full of age and honours, beloved and lamented by all his people, and mourned with ever-flowing sorrow by the nymph Egeria.

B.C. 67

Such is the peaceful and lovely legend of Numa Pompilius, said to have been the second king of Rome, and to have reigned forty years. It is, however, so manifestly poeti-

B.C. 679.

cal, or perhaps mythical, that it is utterly in vain to attempt to extract from it any thing like real history. It may have been merely meant to represent the period of the establishment of forms of laws and religion, which naturally follows that of founding a city and collecting a people. And as all ancient lawgivers assumed divine authority for the sanction of their institutions, so the Roman lawgiver is said to have obtained the instructions of Egeria. The legend is too beautiful to be lost, though too imaginative to be believed; and we turn reluctantly from its evanescent loveliness, to the consideration of matter of a harsher mould.

Tullus Hostilius

An interregnum again followed the death of Numa. At length Tullus Hostilius, a man of Latin or Romish extraction, was chosen by the *curiæ;* and his election having been sanctioned by the auspices, he, like his predecessor, submitted to the *comitia curiata* the laws which conferred upon him full regal power. The new king was more desirous of military renown, than of the less dazzling fame which may be gained by cultivating the arts of peace. An opportunity was soon offered for indulging his warlike disposition. Plundering incursions had been made into each others' territories by the borderers of the two states of Rome and Alba. Both nations sent ambassadors at the same time to demand redress. The Roman ambassadors had private orders from Tullus to be peremptory in their demands, and to limit their stay within the stated period of thirty days. They did so, and receiving no immediate satisfaction, returned to Rome. In the mean time, Tullus amused the Alban embassy by shews and banquets, till, when they opened their commission, he had it in his power to answer, that he had already in vain sought redress from Alba, and that now they must prepare for the events of a war, the blame of originating which was chargeable upon them. By this device Tullus thought to avoid the guilt of being the aggressor, and to secure the favour of the gods by the justice of his cause.

Under the command of Cluilius, the Albans sent a powerful army against Rome, and encamped about five miles from the city. There Cluilius died; and the Albans elected Mettius Fufetius in his stead. Tullus Hostilius, at the head of the Roman army, now drew near the Albans. But when the two armies were ready for a general engagement, Mettius, the Alban general, proposed to save the effusion of blood, by committing the fortune of the war to the valour of certain champions selected from either side. To this proposal Tullus agreed. It so happened that there were in each army three brothers, each three the children of one birth, whose mothers also were sisters, though their fathers belonged to different nations. The three Romans were named Horatii, the three Albans Curiatii. These youthful warriors were chosen to be the champions of their respective nations, and immediately prepared for the combat. It was agreed, that by the issue of this contest should be determined the dominion or subjection of each people. The two armies were drawn up in battle array, each on their own side of the boundary line that divided their territories. The young combatants advanced, and met on the very line. The combat began, and was sustained for some time with equal skill, courage, and ardour, while the two armies gazed on the eventful struggle with the suspended breath of intense anxiety. At length two of the Horatii fell at the feet of their antagonists; a sight which called forth loud shouts of joy from the Albans, while the Romans remained quivering with suspense for the fate of their remaining champion, and the freedom of their country. Horatius was still unhurt, whilst the three Curiatii were all severely wounded. Believing himself more than a match for each singly, he feigned a flight to divide them. They pursued with unequal strength and speed, and were separated to considerable distances from each other. On a sudden he turned, rushed on the enemy nearest him, and slew him at a blow. With equal impetuosity he assailed and killed the second, while the third was hastening to render his brother aid. There was now but one combatant on either side, yet it could no longer be called a battle. Faint, exhausted, and dispirited, the third of the Curiatii sunk beneath the vigorous arm of the victorious Roman, who thus at once avenged his brothers, and won for his country the sovereign sway.

As the Romans were returning in triumph to the city, Horatius bearing the triple spoils, they were met at the Capenian gate by his sister, who had been betrothed to one of the Curiatii. When she beheld the bloody mantle of her lover, which she had wrought with her own hands, borne aloft by her brother, she burst into loud lamentations, flinging loose her scattered locks. Horatius, enraged at her untimely grief and outcry, drew his sword and pierced her to the heart, exclaiming, "So perish the Roman woman that shall bewail a foe." For this fierce deed, Horatius was by the judges condemned to death. But he appealed to the people, and his father defended him, saying, that if his daughter had not deserved to die, he would himself have punished his son, in virtue of his own authority as a father. The people refused to stain the victory which Horatius had achieved for his country by shedding the blood of the conqueror, and therefore spared his life, but caused him to undergo the semblance of capital punishment, and perform certain expiating sacrifices and rites, which thenceforth became hereditary in the Horatian family.

Notwithstanding the agreement which had been entered into between the Romans and the Albans, the latter were unwilling to forfeit their national independence without an additional struggle. This, however, they were desirous to avoid provoking single-handed. They accordingly encouraged the people of Fidenæ to revolt, by giving them secret promises of assistance. Tullus Hostilius immediately levied a Roman army, and summoned the Albans to his aid. The two armies met, the Veientes being drawn up opposite to the Romans, and the Fidenates confronting the Albans. When the battle began, Mettius Fufetius, the Alban leader, wanted courage and decision to fulfil his own treacherous pledge; he neither joined the Romans nor the Fidenates, but drawing his men off from the conflict, stood aloof, to watch the event and act accordingly. His defection struck a temporary panic into the Romans, which was speedily allayed by the bravery and skill of Tullus; and his remaining aloof caused distrust in the Fidenates, who finally fled before the vigorous onset of their antagonists. Tullus gained a complete victory; and concealing his knowledge of the treachery of Mettius, next day called an assembly of his whole army. The Albans came unarmed, and arrived first. The Romans came next, wearing, as they had been directed, their swords hid beneath their mantles, and at a signal surrounded the Albans. Tullus then denounced the treachery of Mettius, and commanded him to be torn asunder by two chariots of four horses, as his mind had been divided between the Romans and the Fidenates in the battle. It was then decreed that Alba should be razed to the ground, and the whole Alban people removed to Rome, to prevent the possibility of future strife. Not only the walls of Alba, but every human habitation, was totally demolished, and the temples of the gods alone left standing in solitary majesty amid the ruins.

But though Tullus had thus put an end to the separate existence of Alba, he did not reduce its inhabitants to slavery. He assigned them habitations on the Caelian hill, which had formerly been possessed by the followers of the Etruscan Lucumo, Caeles Vibenna. Those who had been of patrician rank at Alba were allowed to retain the same rank at Rome, and a new tribe was formed, called the Luceres. The construction and numbers of this tribe were the same as those of the other two; so that the entire senate, composed of the heads of houses of the three tribes amounted now to 300, which continued to be its stated number.

Soon after these events, Tullus made war upon the Sabines, and in a bloody, and for some time doubtful encounter, again obtained the victory. Another war arose with the confederate towns of Latium, who began to dread the growing power of Rome after the destruction of Alba. The Latian war terminated without any decided reverses sustained by either party; and an alliance was formed between the Romans and the Latins. Tullus had now leisure to direct his attention to the arts of peace, in which, however, he did not equally excel. The only public works ascribed to him were the enclosing of a space for the Comitium, or assembly of the people; and the building of a Curia, or senate-house. Towards the end of his reign his mind was disturbed by prodigies, indicating the wrath of the gods, for religion neglected, and temples left desolate. A shower of stones fell from heaven on the Alban mount; and the awful accents of a supernatural voice were heard to issue from the consecrated summit of the hill. A plague swept away numbers of the Roman people. The king himself sickened; and from having been neglectful of religion, became the slave of superstitious terrors. In vain did he supplicate the gods. He had disregarded them in his days of prosperity, and in his adversity no deity regarded his prayers, or sent relief. In his despair he presumed to use the divinations of Numa, by the rites of Jupiter Elicius; but the only answer returned was the lightning of the offended gods, by which Tullus himself and his whole household were smitten and consumed. Such is the legend of Tullus Hostilius, said to have been the third king of Rome. B.C. 640.

After the death of Tullus Hostilius there followed another interregnum, during which the senate, as usual, exercised the functions of sovereignty. An assembly was then held, in which Ancus Marcius, a son of the daughter of Numa, and a Sabine by race, was chosen king. He assumed the sovereignty with the usual formalities, receiving the sanction of the comitia curiata. Ancus seems to have taken the conduct and character of Numa for his model rather than those of his more warlike predecessors. His first object was to restore those religious rites which had been neglected by Tullus; and for this purpose he caused the institutions of Numa to be inscribed on tables, and suspended in public places, that all might read, know, and observe them.

Ancus Marcius.

While he was thus busied in restoring religious worship, the Latins imagined they might recover that power which had been wrested from them by Tullus. They soon found that Ancus, though peacefully inclined, was by no means incapable of resenting injuries. He raised an army, encountered the insurgent Latins, and after a severe struggle, not only defeated them in the field wherever he met them, but also took from them several cities, whose inhabitants he removed to Rome, and settled on the Aventine hill, on the south of the Palatine. On the left bank of the Tiber he prosecuted his conquests till he reached the sea, where he built Ostia, and settled a colony in it to secure it as a permanent conquest, and that it might be a sea-port for Rome. He obtained also some advantages over the Sabines and Veientines; and to render his intercourse with the right bank of the river both more easy and more secure, he formed a wooden bridge across the Tiber, and fortified the hill Janiculum. The oldest remaining monument of Rome, the prison, formed out of a stone quarry on the Capitoline hill, is also said to have been the work of Ancus. He died in peace, respected and beloved, and was known in tradition by the designation of "the good Ancus." B.C. 618.

That part of Roman history at which we have now arrived, is at once characterized by great interest and by great obscurity. It has the appearance of a great poem, containing just enough of fact to give it credibility in the ears of willing listeners, and enough of fiction and embellishment to destroy all its pretensions to the severely simple character of history. In our opinion this is its real character; and we are by no means disposed to discard more of it than seems of itself to assume no claim upon our belief. No reader can possibly mistake poetic ornament for fact; but there is one aspect of the narrative in which the common reader may be mistaken. It is not enough that an event be strange, or even almost marvellous, in order to be discredited. Many things are abundantly strange in our eyes which nevertheless did actually occur. The wild, strange, and daring exploits recorded of the early founders of nations are liable to be disbelieved by posterity, in the exercise of its cool philosophic criticism. But the founders of a nation are generally men of daring and enthusiastic character, whose actual deeds are constantly hovering on the brink of the incredible. Nations, like individuals, have a period of youth, in which their history is naturally full of deeds of lofty daring, strange adventure, and all but miraculous exploit. The most truthful narrative of a nation's youth must contain accounts of those deeds of scarcely imaginable hardihood; and such a narrative will seem utterly unworthy of belief to the cool philosopher of a calmer and more thoughtful age. Hitherto we have been attempting to obtain a glimpse of the very infancy of Rome; now we are to view the exploits of its fiery and impetuous youth. We are not lightly to credit every miraculous statement that claims our attention; but neither are we to demand a succession of events regulated by a cool deliberate prudence, such as our own habits of thought and action could alone approve.

In the days of Ancus Marcius a noble and wealthy Tuscan sought a residence in Rome. He was the son of a citizen of Corinth of some distinction, who had left his native country to avoid the tyranny of an usurper. Having settled at Tarquinii, a city on the coast of Etruria, he married an Etruscan lady of the highest rank. His son, in virtue of his mother's rank, belonged to the ruling caste of Etruria, the Lucumones; but the pride of that caste would not permit them to suffer a person of mixed descent to participate in their hereditary honours. He married an Etruscan lady of the noblest birth, Tanaquil by name, who could not brook that her husband should be disparaged by her haughty kindred. They left Tarquinii, and journeyed to Rome, in the hope of being received by Ancus in a manner more suited to their dignity. They had reached the brow of the Janiculum, and were in sight of Rome, when an eagle hovering over them, stooped, snatched his cap, and after soaring aloft with it to a great height, again descended and placed it on his head. Tanaquil, versed in the lore of Tuscan augury, understood the omen, and embracing her husband, bade him proceed joyfully, for the loftiest fortunes awaited him. He was received as a Roman citizen, and assumed the name of Lucius Tarquinius. His courage, his wisdom, and his wealth, soon recommended him to the favourable notice of the king, and made him greatly esteemed also by the people generally. On the death of Ancus he was chosen king, and received from the assembly the customary sanction to his assumption of sovereignty.

Tarquinius Priscus.

Scarcely was Tarquin seated on the throne when the Latin states broke the treaty which they had made with Ancus, and began to make inroads upon the Roman territory. Tarquinius marched against them, defeated them in battle, and took and plundered Apiolae, where he obtained an immense booty. Prosecuting his victorious career, he made himself master of Cameria, Crustumerium, Medullia, Ameriola, Ficulnea, Corniculum, and Nomentum. The Æqui also felt the power of his arms, and were obliged to humble themselves before him. While he was engaged with the Latins, the Sabines availed themselves of his absence, mustered their forces, crossed the Anio, and ravaged the country up to the very walls of Rome. Tarquinius returning from his Latin wars, encountered the Sabines, and after a desperate conflict, drove them from the Roman territories. Next year they again passed the Anio by a bridge of boats, and advanced towards Rome. Tarquinius met them in battle, and by the superiority of his cavalry gained a complete victory. During the battle a party of Romans, sent for that purpose, burned the bridge of boats, so that the routed Sabines were cut off from their retreat, and driven into the river, where great numbers of them perished. Their bodies and arms, floating down the Tiber, brought the first intelligence of the victory to Rome. He then crossed the river, inflicted upon them a second defeat, and compelled them to surrender the town and lands of Collatia, which they had previously taken from the Latins. Tarquinius placed a strong garrison in the town, and assigned the capture to his brother's son, who thence took the name of Collatinus. In this war the king's son, a youth of fourteen, slew a foe with his own hand, and received as a reward of honour a robe bordered with purple, and a hollow ball of gold to be suspended round his neck; and these continued to be the distinctive dress and ornament of the Roman youth of patrician rank, till they assumed the *toga virilis*, or manly gown.

Tarquinius is likewise said to have engaged in war with the Etruscan nations, to have taken several of their cities, and to have overthrown them, notwithstanding a confederacy of all their twelve states against him. In token of their submission to his power, the Etruscans at length sent him a golden crown, an ivory throne and sceptre, a purple tunic and robe figured with gold, and twelve axes bound up in bundles of rods to be borne before him, such as they used when their twelve cities chose a common leader in war. These, by the permission of the people, Tarquinius adopted as the insignia of kingly power; and, with the exception of the crown, and of the embroidered robe, they remained as such both to his successors on the throne, and to the consuls, unless on the days when they went in public triumph to the Capitol.

Such were the military exploits ascribed to Tarquinius; and there is nothing so improbable in them as to startle our belief. It is indeed manifest from other indications, that about the period assumed as the reign of Tarquinius Priscus, as he is called for the sake of distinction, the dominions of Rome must have comprised nearly all the territory which he is said to have conquered, and also that the city must have risen to great wealth and power. The latter point is proved by the great public works, which all accounts agree in ascribing to him. He built the cloaca maxima, or great sewers, to drain off the water from between the Capitoline and Palatine, and the Palatine and Aventine hills. This vast drain was constructed of huge blocks of hewn stone, triply arched, and of such dimensions, that a barge could float along in it beneath the very streets of the city. Earthquakes have shaken the city and the adjacent hills; but the cloaca maxima remains to this day unimpaired, an enduring monument of the power and skill of the king and the people by whom it was constructed. The Circus Maximus, or great race-course, was also a work of this monarch, intended for the display of what were called the great, or Roman games, "ludi magni Romani." The forum, with its rows of shops, was also the work of Tarquinius; and he began to surround the city with a wall of massy hewn stones. He likewise made preparation to fulfil a vow to build a great temple on the Capitoline hill to the chief deities of Rome.[1]

To conclude the legendary history of Tarquinius, he is said to have been murdered by the treachery of the sons of his predecessor Ancus Marcius. They, perceiving the favour with which the king regarded Servius Tullius, and fearing an attempt to make him king, to the exclusion of their own pretensions and hopes, hired two countrymen to pretend a quarrel, and to appear before the king seeking redress. While he was listening to the complaint of one, the other struck him on the head with an axe, and then they both made their escape. The conspirators did not, however, obtain the fruit of their treachery. Tanaquil gave out that the king was not dead, but only stunned by the blow, and had appointed Servius Tullius to rule in his name till he should recover. Servius immediately assumed the ensigns and exercised the power of royalty. The murderers were seized and punished, and the Marcii fled disappointed from the city. When the death of Tarquinius could no longer be concealed, the power of Servius was so well established, that the people were perfectly ready to grant him the usual confirmation in the powers of the sovereignty.

B.C. 578.

Servius Tullius.

The accounts respecting the origin of Servius Tullius are as obscure as those of any of his predecessors. The most ancient and poetical legend represents him as the son of Ocrisia, a captive and slave of Tanaquil the queen, by the Lar, or household god. Later legends made him a son of one of the king's clients, and for sometime a slave; or the son of a man of rank and power in one of the conquered Latin cities, who being slain in the war, his widow was carried to Rome in her pregnancy, and she and her infant son were protected by Tanaquil.[2] All accounts represent him as enjoying the favour of Tarquinius and his queen, and obtaining the throne in a great measure by the judicious management of the latter. It would seem as if Servius had in the very beginning of his reign encountered the opposition of the patricians. He is said not to have allowed any interregnum, or to have permitted the senate to take the lead in his election to the sovereignty; but as he had already acted as king before the death of Tarquinius was publicly known, so to have made a direct application, without any other preliminary process, to the comitia curiata, and to have been by them invested with the powers of former kings. The only historical conclusion which can be deduced from these incidental notices is, that a contest had begun between the kings and the patrician body, in which the kings deemed it their soundest policy to diminish the power of the patricians, in order to maintain their own. But as no direct diminution of their power could have been attempted without exciting an immediate insurrection, it was deemed expedient by these kings to raise a counterbalancing power in the state, which, having received its existence from them, might be expected to lend them aid in repressing the exorbitant power of the patrician body, combined with their hereditary privileges.

This view, it will be observed, both coincides completely with the tradition that Tarquinius first elevated the tribe of the Luceres to the possession of full senatorial power; and with the tradition that his very coming to Rome was caused by the pride of the privileged and hereditary order of Lucumones, who had excluded him from participating in the honours to which he thought himself entitled both by birth and merit. Finding at Rome also a patrician class, in the possession of hereditary powers and privileges, he not unnaturally regarded them with jealousy, and endeavoured to call into being a counterbalancing power, by which his influence might not only be maintained, but rendered predominant. The policy pursued by all the kings of the Etruscan line entirely accords with this view, so as to give it at least an air of great probability.

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[1] This mention of the building of temples on the Capitoline hill to the chief deities of Rome by Tarquinius Priscus, refers in all probability to the introduction to Rome of the refined and poetical idolatry of Greece, and receives some colouring of credibility from the account of his descent from a native of Corinth. Beaufort proves, that for the first 170 years of its existence at least, there were no images at Rome, unless the rude block of stone called the god Terminus might be considered an image. See *La Republique Romaine*, par M. de Beaufort.

[2] Another account of the origin of Servius has been preserved by a speech of the emperor Claudius, as given in the Etruscan Annals. Claudius begins to recount how often the form of government had been changed, and even the royal dignity bestowed on foreigners. Then, he says of Servius Tullius, "According to our Annals, he was the son of the captive Ocrisia; but if we follow the Tuscans, he was the faithful follower of Caeles Vibenna, and shared all his fortunes. At last, driven by various fortunes, he quitted Etruria with the remains of the army which had served under Caeles, went to Rome, and occupied the Caelian hill, giving it that name after his former commander. He exchanged his Tuscan name, Mastarna, for a Roman one, obtained the kingly power, and employed it to the great advantage of the state." See Niebuhr, vol. i. p. 381.

The twelve Etruscan cities which had acknowledged the dominion of Tarquinius, revolted on hearing of his death. They were speedily reduced to subjection by Servius, for which military success he was decreed a triumph by the people. But his triumphs in war were not to be compared with his triumphs in peace. Finding the population of Rome increasing rapidly, he enlarged the pomœrium, or sacred boundary of the city. When first formed by Romulus, the pomœrium included merely the Palatine hill and a portion of the plain at its base. It was extended by Numa so as to include the Capitoline and Quirinal hills, in consequence of which the Sabine town became completely incorporated with the Roman. Servius again enlarged it, so as to bring within its compass the Viminal and Esquiline hills, in addition to those which were the appropriate seats of the great tribes. He finished the work begun by Tarquinius, by building the walls of the city of hewn stone; and where the hills which he had included in the new addition to the city sloped gently down towards the plain, he fenced them by a large mound of earth, and a moat from which the earth of the mound was dug. For the purpose of consolidating more firmly the union of the races of which the nation was composed, he built the temple of Diana on the Aventine hill, which was to be the chief abode of the Latin population recently brought to Rome. This temple constituted a monument of the league between the Roman people and the thirty confederate Latin towns; and, although Romans, Sabines, and Latins sacrificed there in common, yet, as Rome was now recognised as the head of the confederation, the Romans were allowed to have the precedency.

But the most important achievements of Servius Tullius, were his alterations of, and additions to, the constitutional principles of the state. Incidental notices have already been given respecting the origin and development of the Roman constitution, so far as the obscurity of the traditional narratives and poetic legends have furnished scope for the treatment of such topics. To these we shall subsequently advert; but we must now prosecute the historical narrative, so far as it can be called historical; for there is no part of ancient Rome that more evidently abounds with poetic legends than the conclusion of the kings, and the first years of the commonwealth. Fortunately there is no absolute necessity to discard the poetic legends; for however destitute they may be of what is termed historical truth, there can be no question but that they present a very accurate and lively picture of the times and events in which they are said to have taken place.

Servius Tullius had given his two daughters in marriage to the two sons of Tarquinius Priscus. These daughters were of tempers very unlike, as were also their husbands. The elder, Tullia, was of a gentle disposition, her younger sister fierce, imperious, and ambitious. Aruns Tarquinius was of a mild and quiet character, his brother Lucius proud, restless, and domineering. To counteract these tempers, Servius had given the gentle princess to the ambitious prince, and made the haughty damsel wife to the mild husband. But this dissimilarity of temper did not produce the effect which he had expected. The fiery tempered of each couple became dissatisfied with the one of gentler nature; the milder wife and husband perished by the crimes of their aspiring mates, who were speedily united in a second shameless marriage. Then did the aspiring temper of the one urge on the haughty and ambitious heart of the other, till they resolved to make way to the throne by the murder of the good old man, their king and father. To this attempt Lucius was encouraged by the unconcealed dissatisfaction of the patricians with the influence obtained by the plebeians in the new constitution. Their dissatisfaction was increased by a rumour that Servius intended to abolish the monarchical form altogether, and divide the sway between two consuls, one to be chosen from the patrician, and one from the plebeian body. Having formed a strong faction among the patricians, Tarquinius went to the senate-house, seated himself in the royal chair, and summoned the senators to meet king Tarquinius. Servius having heard the rumour, hastened to the senate-house, accused Tarquinius of treason, and laid hold of him to remove him from the royal chair. The usurper instantly seized the old man, dragged him to the door, and threw him with great force down the steps. There he lay for a few moments stunned and bleeding with the fall; then rising slowly staggered away towards his palace. Some ruffians employed by Tarquinius, pursued, overtook, and killed him, leaving the body lying bleeding in the street. Meantime, tidings of what was going on had reached Tullia, who immediately mounted her chariot, drove to the senate-house, and saluted Tarquinius as king. He bade her withdraw from such a tumult; and she, on her return, passed along the same street where lay the bleeding body of her newly murdered father. The mules shrunk, the charioteer stopped short, and pointed out the appalling spectacle. In a loud and imperious tone of voice she commanded him to drive on; the chariot wheels rolled over the yet warm form, crushing and mangling it as they proceeded, till the spurting blood stained the robes of the more than parricide. From that hour, in remembrance of that hideous scene, the street was called the Vicus Sceleratus, or Wicked Street.

B.C.

Tarqui
Superb

Tarquinius having thus obtained forcible possession of the throne, declined to submit to the form of an election, or to make the customary appeals to the comitia curiata for the ratification of his kingly power. He seized the crown as if it were hereditary; and seemed resolved to rule without the concurrence of any of the great assemblies. But as he had been raised to the throne by the aid of the patricians, his first act was to gratify them by repealing the privileges which Servius had granted to the plebeians. He suppressed the institution of the comitia centuriata, and even prohibited the meetings of the country tribes at the paganalia. But this was only the beginning of his tyranny. He depressed the commons or plebeians; but he had no intention to permit the power of the patricians to become too strong, especially as he was himself but too well aware of their treachery to the former king. He therefore surrounded himself with a bodyguard, the ready instruments of his oppression; and, under colour of justice, banished or put to death, on false accusations, all who were either too powerful or too wealthy to be trusted, or whom he suspected of disaffection to himself. In this manner he reduced the patricians into a state of subjection almost as deep as that into which they had assisted him to reduce the plebeians.

Being now possessed of nearly despotic power, he turned his attention to the enlargement of his kingdom. He gave his daughter in marriage to Octavius Mamilius of Tusculum, the most powerful of the Latin chiefs; and partly by intrigues, partly by force, he procured Rome to be acknowledged the head of the Latin confederacy. Herdonius, the only man who dared to oppose his proud demeanour, he caused to be put to death by false accusations, and completely incorporated the Latin troops with those of Rome. The Hernici were also included in this confederacy. One

Latin city, Gabii, refused to join this league, and was assailed by Tarquinius. The struggle was long and severe; but at length Tarquinius is said to have obtained possession of it by means of a stratagem, conducted by his son Sextus, similar to that by which Zopyrus gained possession of Babylon for Darius Hystaspis. He turned his arms next against the Volsci, and took Suessa Pometia, where he obtained a very great booty, and retained the tithe of it for his own share.

Thus powerful and enriched, he next proceeded to finish the great works left incomplete by his predecessors. He finished the cloaca maxima, and prepared to build the temple which his father, during the Sabine war, had vowed to the three great deities, Jupiter, Juno, and Minerva. For this purpose he levelled the brow of the hill, originally called by the Sabines Saturnius, but better known by its subsequent name, the Capitoline hill. In clearing away the ground for the foundation of this temple, a fresh human skull was found; whence the augurs predicted that Rome should be the capital, or chief city of the world; whence also the name by which that hill was always subsequently known. The hill had formerly been almost covered with altars and shrines consecrated by the Sabines. Tarquinius inquired by augury whether the deities, to whom these were sacred, would yield their places to Jupiter, Juno, and Minerva. The auguries allowed the removal of all except the shrines of Terminus and Youth. This was interpreted as itself an omen, that the boundaries of the Roman empire should never recede, and that the state should be for ever young.

The chief builders of the capitol were Etruscan workmen, whose skill was superior to that of the Romans; but Tarquinius compelled the Roman commons to work also as labourers, giving them merely a certain supply of provisions daily, as if they were mere slaves. They groaned wearily underneath his heavy yoke, but he ruled them with a high hand, and sent colonies of the most refractory of them to the frontiers of his conquests in the Volscian lands. Under the strong and imperious sway of this haughty, yet able tyrant, Rome reached an extent of territory and a pitch of power greatly beyond what it had ever before attained. There may, however, be the aspect of external greatness, and the reality of internal wretchedness; but such a state of affairs cannot be permanent.

Hitherto, the narrative diverges little from the plain course of what was, or might have been, historical truth; and it is not undeserving of remark, that the conduct of Tarquinius Superbus is very natural for a prince who retained much of the Etruscan notions respecting hereditary rights, and scorn of the lower classes. The plan of employing the plebs in task-work, without any other support than a scanty allowance of food, might have been brought from the Nile, as easily as from Etruria; and is some corroboration of the theory which would bring the hereditary half priest half noble caste of Lucumones from Egypt.

About this time the strange story of the Sibyl is told. An unknown woman, of foreign aspect and manners, came to the king and offered him nine books of prophecies, for which she demanded a large sum. The king refused. The woman departed, burnt three of the books, and then returned and demanded the same sum for the remaining six. The king still refused; and again the woman went away, burnt three, and returning, demanded the same price as at the first. Struck by this strange conduct, Tarquinius consulted the augurs, who told him that it was essential to the safety of Rome to procure the books. Accordingly he purchased them, and the woman departed, and was seen no more. These Sibylline books were then deposited in a chest of stone, and entrusted to the charge of two men of the highest rank, who kept them under ground in the Capitol. Their contents were never divulged; nor were they ever consulted, except by a decree of the senate, and in times of the greatest public danger and distress.

But the tyranny of Tarquinius had now nearly reached its limits. Various portents foreshewed its approaching overthrow. According to the legend, the first indications of the coming doom were seen in an unnatural violation of the sacred rites. A huge snake crawled out from an altar in the court of the palace, in the time of sacrifice; the fire suddenly died out, and the snake devoured the victim. To ascertain what this prodigy portended, the king sent two of his sons to consult the oracle of Apollo at Delphi. They took with them their cousin, Lucius Junius Brutus, who had been brought up along with them in the palace, disregarded on account of his apparent apathy of manner, and laughed at as almost half an idiot. He was the younger son of a sister of Tarquinius by Marcus Junius; and his elder brother had been put to death by his uncle for his wealth. To escape a similar fate he had feigned idiocy, and was consequently spared and despised. So runs the legend, to account for the name Brutus; which, however, in old Latin is nearly synonymous with Severus, and may have been given him merely on account of his reserved gravity of manner. The answer of the Delphic oracle was, that the king should fall when a dog should speak with a human voice. This response was of course intended secretly to apply to Brutus, and his unexpected display of mental ability. The young princes also asked which of the king's sons should succeed him; and were answered in general terms, that the regal power should be enjoyed by the person who should first salute his mother. Brutus, as they were departing, stumbled, fell, and kissed the earth, thus fulfilling the meaning of the oracle.

Soon after this event, Tarquinius waged war against Ardea of the Rutuli, a people on the coast of Latium. The city was very strong both by nature and art, and made a protracted resistance. The army lay encamped around the walls, in order to reduce it by hunger, since they could not by direct force. While lying half idle at Ardea, the princes and their kinsmen, Brutus and Collatinus, happening to feast together, began in their gaiety to boast each of the beauty and virtue of his wife. Collatinus extolled his wife Lucretia as beyond all rivalry. On a sudden they resolved to ride to Rome and decide the dispute by ascertaining which of the respective ladies was spending her time in the most becoming and laudable manner. They found the wives of the king's sons entertaining other noble ladies with a costly banquet. They then rode on to Collatia; and though it was near midnight, they found Lucretia with her handmaids around her working at the loom. It was admitted that Lucretia was the most worthy lady; and they returned again to the camp at Ardea.

But the beauty and virtue of Lucretia had excited in the base heart of Sextus Tarquinius the fire of lawless passion. After a few days he returned to Collatia, where he was hospitably entertained by Lucretia as a kinsman of her husband. At midnight he secretly entered her chamber; and when persuasions were ineffectual, he threatened to kill her and one of her male slaves, and laying the body by her side, to declare to Collatinus that he had slain her in the act of adultery. The dread of a disgrace to her memory, from which there should be no possible mode of wiping away the stain, produced an effect which the fear of death could not have done; an effect not unnatural in a heathen, who might dread the disgrace of a crime more than its commission, but which shews the conventional morality and virtue of the time, how ill-founded, and almost weakly sentimental, in even that boasted instance of female virtue. Having accomplished his wicked purpose, Sextus again returned to the camp.

Immediately after his departure, Lucretia sent for her husband and father. Collatinus came from the camp accompanied by Brutus; and her father, Lucretius, from the city, along with Publius Valerius. They found Lucretia sitting on her bed, weeping and inconsolable. In brief terms she told what had befallen her, required of them the pledge of their right hands that they would avenge her injuries, then drawing a knife from under her robe, stabbed herself to the heart and died. Her husband and father burst into a loud cry of agony; but Brutus snatching the weapon from the wound, held it up, and swore by the chaste and noble blood which stained it, that he would pursue to the uttermost Tarquinius and all his accursed race, and thenceforward suffer no man to be king in Rome. He then gave the bloody knife to her husband, her father, and Valerius, and called on them to take the same oath. Brutus thus became at once the leader of the enterprise. They bore the body of Lucretia to the market place. There Brutus addressed the people, and moved them to vengeance. The youth immediately enrolled themselves into an army. Part remained to guard the city, and part proceeded with Brutus to Rome. Their coming raised a tumult, and drew together great numbers of the citizens. Brutus, availing himself of his rank and authority, as tribune of the celeres, or captain of the knights, summoned the people to the forum, and proceeded to relate the bloody deed which the villany of Sextus Tarquinius had caused. Nor did he content himself with that, but set before them in the most animated manner the cruelty, tyranny, and oppression of Tarquinius himself; the guilty manner in which he obtained the kingdom, the violent means he had used to retain it, and the unjust repeal of all the laws of Servius Tullius, by which he had robbed them of their liberties. By this means he so effectually roused the people, that they passed a decree abolishing the kingly power itself, and banishing for ever Lucius Tarquinius Superbus, and his wife and children. In the midst of the tumult the wicked Tullia fled from her house and the city, pursued by the curses of the whole population wherever she passed, imprecating upon her head the vengeance of the furies, for the murder of her sister, husband, and father.

Intelligence of the tumult had in the mean time reached the camp at Ardea. Tarquinius hastened to the city, if possible to suppress it; and Brutus, assigning the command of the city to Lucretius, set out himself for the camp, taking a different road, so as to avoid meeting the dethroned usurper. When he reached the camp he soon roused in the army the same indignation against the tyrant, which had blazed so strongly at Rome. The commanders of the troops joined him; the army adhering to the observances of the comitia centuriata, confirmed in legal form the decree of the citizens, banishing the Tarquin family, and abolishing the regal name and power for ever. They then made a
B.C. 509. truce with the Ardeans for fifteen years, and marched towards Rome. Tarquinius, finding the gates shut against him, and learning the defection of the army, fled with his sons to Caere in Etruria. Thus ended the reign of Tarquinius Superbus; and with it the existence of the monarchical form of government at Rome.

The first consuls.

The monarchical form of government being thus abolished, the next step was to constitute another in its stead. Lucretius was appointed *inter-rex*, and the comitia centuriata were held by his authority in the Campus Martius, when Brutus and Collatinus were chosen to be supreme magistrates, at first with the name of prætors, which was afterwards changed to that of consuls, by which title, as the better known, we shall continue to designate these colleagues in the chief power. They retained all the power of the kings, and all the insignia of royalty, except the diadem; but the rods and axes, the emblems of the power of life and death, were carried before each alternately for a month. In order that the sacred rites might be duly performed, they appointed a priest with the title of *king of the sacrifices*, but without political power. They then proceeded to fill up the due number of three hundred in the senate, which had been diminished partly by the tyranny of the last king, and partly by the flight of his adherents, who were implicated in his crimes. They restored those laws of Servius Tullius which were favourable to the commonalty; and re-appointed the meetings and common sacrifices of the tribes.

Rome seemed now to have regained its liberties, but it had not obtained the sense of security. It was thought necessary to banish Collatinus, who was the nephew of Tarquinius, that there might remain none of that hated race in the city. Collatinus yielding without a struggle, withdrew to Lavinium, and there died in old age. Publius Valerius was elected consul in his stead, by the comitia centuriata.

It was not to be expected that the banished king would submit without a contest. He first attempted to induce the Latin states to espouse his quarrel; and finding them unwilling, he applied to the Etruscans. Ambassadors were sent from Etruria to demand the restitution of his private property. This demand gave rise to warm discussions, whether they should obey justice by giving up the private property of Tarquinius, or prudence, by refusing to put money into the hands of an enemy, which they foresaw would soon be used against themselves. The plea of justice prevailed, and the property was ordered to be restored. But during the discussion, and the period required for collecting the property, the Etruscan ambassadors were intriguing with the younger patricians in the formation of a plot to restore the king. Considerable numbers of the more haughty of them, offended with the favour shewn to the commons, joined in the conspiracy, among whom were the two sons of Brutus himself. The conspiracy was discovered by the information of a slave, who had overheard them while concocting this plot in secret. The two consuls called the people to the comitium, and commanded the conspirators to be brought bound before them. The whole plot was detected; the Etruscan ambassadors permitted to depart uninjured, out of respect to the laws of nations; and the convicted traitors thrown into prison to await their trial. Next day the trial was conducted in public, and sentence of condemnation passed. Brutus commanded the sentence to be put in execution upon his own sons. They were stripped, beaten with rods, and then beheaded. Nor till this fearful example of stern retributive justice had been completed did Brutus leave the assembly; and when he departed, the people could do no less than inflict an equal doom on the remaining conspirators.

The private danger was thus turned aside, but a public tempest was at hand. The Etruscan cities of Tarquinii and Veii took up arms in the cause of the banished king, and advanced against Rome. The Romans crossed the Tiber to encounter the foe; and the two armies met near the grove of Arsia. Before the battle began, Brutus, who was riding at the head of the Roman cavalry, was descried by Aruns Tarquinius, who led those of Etruria. The banished prince, burning with personal hatred, spurred his steed furiously against the consul. Brutus, with equal animosity, met him in mid career; and in the shock each pierced the body of his antagonist with his spear, and they fell wounded and dying together to the ground. The cavalry on each side hastened to avenge their leaders; the battle became general; each right wing was victorious over its opponent; and after a long and bloody struggle, night put an end to the undecided contest. Both parties kept the field; but in the dead of night a voice was heard from the adjacent grove, declaring that the Etruscans had lost one man more than the Romans, who were, and would be victorious. A panic seized the enemy, they deserted their camp and fled; and at dawn the Romans found nothing to do but to carry off the booty. Valerius returned to the city in triumph, and in the forum pronounced a funeral oration over the body of Brutus. The matrons mourned for him a whole year, and his statue was placed in the Capitol, among the kings, with a sword in his hand.

After the death of Brutus, Valerius for a time retained the consular power alone; not from ambition, but probably that he might, unobstructed, pass those laws which he deemed necessary for the public welfare. He enacted a law, by which every person who should seek kingly power was pronounced accursed, so that any man might kill him without fear of punishment. In the presence of the assembly of the people, (the populus, *i. e.* the comitia curiata,) he caused the ensigns of consular power to be lowered; thus acknowledging the supreme authority of that assembly. But his best act was the passing of that law, *(lex de provocatione,)* which gave to all Roman citizens the right of appeal to the assembly of the people from the sentence of any magistrate. This was the first law enacted by the comitia centuriata; and as soon as it was passed Valerius took away the axes from the bundles of rods which were borne before the consuls. This right of appeal existed only in the city itself, and within a mile of it. Beyond that distance the military power of the consuls remained unlimited, and the axes were borne and used as formerly. The enactment of these laws obtained for Valerius the surname of Poplicola.

B. C. 508.

As soon as they were passed, he held the comitia for the election of a consul in the room of Brutus. Spurius Lucretius was chosen; and he dying within a few days, Marcus Horatius Pulvillus was elected to complete his year. About this time occurred that famous treaty between Rome and Carthage, mentioned by Polybius, and which is perhaps the best proof of the power of Rome under her latter kings. Ardea, Antium, Aricia, Circeii, and Terracina, are mentioned in such terms as to cause them to be regarded as subject cities, and Rome stipulates for them as well as for herself. The treaty was signed by Brutus and Horatius; whence a difficulty has arisen, as these two were not at any time colleagues in the consular office. But Gibbon[1] has shewn that such treaties were signed by the *feciales* more properly than by the consuls; and there is no reason for doubting that Brutus and Horatius may have been conjoined in that office.

War with Porsenna.

In the mean while Tarquinius, finding the inability of the Veientians and Tarquinians to replace him on the throne, applied to Lars Porsenna, king of Clusium, at that time the most powerful of all the Etruscan monarchs. Porsenna raised a great army, and marched towards Rome. He was met by the Romans near the fortress on the Janiculum; but almost at the first encounter they took to flight, and the Etrurians pursued them impetuously as they sought safety by crossing the bridge. Horatius Cocles, seeing the danger that the city might be taken at once if the enemy should enter it along with the flying Romans, posted himself on the bridge, made head against the pursuers, and called on his countrymen to cut down the bridge between him and the city. Spurius Larcius, and Titus Herminius lent their aid in the heroic deed. When the bridge was nearly cut through, Cocles sent back his two companions, and singly maintained his post. At length the crash of the falling beams, and the shouts of his countrymen gave him to know that the deed was done; when calling on the god of the Tiber to receive him, he plunged into the stream, and, accoutered as he was, swam in safety to the shore, through the missile weapons of the enemy, which showered fast and thick around him.

Thus was the city saved from that sudden danger; but all its peril was not over. Porsenna not only retained possession of the Janiculum, but sending his army across the river in boats, pillaged the country, cut off all supplies, and reduced Rome to the utmost distress by famine. In this emergency, a noble youth, Caius Mucius, undertook to rid his country of this dangerous enemy. He made his way into the camp of Porsenna, and entered into the very praetorium, where he saw a person royally attired, and seated on a chair of state. Supposing this to be the king, Mucius sprung upon him, and stabbed him to the heart. He was immediately siezed, and led before Porsenna, whose secretary he had thus killed. There he acknowledged his deed, and told the king that his danger was by no means over. Porsenna threatened him with death by torture, unless he would divulge the plots by which his life was threatened. Mucius immediately stretched forth his right hand and thrust it into the fire of an altar which was burning before the king, saying, "Behold how much I regard your threats of torture." He held it in the flames till it was consumed, without a feature of his stern countenance indicating that he felt the pain. Porsenna, struck with his noble daring and contempt of suffering, commanded him to be set at liberty. Mucius then told him, in requital of his generosity, that he was only one of three hundred patrician youths who had vowed to kill Porsenna; and that he must prepare for their attempts, which would be not less daring than his own. From that time Mucius was called Scaevola, or the left-handed, because he had thus lost the use of his right hand.

B. C. 508.

Alarmed by the dangers which threatened him from foes so determined, Porsenna offered terms of peace to the Romans. A treaty was at length concluded, according to which Porsenna ceased to maintain the cause of the Tarquinian family; but demanded the restitution of all the lands which the Romans had at any time taken from the states of Etruria, and that twenty hostages, ten youths and ten maidens of the first houses, should be given up to him for security that the treaty would be faithfully observed. The legend relates that Clœlia, one of the hostages, escaping from the Etrurian camp, swam across the Tiber on horseback, amidst showers of darts from her baffled pursuers; but that the Romans, jealous of their reputation for good faith, sent her back to the camp of Porsenna. Not to be outdone in generosity, he gave to her and her female companions their freedom, and permitted her to take with her half of the youths; while she, with the delicacy of a Roman maiden, selected those only who were of tender years. The Romans then, at the final settlement of the treaty, sent as a present to Porsenna, an ivory throne and sceptre, a golden crown, and a triumphal robe, the offerings by which the Etruscan cities had once acknowledged the sovereignty of Tarquinius.

When Porsenna quitted Rome, he entered the Latian territories, and attacked Aricia, the chief town of Latium. The Aricians being aided by the other Latian cities, and also by the Cumans, under the command of Aristodemus, defeated the Etruscans in a great battle, and put a stop to their aggressions. The Romans received the fugitives from Porsenna's army, and treated them with great kindness; in requital for which Porsenna restored to them the lands which he had conquered beyond the Tiber.

Such is an outline of the poetical legends respecting the great war against Porsenna. It is, however, clear from other accounts and indications,[1] that Porsenna took the city, deprived it of one-third of its land, as was customary, imposed a tribute upon it, received the usual recognitions of sovereign authority, and even deprived the Romans of the use of metal in any other form than those employed in the purposes of agriculture, that they might not have it in their power to revolt. In this latter statement, we have again an incidental hint of the eastern origin and customs of the Etruscans; in proof of which, reference may be made to the way in which the Philistines tyrannized over the Israelites during one of their periods of conquest. (See Arnold's History of Rome.)

Tarquinius, as his last resource, now applied to the Latins, through the influence of his son-in-law Mamilius Octavius. He was the more encouraged to hope for success in consequence of a fierce war in which the Romans had been engaged with the Sabines, and by which they had been considerably weakened. For a time the Latins hesitated to provoke an encounter with Rome; and in the mean while the Sabine war continued to harass the republic. Valerius gained repeated victories over them, and some of the Sabines, wearied with fruitless hostilities, were anxious for peace. Attus Clausus, a Sabine chief of great power, came over to the Romans, became a Roman citizen, and took the name of Appius Claudius, on being admitted into the Patrician order. At length Valerius, after gaining another triumph, died, was buried at the public cost, and mourned by the matrons for a year.

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[1] See Essai sur L'Etude de La Litterature.

[2] See Tacitus, Hist. iii. 72. and Pliny, xxxiv. 14.

War with the Latins.

The entreaties of Tarquinius, and the influence of Mamilius, had by this time prevailed among the Latins, and they prepared for a contest with Rome. Nor were the Romans unaware of the approaching struggle; and that it might be full and final, an opportunity was given on both sides for the dissolution of intermarriages, and such other ties as had been mutually contracted by the two nations. The Romans were determined to meet the decisive struggle as it ought to be met. They created a new magistrate, called a Dictator, to whom was entrusted for a period uncontrolled dominion. He was Master of the people; and he chose to be his second in command another officer, whom he named Master of the knights. The dictator was Aulus Postumius; the master of the horse Titus Æbutius. With these were joined in command the most distinguished Romans who had already signalized themselves in war. On the side of the Latins were Mamilius, and the whole of the exiled Tarquinian family, resolved to regain their sway, or perish in the attempt. The two armies met at the lake Regillus. The dictator and the banished king encountered hand to hand, but were parted by their followers. Mamilius and Æbutius were likewise separated, after the infliction of mutual wounds. Marcus Valerius fell while rushing into the throng of the fight against Sextus Tarquinius. The exiled princes bore down or put to flight all opposed to them, till the dictator himself, assailing indiscriminately the pursuers and the pursued, turned the tide of battle, and forced his way even into the enemy's camp. In this battle fell the two sons of Tarquinius, Mamilius, and the chief of the Roman warriors who had been the means of gaining their country's liberty; but the victory was complete. Tarquinius retired to Cumae, where he died, and the Romans were left to enjoy the victory, so gloriously yet dearly purchased.

Thus terminate the poetic legends respecting the wars waged between the Romans and the banished Tarquinii; and while it must be evident that a great deal of imaginative embellishments have been added to and intermingled with the course of the actual events, still there is enough of verisimilitude in them to give them currency, as at least a very spirit-stirring representation of what might have occurred. Besides, the effect produced on the Roman character by these poetic lays can scarcely be over-estimated, in stirring them up to that stern, unyielding courage, that unswerving energy of will, and that boundless ambition and confidence in the fortunes of Rome, which gained for them the empire of the world. While, therefore, we admit that it is impossible to state how much of fiction has been introduced into the narrative of these events, we see no reason to discredit the general truth of the history. The pride of the Roman historians concurred with the imagination of the poets, in maintaining to the utmost the glory of Rome; yet even from what they have agreed to record, we may arrive at conclusions somewhat different from those which they were anxious to establish. Rome was undoubtedly taken by Porsenna; and within twelve years after the expulsion of the last king, the Romans had lost all their territory on the Etruscan side of the Tiber, and all their dominion over Latium.

The principles of political liberty had also been severely shaken. It is plain that the Tarquinian family attempted to render the crown hereditary; and availed themselves of the jealousy between the patrician populus and the plebeian commonalty, to deprive each of their rights, and tyrannize over both. A junction enabled the nation to expel its tyrant; but the contest cost Rome her independence for a few years, and the loss of all her previous acquisitions. The defeat of the Etruscan army at Aricia enabled the Romans to recover their independence, but left them reduced almost within their original limits immediately around the city. The liberties of the commonalty were in danger in another manner, and from a different foe. Instead of a period of peace in the enjoyment of their recovered freedom after the decisive battle of Regillus, we find dissensions of the most serious kind arising almost immediately between the patricians and the plebeians. As these contests form a very important part of Roman history, especially in a constitutional point of view, and have been much misunderstood, it is necessary to offer a few remarks on their origin and nature.

It was the policy of Tarquinius to depress the growing power of the commons *(plebs)* as much as possible, that he might the better succeed in his ambitious designs. In this the patricians *(populus)* injudiciously joined him; and all the wise laws of Servius were repealed, or allowed to fall into desuetude. Additional enactments against debtors were framed, and every step was taken to reduce the plebeians to a condition little better than slavery. The wars arising out of the expulsion of the Tarquinian family blended for a time the interests of both classes, by the pressure of a common danger; but no sooner was this pressure removed, than the patricians resumed the oppression to which they had been too much accustomed, and were too prone. Again were the comitia centuriata allowed to fall into neglect, while in the senate, and in the comitia curiata, where they possessed exclusive power, the patricians enacted new laws against debtors, by which the plebeians were grievously oppressed.

The plebeians being composed generally of the population sprung from conquered cities, and admitted to settle at Rome in the enjoyment of personal freedom, were chiefly occupied in the culture of the public lands, or the lands held by patrician families. The loss of territory sustained by Rome in the Etruscan wars, deprived great numbers of the plebeians of their property and employment. Being reduced to poverty, they were compelled to borrow money from the patricians, whose lands lay chiefly within the Ager Romanus, and were not lost, and who also were alone permitted to enjoy the profits of commerce.[1] By the Roman law of debtor and creditor, when a man borrowed money, and his poverty continued, so that he became insolvent, there were but two resources to which he could betake himself. He might sell himself to his creditor, on the condition, that at the expiration of a stated term, if he did not discharge the debt, he should become the slave of his creditor. This was called the entering into a *nexum*, and the person entering into this conditional sale of himself was called a *nexus*. When the day came, the creditor claimed possession, the magistrates awarded it; and the debtor, his family, and all that belonged to him, passed into the power of the creditor as slaves, and were termed *addicti*. If, on the other hand, a man were unwilling thus to sell himself and family, and resolved to meet in his own person the consequences of his debt, the danger thus incurred was much greater. If he failed to pay, and could neither himself give security, nor obtain any person to give it for him, he might be thrown into a dungeon, loaded with chains, and half starved for sixty days. If during that time he refused to come to any terms with his creditor, he might be again brought to the market place, and the amount of his debt stated, to see whether any person would yet become security for him. On the third day, if no friend appeared, he might be put to death, or sold for a slave beyond the Tiber; nay, if there were more creditors than one, they might actually hew his body in pieces, and divide it among them; and whether a creditor cut off a greater or smaller piece than in due proportion to the debt, he incurred no penalty.

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[1] See Niebuhr, vol. i. pp. 571, *et seq.*

B. C. 493.

In this manner vast numbers of the commonalty were reduced to the utmost wretchedness; and instead of the influence which they had been promised by the Servian constitution, they were in a worse condition than the veriest slaves. The old Roman populus, the patricians and their clients, had engrossed all the wealth and power of the community, and formed the government into an exclusive aristocracy. Great numbers of the plebeians were *nexi*, though not yet *addicti;* and in this condition felt themselves trembling on the brink of utter ruin. Driven to despair by their distress, the commons resolved that they would no longer endure their misery and degradation. Such of them as were in the city seized upon and began to fortify the Aventine hill, their own quarter; those who were at the time in the field, deserted their generals, marched to a hill on the north bank of the Anio, beyond the limits of the Ager Romanus, and within that of the Crustuminian tribe. There they established themselves, and proposed to found a new city. The patricians, perceiving the ruin that must fall upon Rome if thus deserted by the great body of the commons, entered into negociations with them for a return. Their demands were not extravagant. They required a general cancelling of the obligations of insolvent debtors, *(nexi)*, and the release of those who in default of payment had been assigned to the power of their creditors, *(addicti)*. They further stipulated, that two of their own body should be acknowledged as their public protectors, and that the persons of these two should be held sacred and inviolable. To these terms the patricians agreed; a solemn treaty was concluded; the two protectors of the commons were chosen, and called Tribunes, and the commons returned to Rome. The spot where this treaty had been concluded was enclosed, and consecrated to Jupiter, and received the name of the Sacred Hill.

This event was almost of equal importance with the expulsion of the kings and the abolition of the monarchical power. It laid the foundation of the liberties which the body of Roman citizens subsequently enjoyed; and by giving them legal rights and legal protectors, converted into legal contests what might otherwise have rent the state asunder. But at the same time it gave to the tribunate, in the inviolability of the persons of those who held it, the means of acquiring an unlimited power in the state, such as might and did lead to ultimate despotism.

The termination in an amicable manner of these feuds was greatly promoted by the fact, that the state was then at war with the Æqui and Volsci, two nations of Oscan race, whose lands lay south from Rome. It was no time for protracted civil broils when the country was ravaged, and the city itself threatened by such dangerous neighbours. To the same necessity may be traced the alliance with the Latin states, formed in the consulship of Spurius Cassius, on terms of perfect equality; and seven years afterwards by the same Spurius Cassius, with the Hernicians, on similar terms. These leagues were of the utmost importance to Rome, both as restoring to her the power which she had lost after the expulsion of the kings, and that too on a more equitable and therefore more permanent basis, and in commencing that thoroughly incorporating and blending system which afterwards converted all the inhabitants of Italy into Roman citizens, and thus consolidating her growth, confirmed her power.

Agrarian law.
B. C. 486.

A measure of equal justice, and not less importance, was also attempted by Spurius Cassius, the passing of which would have established the frame of Roman liberties on a secure foundation. This was an Agrarian law. The nature of the Agrarian laws, proposed from time to time at Rome, and always the cause of bitter contests between the patricians and plebeians, was never accurately known till it was explained by Niebuhr.[1] From him we learn, that when a new territory was gained in war, by the third being taken from the conquered people, part of it was left unenclosed for pasture, and the cultivated parts were either divided among the new citizens who had not previously received any allotment, or left to be occupied by certain individuals, who were required to pay a tithe of the produce to the state. The persons thus allowed to occupy these new acquisitions were generally members of powerful patrician families; and, although tenants at will of the state, they were actual proprietors with respect to the other citizens. When a number of new citizens had been added to the state, it was consistent with the whole polity of Rome to allot them lands: but in order to do so it would be necessary for the state to resume its property from its tenants at will, and divide it among the new citizens; for it was equally a matter of strict justice and sound policy to unite by permanent ties to the state those men by whose blood its victories were gained, and could alone be preserved. To this the occupiers would by no means consent; and thus the public land was wholly unprofitable to the commons, though they had been largely instrumental in conquering it for Rome.

The Agrarian law proposed by Spurius Cassius had for its object the division of a certain proportion of the public land; while from the occupiers of the remainder he intended to demand the regular payment of the tithe, which had been greatly neglected. His colleague, Proculus Virginius, headed the more aristocratical party of the patrician body in opposing the passing of this law, kept it in abeyance, if not uncarried, till the termination of his consulship, and then accused him before the comitia curiata of having treasonably conspired to make himself king, and for that purpose seeking to ingratiate himself with the commons. He was sentenced to die as a traitor, and was scourged and beheaded, and his house razed to the ground. Such was the fate of the first proposer of an Agrarian law; a topic equally detested by the Roman aristocracy, misinterpreted by the historians, and misunderstood by the moderns, yet a measure of strict justice and sound policy, and sufficiently intelligible when fairly stated.

B. C. 481

The contests between the patricians and the plebeians still continued; but the plebeians had now obtained the means of insuring ultimate success, though for a time defeated and overborne. They refused to serve as soldiers in the wars with which the state was still harassed, and their tribunes protected them in this refusal, till the consuls held their enrolment without the city, where their power was unlimited. At length the patricians consented that one of the consuls should be chosen by the plebeians in their centuries, the other by themselves, as usual, in their curiæ. This was a considerable advantage obtained by the plebeians; and they requited it by gaining a victory over the enemy.

For seven successive consulships the family of the Fabii had been elected, and had headed the patrician party. At length they resolved to conciliate the commons, and thereby incurred the hatred of their own order. Feeling them-

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[1] Niebuhr, vol. ii. pp. 129, *et seq.* Arnold, vol. i. pp. 156, *et seq.*

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selves thus distrusted, and incapable of serving their country in council, they resolved to emigrate in a body, and establish themselves on one of the outposts of the Roman territory, to be a defence against aggression from that quarter. They settled on the Cremera, in Etruria; but about two years afterwards the Veientians surprised them, put them all to the sword, and destroyed their settlement. Three hundred of the Fabian house are said to have perished by this disastrous event.

B.C. 470.

In a short time afterwards new contests arose; the plebeians seized the Capitol; and the patricians were obliged to yield to the passing of the Publilian law, by which it was enacted, that the tribunes should thenceforth be chosen by the votes of the commons in their tribes, and not by those of the whole people in their centuries. They could now elect their tribunes freely; and they had formerly obtained the right of discussing all national questions in their own assembly. Had it been possible, when this great step was gained, for the two parties to have laid aside their contention, and regarded each other as truly brethren and fellow-citizens, instead of rivals, those rankling animosities might have been altogether allayed, which terminated only in the destruction of the republic, and the establishment of an imperial dominion, which was in fact a military despotism, so frequently the consummation of civil dissensions and revolutionary contests.

The wars between the Romans and the Æquians and Volscians still continued without any marked success on either side, internal feuds preventing Rome from exerting her whole strength; nay, at times inducing the army to suffer itself to be beaten, out of dislike to its patrician general. During these wars, some events of a striking character are said to have occurred, which seem to have formed the subject of popular poems, and have in that form been admitted into regular history. The story of Caius Marcius Coriolanus is the most brilliant of these warlike legends. He is said to have contributed mainly by his great personal valour to the capture of Corioli, and the defeat of a Volscian army assembled for its aid, on the same day. For this gallant exploit he received the name of Coriolanus. Soon afterwards, during a scarcity at Rome, he opposed the distribution of a supply of provisions sent by the king of Sicily, unless the plebeians would consent to forego the privileges they had so hardly won. For this he was tried in the comitia tributa and banished. He immediately joined the Volscians, and by his military skill and renown, at once defeated and appalled the Romans, till having taken almost all their subject cities, he advanced at the head of the Volscian army against Rome itself. In vain did embassies of his former friends entreat him to spare his country; he remained inexorable. At length a band of Roman ladies, headed by the mother and wife of Coriolanus, proceeded to his tent, where the lofty remonstrances of his mother were more powerful than all the arms of Rome. Coriolanus granted her request, at the same time exclaiming, "O mother, thou hast saved Rome, but lost thy son." Some accounts state, that he was soon afterwards killed by the Volscians in a tumult; others, that he lived to an advanced age among that people, often towards the close of his life exclaiming, "How miserable is the state of an old man in banishment!"

Another well-known and spirit-stirring legend of the Volscians is that of the dictator Cincinnatus. His son, Cæso Quinctius, had been banished on account of his violent abuse of the tribunes during some of the numerous contests between the patricians and the plebeians; and he had retired to his own patrimony, aloof from popular tumults. The successes of the Æqui and Volsci at length rendered the appointment of a dictator necessary, especially for the rescue of the consul and his army, who were surrounded by the enemy and blockaded in their camp. The dictator laid aside his rural habiliments, assumed the ensigns of absolute power, levied a new army, marched all night to bring to the consul Minucius the necessary succour, and before morning had surrounded the enemy's army, and reduced it to a condition exactly similar to that in which the Romans had been. The baffled Æqui were glad to submit to the victor's terms; and returning in triumph to Rome, he laid down his dictatorial power, after having held it only fourteen days.

Roman History.

About the same time, Rome was engaged in a war which ultimately led to consequences of the utmost importance. This was the war with Veii, at that time the most powerful city of Etruria, and distant only about ten miles from Rome. There had been peace between Rome and Etruria from the days of Porsenna; and the Etruscans had even supplied Rome with grain in a time of great scarcity, and when no other neighbouring state would grant any relief. A contest at length arose, which led to a war of nine years' duration, and a peace of forty years. This peace was concluded in the year of Rome 280.

B.C. 47

The intestine feuds between the patricians and the plebeians still continued with unabated animosity. Occasionally one of the consuls favoured the plebeians, and proposed some mitigation of their suffering, or increase of their privileges, but generally with little success. The Agrarian law, proposed by Spurius Cassius, continued to be the main demand of the commons and their supporters; but its passing was constantly either directly prevented or evaded. But at last the commons became convinced that they need hope for no complete redress of their grievances, until they should have previously secured the establishment of some constitutional principle, from which equal justice would of necessity, and from its very nature, flow. Accordingly Caius Terentilius Harsa, one of the tribunes, proposed a law for a complete reform of the existing state of things. Its purport was, that ten commissioners should be chosen, five by the patricians, and five by the commons, to draw up a constitution, which should define all points of constitutional, civil, and criminal law; and should thus determine, on just and fixed principles, all the political, social, and civil relations of all orders of the Roman people. The question of passing the Terentilian law, was now the subject of contention in Rome; and the patricians seem to have endeavoured to prevent it chiefly by interruptions to the proceedings of the popular assemblies, caused by the violence of the young patricians. In consequence of these interruptions, the commons carried the Icilian law, by which a tribune was empowered to impeach before the commons in their own assembly (the *comitia tributa*), any patrician who should interrupt him when discussing public measures, and might require him to give security for his appearance, on the penalty of death and confiscation of his goods, if he should refuse to give such security. This law gave to the plebeian assembly jurisdiction over a patrician, and thus placed in their hands, not only the means of defence, but of retribution or revenge. The banishment of Caeso Quinctius, and perhaps also of Coriolanus, were the consequences of the Terentilian law; but no dependence can be placed upon the dates given to these perhaps legendary lays.

B.C. 461

Three commissioners were at length sent to Greece, to collect from the Greek states, such notices of their laws and constitutions as might be serviceable to the Romans. After the absence of a year they returned; and the commons finding it in vain to insist upon five of their own body forming part of the revisers of the law, yielded the point, and ten of the most distinguished of the patrician and senatorial body were chosen to form an entirely new and complete code of laws, by which the state should be governed. They were named decemviri, and during their office they were to supersede every other magistrate; and each in his turn was to administer the government for a day, till they should complete their legislative labours.

B.C. 451

After the careful deliberations of a few months, the result was laid before the people, in the form of ten tables, fully

B.C. 450.

written out, and exhibited in a conspicuous place where all might read them. Various amendments were proposed, and the ten tables again laid before the senate, the curiæ, and the centuries, and having received the sanction of both orders of the state, were received and recognized as the very fountain of all laws, public and private, to use the expression of Livy. Nothing but fragments of these laws, afterwards known by the name of the Laws of the Twelve Tables, have been preserved to us; and even of these fragments, we cannot refer to more than those which relate to constitutional law, the origin and course of which we have been attempting to state and trace.[1]

Of these the most important which remain are the following. 1. That there should be an appeal to the people from the sentence of every magistrate. 2. That all capital trials should be conducted before the comitia centuriata. 3. That *privilegia*, or acts of pains and penalties against an individual, should be unlawful. 4. That the last decision of the people should supersede all former decisions on the same subject. 5. That the debtor whose person and property were pledged to his creditor, *nexus*, and he who remained the free master of both, *solutus*, should be equal in the sight of the law. 6. A sixth enactment, which unfortunately left matter for a grievance, and for future contentions, ordained, that there should be no legal marriages between the patricians and the plebeians; and that, if a patrician married the daughter of a plebeian, his children should follow the condition of their mother, should not be subject to the paternal law like his legitimate children, and should not inherit his property if he died intestate.

By these laws the privileges and rights of the commons had, in certain points, been greatly promoted, and in many others secured on the firm basis of national laws. But not only were subjects of great importance left unsettled on any equal foundation; these very laws, and the liberties of the entire community, were destined to encounter another peril of a formidable nature. The decemvirs had conducted matters so much to the satisfaction of the community, that when, at the expiration of their year, they requested a renewal of their office, on the ground that they had still two more tables to form, in order to complete their task, they were permitted to resume their powers without opposition. Appius Claudius, an old enemy of the commons, was one of the decemvirs, and was retained among them on their re-appointment. The possession of uncontrolled, irresponsible power, now began to display its usual consequences. The decemviri seemed resolved to change the government of Rome into a complete oligarchy, consisting of a council of ten, whose power should be absolutely supreme in every thing. They arrogated the right of superseding all other magistracies; and at the conclusion of their second year they shewed no intention of resigning their offices, or of appointing their successors. Popular liberty seemed on the point of being finally overthrown, just when its establishment on a secure basis had been fondly anticipated.

Matters had nearly arrived at a crisis when a war arose, the Sabines and Æqui having united their forces, and being desirous to avail themselves of the contentions by which Rome was weakened. The combined forces ravaged the left bank of the Tiber, and the Æqui encamped on Algidus and pillaged the country around Tusculum. The decemvirs assembled the senate, obtained their authority to raise an army, at the head of which they placed three of their number, and sent it against the Sabines. Another was raised and sent against the Æqui, while Appius Claudius remained at Rome to provide for the safety of the city, and for the maintenance of the power of the decemvirs. Both armies suffered themselves to be defeated, and retired nearer to the city, dissatisfied rather than discomfited.

Meanwhile Appius chanced to see a beautiful maiden named Virginia, daughter of Lucius Virginius, a centurion in the army sent against the Æqui. The maiden had been betrothed to L. Icilius, one of the tribunes, and the author of the law known by his name. Her beauty inflamed the passions of the licentious Appius, and he caused one of his clients, M. Claudius, to seize her as his slave, intending, in this manner, to get the person of the damsel within his power. Intelligence was immediately sent to the camp to Virginius, who, obtaining leave of absence, hastened to Rome to protect his daughter. But in vain did he claim his daughter, in vain appeal to the sympathy of the people, in vain address himself to the better mind of Appius. The decemvir, blind to every thing but the beauty of Virginia, and deaf to all but the impulse of his own passion, passed sentence assigning the maiden to Claudius. Upon this Virginius, snatching up a butcher's knife, exclaimed, "This is the only way left, my child, to keep thee free and unstained!" and plunged it to her heart; then turning to Appius, he cried, "On thee, and on thy head, be the curse of this innocent blood!" Appius ordered him to be seized, but in vain. Waving aloft the bloody knife, he burst through the multitude, flew to the gates, mounted a horse, and spurred headlong to the camp near Tusculum.

The wild and frantic aspect of Virginius, his attire stained with blood, and the bloody knife still held convulsively in his grasp, instantly drew a crowd of the soldiery around him. In brief but burning terms he told his tale, and called aloud for vengeance. One thrilling sentiment of sympathetic indignation filled every bosom; they called to arms, plucked up their standards, and marching to Rome, seized on the Aventine. The army near Fidenæ caught a similar spirit, having received information of the bloody tragedy from Icilius. They likewise threw off the authority of their commanders, chose military tribunes to lead them, and hastening to Rome, joined their brethren on the Aventine Hill.

In the city all was tumult and terror. The decemvirs were unable to make head against the excited multitude, and the senate itself felt its power ineffectual to allay the tempest. They began to treat with the people and the army, yet with dilatoriness, hoping the ferment would abate, and they might still retain their power. But the people were in earnest. Leaving a strong body to defend the Aventine for the present, they marched in military array through the city, and once more posted themselves on the sacred mount *(Mons Sacer,)* followed by vast numbers of the plebeian party, men, women, and children. Then were the patricians compelled to yield, and the decemvirs resigned. The plebeians obtained also the restoration of the tribuneship and of the right of appeal, with a full indemnity for the authors of the secession. The commons then returned to Rome, and re-occupied the Aventine; but along with it the Capitol also, as security that the terms of peace would be duly kept. The decemvirate was finally abolished, and the consulship restored; with this additional provision, that whereas formerly one had been appointed by the patrician curiæ, both were now chosen in the centuries. B.C. 447.

The new consuls were L. Valerius and M. Horatius, men who had shewn themselves to be favourable to the people. They wisely endeavoured to unite the two orders of the state on terms of perfect equality. A law proposed and passed by Valerius, formally acknowledged the commons of Rome to be the Roman people; a plebiscitum, or decree of the commons, was to be binding on the whole people; *quod tributim plebes jussisset, populum teneret.*[2] Such a popular decree, however, would not have passed into effect without the sanction of the senate, and of the curiæ; but it was a mighty stride in advance towards the obtaining of a recognized and legal equality between the two great orders of the state. B.C. 446.

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[1] For an admirable view of these laws, see Arnold, vol. i. p. 253, *et seq.*

[2] Livy, iii. 55.

Laws were also passed, rendering every magistracy open to individuals of either order, the patricians to the tribunate as well as the commons to the consulship; and there seemed to be now a complete union of all parties in the state, with the exception of one point, the law prohibiting intermarriages between the patricians and the commons.

A re-action, however, took place, and the patricians had sufficient influence to prevent the new constitution from coming into operation. No plebeian consul was elected; and all the military tribunes, six in number, were chosen B. C. 445. from patrician houses. Another struggle took place; the tribune Canuleius proposed a law to repeal the prohibition of intermarriages between the two orders; and after a temporary secession to the Janiculum, this law was carried. Still the plebeians were not content without the consulship being rendered accessible to them; but this they were not yet able to obtain.

A new patrician magistracy was next appointed, which acquired powers not probably expected, or at first intended. B. C. 441. This was the Censorship, the main duty of which had at first been limited to taking the census of the people; but which, from the office of superintending the public morals with which it was entrusted, derived the power of reducing any dangerous citizen to insignificance, by degrading him from his rank and order. The commons had now acquired full security for their persons and their property; and while ambitious individuals would continue to be desirous of additional powers and privileges, the great body of the community felt little interest in their personal intrigues, and the state began to enjoy a period of comparative internal repose. The people had now learned the secret of their own strength, and how to make it available. For not long afterwards we find them aiding the senate when the consuls appeared inclined to disobey its authority, thus asserting their supreme power, and also refusing to permit the enrolment of soldiers for the Veientine war, unless the question of war were first submitted to the comitia centuriata.

The war with the Æqui and Volsci was again renewed, but was now waged by the united force of the republic, and with corresponding success. Several victories were gained and towns taken. Treaties were formed on favourable terms with the Latins and the Hernici, and Rome again began to extend her boundaries as she had done in the days of her kings. Her attention was now turned to the right bank of the Tiber, the peace with Veii being near its termination.

Between Rome and Veii a keen rivalship had long existed; and as the truce approached its close, both nations prepared for a strife which both intended to be final. The taking of Anxur from the Volsci, enabled the Romans to B. C. 404. send the greater part of their army against Veii. Several battles were fought, in which the Romans were generally successful, and Veii itself was invested. For some time it was rather a blockade than a siege; and when the Romans attempted a complete circumvallation, the Veientians, aided by some of the neighbouring states, stormed one of the Roman camps, and broke up the siege. Again was the city invested by the Roman armies, and again were those armies so severely worsted by the assistance of the Faliscans and Capenatians, that it was deemed necessary to appoint the celebrated Marcus Furius Camillus to the dictatorship.

Immediately upon his taking the command, the war began to assume a different aspect. A close siege was formed, and pressed with vigour; all attempts from without to raise it were defeated; all sallies from within repelled with great loss. The poetical legends connected with the fall of Veii, mention several prodigies that portended the approaching doom of the one or the other of the belligerent nations. The supernatural swell of the Alban lake, and the formation of a tunnel, by which its waters were drained off, and directed into the fields of the circumjacent country, was one romantic episode of this poetic lay. The stratagem by which the city was taken, a mine carried underneath the walls, and opening into the precincts of the temple of Juno, by which the Roman soldiers were enabled to burst from the earth in the very heart of the city, rush to the gates, and open them for the admission of their countrymen, while the general himself, issuing from the same subterranean passage, finished a sacrifice to Juno, which the priest had declared to be the omen of victory, certainly bears more the appearance of poetic fiction than of historic reality. Veii, the rival of Rome, was taken, and the greater part of the districts, formerly subject to the Veientians, added to the Roman dominions. Capena and Falerii followed its fate, and the whole valley of the Tiber, on both banks, formed now the natural extent of the territories acknowledging the sway of the seven-hilled city.

More important to the future glory of Rome, than the territory gained by the conquest of Veii, was the new principle in the organization of her armies to which the siege of that city gave rise. In order to insure the destruction of Veii, it was determined to surround it completely, and prevent it from receiving any supplies of men or provisions, either by summer or winter. This rendered it necessary that the beseiging army should continue its operations during winter, which was a measure never previously adopted. But as the soldiers were, in general, cultivators of land, and supported themselves by the produce of their own industry, without pay from the state, it was necessary to give them pay if their services were to be required permanently in the field.[1] This could be done only by the patrician holders of public land paying fairly their tithe into the public funds, besides bearing their due share of the public taxes. To this they consented, in order to secure the overthrow of their rival. Still the heaviest burden, and the greatest share of the danger fell on the commons; and in order to procure their consent, the election of military tribunes out of their order was at length sanctioned by law. Rome had now nearly acquired that formidable character in which she soon afterwards appeared to terrify and subdue the world; a military republic, where every citizen was, or might be, a soldier, and with a standing army inured to war and conquest.

Camillus, the conqueror of Veii, and the most distinguished man of his time, was accused of having secretly appropriated to his own use a portion of the plunder of that city. Whether he had been really guilty of so mean an action, or whether the accusation was prompted by envy of his glory, dislike of his haughtiness, or dread of his power, cannot be determined; but seeing the probability that he would not be acquitted, he went into voluntary exile to Ardea; and as he passed through the gates he is said to have turned, and invoked the gods, that if he were driven unjustly into exile, some grievous calamity might fall upon his ungrateful countrymen, and force them to feel his want, and to be glad to recall him to their rescue. Such a calamity was at hand, and ready to burst on the devoted city.

The Gauls had some time previously crossed the Alps, gained possession of the plains of the Po, penetrated the passes of the Apennines, and were advancing into central Italy. It is probable that the report of their approach was what prevented a union of the Etruscan cities when Veii was besieged by Rome. The Romans having accomplished their object, became also alarmed at the rumour of the advance of this terrible foe, and sent some of their citizens into Etruria to observe their movements, or at least obtain accurate intelligence. They arrived at Clusium just as it was beset by the Gauls. The Roman deputies joined the citizens in a sally, and one of them slew a Gaulish chief, and was recognized as a Roman while he was stripping off the spoil. The Gauls sent to Rome to demand the aggressors to be given up to them, as there had been no war declared between the Romans and the Gauls. The Romans refused to yield up their brave countrymen to torture and death; and the Gauls, finding their demands rejected, broke up in haste from Clusium, and marched away, shouting "to Rome, to Rome."

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[1] Livy, iv. 59, 60.

The Roman army had marched towards the Etrurian frontier, expecting to meet the enemy at some distance from the city; but the Gauls had crossed the Tiber considerably higher up, and were proceeding along its left bank towards Rome. Upon receiving this intelligence, the consuls hastened back to the city, crossed the river, and marched rapidly against the enemy. The Romans had scarcely time to assume a hasty position on the banks of the Alia, where, through a deep bed, that slight stream joins the Tiber. The Gauls at the very beginning of the battle, turned the right flank of the enemy, drove it back in confusion on the main
B C. 388. body, and rushing impetuously in their victorious career, hurled the broken mass headlong into the river. The rout was total, the slaughter great. Many were drowned, and many more slain by the Gaulish javelins, while attempting to swim across the river; those who succeeded fled to Veii, and there sought an ignoble safety. Others fled to Rome, carrying the tidings of their utter discomfiture; and thence continued their flight to Veii, despairing of being able to save Rome. The Capitol alone was garrisoned by a devoted few, who were resolved to defend this last bulwark of their country, or perish in its ruins.

The city was left open and undefended, but it was on the third day after the battle that the Gauls entered it. In the interval, the great body of the Roman citizens had abandoned their homes, and fled for refuge to the neighbouring cities, carrying the most sacred of their images and relics to Caere, and leaving those which they could not remove deeply buried in a secret retreat. But some of the priests, and the aged patricians of the highest rank and dignity, could not endure the thought of quitting their native city, and dragging out the remainder of their feeble days in a foreign land. They solemnly devoted themselves and the Gauls to the infernal deities, and then seated themselves in the forum to wait their death, by which they hoped to draw down on the Gauls the vengeance of the gods. When the Gauls entered, all was silence in the forsaken city, nor did they see a human being till they reached the forum. There they beheld the majestic fathers of Rome, seated each on his ivory chair of office, and clad in his senatorial robes, unmoving, silent, awful impersonations of sublime despair. The Gauls gazed on them with reverential respect, regarding them as more than mortal. At length one of the Gauls drew near to M. Papirius, and began to stroke gently his long white beard. Papirius, a priest of the highest rank and sanctity, indignant at the profane touch of the barbarian, struck him on the head with his ivory sceptre. The Gaul cut down the venerable man with his sword. The spell was broken; barbarian fury kindling at the sight of blood, rushed on its defenceless prey, and in an instant the vows of the aged senators were ratified in their blood.

After pillaging the forsaken city, the Gauls turned their attention to the Capitol; but being unable to scale the rock, were repulsed from the only access with considerable loss. They now changed their plan, made the city their head-quarters, continued the blockade of the Capitol, and spread devastation into the surrounding country. Meanwhile the Romans who had taken shelter at Veii, began to recover courage, and to seek to open a communication with the brave garrison in the Capitol. This was accomplished by a daring youth named Pontius Cominius, who swam across the Tiber and scaled the cliff during the night, and having explained to the garrison the state of affairs at Veii, returned as he came, undiscovered by the Gauls. But in the morning some traces of his exploit were seen by the besiegers, who concluded that if the cliff had been scaled by one, it might by more. They made the attempt, and the spot being thought inaccessible, and therefore left unguarded by the garrison, they had nearly reached the summit, when the sacred geese kept in the temple of Juno, hearing the unwonted sound at such an hour, made so much noise as to awaken M. Manlius, a young patrician, whose house was hard by the temple. He sprang up, seized his arms, called on his sleeping comrades, and ran to the edge of the cliff just as the head of a Gaul was appearing above it. Manlius rushed upon him, dashed the boss of his shield into his face, and tumbled him down the precipice. The falling Gaul bore down many of his countrymen along with him, and the rest, perceiving themselves discovered, and struck with terror, leapt, fell, or scrambled down the crags, and abandoned the attempt.

But though the Capitol was thus secured against direct force or surprise, it might be reduced by famine, and therefore the Gauls continued the siege. The brave garrison were reduced to the utmost extremities, but still continued the defence of their impregnable citadel, till the Gauls began to suffer scarcely inferior calamities, arising likewise from the want of food, aggravated by the unhealthiness of a Roman autumn. Great numbers daily perished; and the place where their bodies were burned was long afterwards known by the name of *Gallica busta*, or Gallic funeral piles. These calamities induced the Gauls to offer more reasonable terms, which the exhausted garrison was willing to accept. The demand was one thousand pounds of gold, on payment of which the Gauls agreed to depart from the Roman city and territories. It is also related that the Gauls had received intelligence of their own country being invaded by the Venetians, which increased their willingness to come to terms with Rome.

A truce was concluded; both parties met in the forum; and the military tribune, Q. Sulpicius, proceeded to weigh the stipulated sum. The Gauls fraudulently attempted to falsify the weights; and when Sulpicius complained, Brennus, the king of the Gauls, cast his heavy broadsword into the scale which contained the weights. The tribune asked what was meant by this action; and the haughty barbarian insultingly replied, "It means, woe to the vanquished." Having received this large ransom, the Gauls appear to have departed from central Italy, and returned to their own settlements on the regions in the valley of the Po, leaving the Romans to set about repairing, as they might, their sacked and desolated city.

The accounts which represent Camillus to have entered the forum at the moment when Brennus had uttered his insulting *Vae victis*, and to have ordered the gold to be taken away, saying, it was the custom of Romans to ransom their country with steel, not gold; to have driven the Gauls out of the city, and next day to have defeated them so totally that not a man was left alive to carry the tidings of their defeat to their countrymen; these accounts are manifestly parts of some poetical lays in honour of Camillus, the hero of his age and country. But they are too inconsistent with the more plain statements of other historians, and with the well known facts of the case in other respects, to receive any other than a poetic credence best suited to their poetic character.[1]

But when the first feelings of exulting triumph abated, and the Romans began to gaze around them on the scene of ruin and desolation, their hearts sunk within them, and they were on the point of yielding to the wretched dictates of cowardly despair. It had been previously proposed by the popular party, that a large body of the Roman citizens should at once migrate to Veii, and raise it to an equality with Rome in power and privileges. This destructive proposal was at the time successfully resisted by the more clear-sighted patricians; but now, when Rome was in ruins, the people few and dispirited, and Veii in a flourishing condition, its buildings better than even those of Rome had been, the proposal to quit the scene of devastation, and remove to one of comfort, was renewed and listened to with eagerness. It required all the authority of Camillus, enforced by that of the senate, and strengthened by every kind of assistance and encouragement that could be devised, to induce the Romans to remain, and undertake the heavy and almost hopeless task of rebuilding the ruined city of their fathers.

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[1] See Niebuhr, vol. ii. p. 547, *et seq.*

Livy informs us, that while the senate were sitting in grave and final deliberation respecting the removal to Veii, or the rebuilding of Rome, the people at the same time standing in clusters about the forum eagerly debating the same subject, some cohorts, returning from relieving guards, chanced to pass through the forum, when a centurion in the comitium called aloud, " standard-bearer, plant your standard; here we shall best remain." The well-omened expression was seized upon by the senate, they rushed out, exclaiming with one voice, that " they accepted the omen;" the surrounding commons applauded and re-echoed the cry; and all, with one voice and one mind, agreed to abide by the will of the gods thus indicated, to raise from prostrate ruin, and maintain the destinies of their everlasting city. There is little doubt that Camillus planned this fortunate omen, and by his well-directed efforts in this point, not less than in war, gained the glorious designation of A NEW ROMULUS, FATHER OF HIS COUNTRY, AND SECOND FOUNDER OF ROME.

Progress of Constitutional Law.

Hitherto we have been led to trace the growth of Rome from the building of the thousand Romulean huts on the Palatine, till under the Etruscan dynasty of its kings it had extended its power in all directions, entered into treaties with transmarine nations, and raised at home structures of great magnitude and imperishable durability. We have seen it sink into comparative feebleness during the intestine wars by which it was torn immediately after the expulsion of its tyrant monarch; yet even then have we also seen noble proofs of that love of liberty, that strength of stern indomitable will, that irrepressible perseverance, and that lofty confidence in their own destinies, which conspired to render the proud citizens of Rome the conquerors of the world. Of even more importance is it to trace the growth of constitutional law, as it arose out of the struggles of one party which wished to engross and retain all civic rights and privileges, and the growing wealth, intelligence, and power of another, which gradually became more and more sensible of its rights, and more and more determined to obtain them. Even the most careless observer of these contests, and their fluctuations of success and disappointment, must have marked, that whatever either party gained by unconstitutional violence, was never to either a permanent gain; that any premature advance of popular liberty was almost instantly followed by a recoil, proving, that not the soundness of a principle, nor the truth and accuracy of a theory, but the substantial, the felt, the practical necessity of the measure, is the only sure foundation of any addition to, or change in, the institutions of a country; and that the natural and spontaneous adjustment of existing rights and institutions, which takes place wherever they are pervaded by the genial influence of a healthful vitality, is productive of a far greater and more lasting amount of true liberty, public and private, and of all that can promote real national welfare, than could ever be obtained or secured by those impetuously philanthropic legislators, who dream of creating a commonwealth in a day, as a magician would produce a palace by the utterance of some all-powerful spell.

To trace the growth of constitutional law as accurately as possible, we must revert to the earliest period of Rome, and endeavour to extricate from their fabulous envelopements the historical truths contained in what are now admitted to be poetic legends. By this process we may hope to obtain as rational and intelligible a view of the city, the people, and the constitution of Rome, as the preceding narrative is capable of affording. It has already been stated, that the various inhabitants of that district of Italy, in which Rome was built, were the Oscan, Pelasgian, and Etruscan. The Pelasgi appear to have settled chiefly along the coast of Italy, from which they drove back the original inhabitants, who were probably Oscans. In process of time the Oscans descended again in great force from the mountains, overpowered the Pelasgians, and reduced them to a species of servitude, allowing them however to remain as tillers of the land, and artificers. From this intermixture arose the people subsequently known by the name of Latins; combining the hardy and warlike habits of the Oscan mountaineers with the superior skill and civilization of the Pelasgi. This view may be regarded as confirmed by the fact, first pointed out by Niebuhr, that the words which relate to agriculture and the comparatively refined arts of life, in the Latin language, are closely allied to the same words in Greek, indicating the Pelasgian origin of both; while the Latin words pertaining to war and the chase are entirely alien from the Greek, and are in short of Oscan origin.[1] From this it may be inferred, that during the formation of the Latin language, the nation was composed of two races, the Oscan and the Pelasgian, of whom the Oscan held the chief sway. The two races being both accustomed to the simple patriarchal, or family form of rule, would have a natural tendency to blend together so as speedily to become one people. This seems to have been the condition in which they were, during the period when Rome is said to have been built.

Whether the traditionary founder of Rome was of Oscan or Pelasgian race, cannot be ascertained. The greater part of his followers appear to have been Pelasgian; and from them the settlement may have obtained its name, which was afterwards given to the legendary hero himself. One of the traditionary accounts of Romulus, represents him as having been sent in his youth to an Etruscan city, for the purpose of receiving instruction superior to what could be obtained in Latium. Were we receiving the narrative as that respecting a real person, we should ascribe to his Etrurian education the attention paid by Romulus to augury, and the other arts of divination, in which the Etruscans are known to have excelled. The tradition may however refer to some influential Etruscan leader, who may have joined the early founders of Rome, and contributed greatly to mould their religious institutions. This view is supported by the statement of some authors, that an Etruscan chief, named Lucumo, was an early ally of Romulus, and aided him in the Sabine war, in which he was killed. The term Lucumo, we know, was not a personal name, but one of rank and office common to the Etruscan chiefs, who were all Lucumones. This Lucumo may have been the Tuscan chief Caeles Vibenna, who is said to have settled on the Caelian hill, to which he gave his name.[2] If this be admitted, and we suppose the followers of this Etruscan Lucumo removed to Rome by the Roman founder, after the fall of their own chief, we have a very probable account of the origin of the third tribe of the Roman people, the Luceres, who, though admitted as an original tribe, were in some respects subordinate to the other two, the Ramnenses and Titienses, or Romans and Sabines. The Luceres may have been of a more mixed race than the other two tribes, and on that account somewhat less esteemed. It is indeed by no means improbable that the first inhabitants of Rome were composed of some of all the adjoining states, although the Oscans and Pelasgians were the most numerous.

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[1] Niebuhr, vol. i. p. 83.

[2] Ibid. pp. 382, 383.

With regard to the Etruscans, we are of opinion that for a very peculiar reason, they could not have formed any considerable proportion of the inhabitants of Rome. We are inclined to hazard the conjecture, that the name Etruscan, as commonly used, is extremely deceptive, and leads almost invariably to error. The true name of the peculiar people generally called Etrusci, was, according to themselves, Rasena. It is constantly asserted that their language is totally unknown; and yet they are said to have occupied a very large portion of Italy, and to have been in constant and intimate intercourse with the nations inhabiting its other divisions. It is scarcely credible that not one word of confessedly a highly civilized people should have entered into the language of those nations with whom they held intercourse. But, if the body of the people called Etrusci were of Oscan, Umbrian, or even of Celtic origin, while the Rasena were merely a race of skilful and intelligent foreigners, who had, by force or policy, acquired the station of a ruling and a sacerdotal caste, their peculiar language might never be communicated to the body of the people whom they ruled, and so might perish when their power was broken and their caste destroyed.[1] The possibility that the Rasena were indeed a sacerdotal caste, similar to those of Egypt, India, and other oriental nations, perhaps also of the Celtic race, will scarcely be questioned by those who are acquainted with the history of the Brahmins and the Druids.[2]

atriarchal nciple.

Reverting to what has already been stated respecting the patriarchal form of rule common to the Oscan and Pelasgian races, we are furnished with an explanation of the central principle of all the Roman institutions. The form of government resulting from such a principle was necessarily monarchical, but could not be despotic. For, while the king ruled supremely over the nation at large, every head of a family ruled over his own household with uncontrolled sway, at once as its king and its priest.[3] But, in order to obtain the advantages of union, the families, houses, or gentes, formed themselves into bodies of *ten* each, called *curiæ*. Over each curia, one head of a House, or *gens*, held a sort of presidency, and received the name of *curio*. The union of ten curiæ formed a tribe. The union of the three tribes, the Ramnenses, or Romans strictly speaking and with reference to the inhabitants of the Palatine hill, the Titienses, or subjects of Titius, who were Sabines, and inhabited the Quirinal and Capitoline hills, and the Luceres, who were probably the original followers of the Etruscan Lucumo who aided Romulus, and settled at first on the Caelian hill, augmented by adventurers from neighbouring states, formed the Populus Romanus in the strict sense of that term. Thus the patriarchal principle pervaded the entire body politic, and gave to it all that was peculiar in its aspect and institutions.

P rons a Clients.

We must not, however, omit to mention, that within this external and public form of the body politic there was included another of a more private and personal character. As a state, tribes, curiæ, and houses were alone visible; but in each house there were necessarily members and dependents. The *members* connected by blood with the head of the house, or gens, were *Gentiles*, or as we might term them, *kinsmen*, and formed the free citizens of Rome: the *dependants*, who were not all, nor necessarily, blood relations, were called *clientes*, and might, with some modifications, be designated *clansmen*, belonging to the clan, but beneath the rank of the *duinne-wassal*, or gentlemen directly related to the chief. From this arose that more private or domestic division of the people into *patroni* and *clientes*. The patrons alone were recognised as citizens by the state, in their various aspects, as heads of houses, members of the curiæ, and of the tribes; and by them, and for them, were all laws made, with all which the clients had no connexion. The relationship in which the clients could alone be viewed was entirely of a private nature, subsisting exclusively between them and their patrons. The power of the patrons over the clients, on the other hand, would have been altogether despotic, but for the patriarchal element from which it sprung, and by which it was tempered. The client was regarded by the patron as to a certain extent a member of his family, owing to him indeed the most implicit obedience, but having the strongest claims upon him for protection, and even for some measure of paternal regard. The patron was bound to relieve the distress of his clients, to appear for them in court, to expound to them the law, civil and pontifical, and to allot them portions of land to cultivate and build upon, which, however, they held only as tenants at will. The clients on their part were bound to be obedient to their patron, to promote his honour, to pay whatsoever public fines might be imposed on him, to aid him jointly with the real members of his house, in bearing the public burdens of taxes, to contribute to the portioning of his daughters, and to ransom him or any member of his family who might fall into the hands of an enemy. If the client died without heirs, the patron succeeded to his property; and if the patron failed in discharging his duty to his clients, he was accounted infamous and accursed.

Tribes.

But the union of the three Tribes belongs to a subsequent period of the history. Although it seems sufficiently probable that the rudiments of the tribe called the Luceres, existed in the time of the founder of Rome, yet that tribe was not raised to a full equality with the other two till a later period. During the reigns of the first two kings of Rome, the nation presents a strictly twofold aspect, consisting of the two chief tribes, the Ramnenses and the Titienses. In each tribe the arrangements were precisely similar, ten houses constituting a curia, and ten curiæ a tribe, of which the heads of houses formed the senate, and the heads of the curiæ formed the chief senators. The great national council consisted thus of 200 senators, half Romans and half Sabines, or, laying aside the national designations, and retaining those of the tribes alone, half Ramnenses and half Titienses. The senate thus being wholly composed of heads of houses, its members were rightly named patres, and their order the patrician; but this patrician order comprehended at first the entire people, in consequence of the family-relationship, which, in fact or semblance, pervaded the whole community. Every head of a house was the judge and ruler of his house, both members and clients; the curia of ten houses governed the affairs of their collective body; and the senate of ten curiæ deliberated upon the affairs of the nation. In those early days, the assemblies of the people were merely assemblies of the patrician houses, who alone possessed the rights of full citizenship; and these assemblies were held in the valley between the Palatine and Capitoline hills, termed the Forum

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[1] Niebuhr, vol. i. p. 122.

[2] If this view could be substantiated, it would explain many of the most difficult questions that arise respecting the Etruscans. It would at once account for the want of a community of interest between the Etruscan chiefs and the body of the people, which prevented the growth of any regularly consolidated power among them, caused those sudden transitions from strength to weakness, and led ultimately to the disappearing of the ruling caste, and the complete blending of the real people with the other Italian nations. For when the Rasena ceased to rule, having little, if any thing, in common with the body of their subjects, not even their language, they speedily ceased to have a separate existence; and the people, who were correctly designated Tyrrheni, or Tursceni, and were of Pelasgic origin, very soon blended with their more kindred races, as, indeed, the Luceres had done with the primitive Romans at an earlier period.

[3] See Niebuhr, vol. i. p. 306, *et seq.*; and Arnold's History of Rome, vol. i. p. 25, *et seq.*

Romanum, and said to have been the place where the comitia curiata were held from the time of Romulus.

At this time the body, afterwards known by the name of the plebs, or plebeians, had no existence, the entire population being composed of patrician houses, with their members and dependents, in other words, of patrons and clients, the patrons alone being full citizens, and known as the people. In a very short time a population of a different character began to appear, composed of strangers who came to settle in the country, and the inhabitants of conquered states brought forcibly to Rome, and obliged to unite to a certain extent with their conquerors. This population had, of course, no connexion with the houses, but only with the state politically. They could not become *members* of the houses; they were not *dependents* on them; and thus they came to form a body of an entirely new character, springing up in the midst of the privileged citizens. They were not permitted to intermarry with the houses, who were very tenacious of purity of blood; and thus they belonged to no house, no curia, and no tribe, consequently they had no share in the public government nor in the public property. Their own property in their native country might have been diminished, or altogether lost in that war by which they had been subdued, in consequence of the law by which a third part of a conquered nation's lands was seized by the conquerors; yet what the state might subsequently seize in war, even by their aid, did not become theirs, because they formed no integral part of the state as such, being *in* the state, but not *of* it. Such an inferior population, of a character, and occupying a position so anomalous, not slaves, yet not citizens, was the element from which arose the original plebs or commons of Rome.[1]

Luceres.

The only events recorded in the legend of Tullus Hostilius, to which any degree of credit can be attached, are those which refer to the Alban war and its consequences. It seems to be a fact, that at some indefinitely early period in the history of Rome, the honour of being head of the great confederacy of the thirty towns of Latium, which had belonged to Alba, was transferred to the former city. This has been ascribed to the reign of Tullus; and as no period to which it may with greater certainty be referred, can be pointed out, it may be regarded as an historical truth, accounted for in no unnatural manner by a national legend. The combat of the Horatii and the Curiatii appears to be chiefly a poetical episode, and one of a very high and spirit-stirring character, but may have had some foundation in fact. The death of Tullus is also legendary and imaginative. It seems to have been partly at least an Alban lay, from its indications of divine wrath falling upon Tullus on account of the desolate temples and deserted gods of the Alban mount. But the most important part of the narrative is that which records the reception into the state of the third tribe, the Luceres. In the legend, this is said to have taken place in consequence of the union of the Albans with the Roman people. There may be a considerable portion of truth in this statement, and it is perfectly consistent with the known facts of the case, as far as they bear upon the subject. The Luceres were held to be to a certain degree inferior to the other tribes, as was not unlikely to be the case with the descendants of a conquered people. All the patrician houses that traced their genealogy to the Albans belonged to the Luceres, such as the Julii, Quinctii, Servilii, Cælii, and several others of the most distinguished Roman houses. The explanation of the name Luceres cannot be clearly given. Some derive it from the Lucumo who is said to have settled on the Cælian hill, and to have given it his name. If he founded a small city for his followers, and give it his official name, as he gave the hill his personal, the name of the town might be Lucerum; and when the Albans were located on that hill, and in that town, and raised to the condition of a tribe, they might be called Luceres from their new abode, and in order to sink the remembrance of Alba.

Plebs.
Plebei

The most important event recorded in the period assigned to the reign of Ancus was the removal of the conquered Latins to Rome, and the apportioning to them of a settled residence on the Aventine hill.[2] This may be regarded as the origin of the Roman plebs, or commons, as distinguished from the patrician body, who were the true and original Populus Romanus. It cannot be too distinctly stated, nor too clearly and strongly remembered, that among the early Romans, the populus and the plebs were wholly and in every respect different. The populus was originally the whole body of the early inhabitants of Rome, both those of Romulian and those of Sabine origin. This body, consisting of senators or patres, curiæ, and houses, with their members and dependants, was completely aristocratic in its aspect, and tolerated no degrading intermixtures. The plebs were originally the conquered Latins, who were in a measure incorporated into the mass of the nation, by being removed to the Roman territories, placed on the Aventine hill, and permitted to farm the land of the state, which latter arrangement is said to have been made by Ancus. They retained their personal freedom, but could neither become members of houses, nor in general would submit to be dependants. They grew up, therefore, along with the populus, a free, but unprivileged, and too often an oppressed population; and though both despised, feared, and hated by the exclusive patrician populus, rapidly growing what they ultimately became, the real strength of Rome. Had it not been for the patriarchal principle pervading Rome, which caused the ties of kindred to be the only legitimate method of obtaining the full privileges of a citizen, these near residents might have been admitted at once, and all the subsequent fierce domestic broils might not have taken place; but without these contests the nation might never have been knit into such compact strength, nor have been led to the formation of such a body of wise and well-digested laws.

New
tors.

In the constitution of the Roman state, Tarquinius made at least one alteration concerning the true nature of which, authors are by no means agreed. Some say that he added an hundred members to the ancient senate, which till then had amounted to no more than two hundred. These new senators were called fathers of the lesser houses, *(patres minorum gentium;)* and the old senators fathers of the greater houses, *(patres majorum gentium.)* If this account were entitled to implicit credit, we should regard it as referring to the admission of the Luceres into the full enjoyment of the rights and honours of citizenship. Yet this seems to have taken place during the reign of Hostilius, when he brought the conquered Albans to Rome. Perhaps a portion of each statement may be true. The Albans and Latins may have been settled on the Cælian hill, and formed into a tribe by Tullus; but not raised to the senate till the accession of Tarquinius, who may have thought such a step necessary in order to secure the support of a large body of the state, his claims to the throne being so very questionable. It is true Niebuhr[1] hazards another very ingenious conjecture. He thinks that Tarquinius may have been himself one of the tribe of the Luceres, that Priscus may have been a name belonging to him, as one of a Priscan gens, or house, and that the legend of his Etruscan conquests and acknowledged sovereignity may have some connexion with the much more ancient tradition of the fabulous Tuscan hero, Tarchon, to which the name Tarquinius itself may allude. It is sufficiently evident, that there did exist at some remote period, an intimate intercourse between Rome and the Etrusci; and there appears to have been some connexion between this Etruscan influence and the tribe of the Luceres. What the exact nature and extent of this Etruscan intercourse and influence were, it seems a hopeless task to inquire, and it would be fruitless to indulge in framing conjectures.

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[1] It may be added, though here we are anticipating the regular course of events, that the great proportion of the Roman commons were conquered Latins. Besides receiving grants of a portion of their former lands, to be held by them as tenants at the will of the state, they had also the Aventine hill assigned to such of them as removed to Rome. The Aventine was not included within the walls of the original city, so that these half-citizens became the suburban neighbours of Rome rather than its inhabitants, enjoying its protection, sharing heavily in its burdens, exposed to a full proportion of all its dangers, but excluded from all its political rights and privileges. From such a condition no wonder that future contentions arose.

[2] See Niebuhr, vol. i p. 355.

It is stated, that Tarquinius wished to add to the centuries of the Equites, established by Romulus, three new centuries, and to call them by his own name, and the names of his friends. In this intention he was opposed by the augur Attus Navius, who affirmed that what had been instituted with augury, could not be changed without it, and that the omens forbade any change. The king, in order to cast discredit on the art of the augur, asked him to divine whether what he was then thinking of could be done. The augur observed the omens, and answered that it could. "I was thinking," said the king, "whether you could cut this whetstone in two with a knife." Navius instantly took the whetstone, and cut it sheer asunder, to the amazement of the king. This proof of the augur's skill caused Tarquinius to desist from his intention to its full extent; and he merely added to each of the former centuries a second or latter century under the same name. In this legend may be contained an account of the opposition which Tarquinius experienced from the patrician body, when he purposed to raise a number of the most distinguished of the free citizens to the equestrian rank,—an opposition to which he was so far obliged to yield.[2]

It has been already stated, that the constitution of Rome[3] was founded on the patriarchal principle, as to its essential characteristic, while the numerical divisions of the government by tens were arbitrary, so far as can be traced. Every head of a house was an integral member of the state, as a free citizen; but there is no very manifest reason why houses should have been aggregated into *tens*, or curiæ, these into other *tens* forming the senate, or patres, of one hundred. But this division or rather aggregation having been adopted, it influenced all the arrangements of the body politic, both in peace and war. While there was but one people, the followers of Romulus, there was but one tribe, the Ramnenses, or, as some term it, the Ramnes, and the senate amounted to one hundred. Upon the junction of the Sabines, there were two tribes, the Titienses or Tities being added, and consequently the senate then numbered two hundred. The elevation of the third tribe, the Luceres, completed the number of curiæ, decuriæ, tribes, and senators, till thirty and three hundred became the ruling numbers in this division.

It is worth remarking, that, according to the statement of ancient authors, when Romulus formed the Pomœrium, including all that composed ancient Rome, his city merely contained one thousand wretched huts, clustered together on the Palatine hill. Now, if it could be shewn that the union of ten families formed a house, ten houses a curia, and ten curiæ the entire tribe, we should have the exact number of the first huts erected on the Palatine, and of the primitive mansions of the Roman fathers.

The army followed in its construction the numerical arrangement of the people. The earliest Roman legion could contain no more than the male inhabitants of Rome, which would be at that time only a thousand capable of bearing arms. As the senate was formed from the hundred chief men of the curiæ, so there were an hundred of the bravest selected from the curiæ to fight on horseback. Thus the equites, or knights, were at first equal in number with the senate, and equal in rank, as members of the curiæ, though not senators, because not the heads of the curiæ. When the senate was increased to three hundred, by the addition of the other two tribes, there were also three centuries or hundreds of knights, retaining the proportion. The legion would then consist of 3000 infantry, and 300 cavalry; and though in later periods the numbers of the infantry were increased, 300 continued to be the legitimate number of cavalry in a legion. Although the name remained, the numbers fluctuated according to the dictates of policy or necessity, so that when we read of a century, we are not to assume that an hundred is meant, and neither more nor less.

Servian Constitution.

Adopting recognised terms and divisions, Servius, in his endeavours to improve the constitution of Rome, divided the large body of unprivileged yet free citizens, the plebs, or true commons, into thirty tribes, according to the thirty curiæ of the senatorial patricians. Of these thirty tribes four were contained in the city itself, and the remaining twenty-six in the lands that had been added to the dominions of Rome by conquest. Each tribe was under the dominion of a magistrate of their own body, called a Tribunus. There were also judges appointed, three for each tribe, to determine private causes among the plebeian citizens. For the appointment of these official persons, and other matters connected with their own interests, the plebeians were empowered to hold their own meetings, called the comitia tributa. These were held on the *nundinæ*, or market days, when the country people came to Rome, and in the forum or market-place adjacent to the comitium, or meeting place of the patricians, but quite distinct from it. These comitia tributa were entirely plebeian, and at first referred only to the decision of disputes respecting private rights among the plebeians themselves. They were not convoked by the patricians, nor held under patrician auspices. They had nothing to do with national affairs as such, but were confined entirely to the private business of the plebeian order. Neither had the patricians at first any thing to do with this plebeian assembly: they formed no part of it, and had no authority over it. Yet, though thus distinct from the state in its original formation, it gave an organized form to the plebeian body, which soon proved its importance, as the very thews and sinews of the body politic, and therefore essential to its growth and strength.

Comitia Centuriata.

The institution of the comitia tributa, though at first of an entirely private character with reference to the state, tended to the formation of a new assembly, in which all the orders of the people were included, and arranged for the discussion of public affairs. It was not possible that the plebeian body could be so far organized as to have its own, magistracy, elected by itself in an assembly of its own, without producing an early necessity for its admission into the state; for organization both gives power, and the consciousness of power, in the body politic. The most natural occasion and mode of its admission, had a military origin and character, like most of the other Roman institutions. Though the patricians and plebeians remained completely distinct in their civic character, and in the time of peace, yet in the time of war they acted together in one great body, the army. The arrangements of the army were therefore those which led to their junction in another aspect, and were in that new aspect retained as much as possible. As the earliest principle of the structure of the Roman army was its division into centuries, so the same principle gave rise to an assembly of a new character, called the comitia centuriata, where the military principle predominated, and in which the whole population met. So much of a military character did this assembly at its origin bear, that it was not permitted to meet within the city, but in the Campus Martius, and it even bore the name of *exercitus urbanus*.

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[1] Niebuhr, vol. i. pp. 376, 377.

[2] See Niebuhr, vol. i. pp. 360, 361.

[3] For a full view of the Servian constitution of Rome, see Niebuhr, vol. i. pp. 405–487. Arnold, vol. I. pp. 64–82.

Tarquinius is stated to have added, not three new centuries bearing new names, to the equestrians, for that was prevented by the augur Navius, but three new centuries, forming a second series, and retaining the designation of the first three. These three double centuries of the Ramnenses, Titienses, and Luceres, were now recognised as distinctly six privileged bodies of voters, *sex suffragia*, of the new assembly. To these, which contained all the members of the houses, there were added by Servius twelve new centuries of knights,formed from the richest members of the plebeian community, and continuing, like the centuries below them, to belong to the thirty tribes of the commons. There were thus eighteen centuries of the most noble and wealthy persons in the state, who enjoyed the privilege of serving in the army on horseback; known in their military character as the equites, and in their civil character as the equestrians, or, as we term them, the knights. Their distinction as an order was however posterior to their formation as the eighteen equestrian centuries in the comitia centuriata.

Classes.

Proceeding on the military principle, the next point was to organise the foot soldiers of the state. This was done chiefly with reference to the value of the armour which individuals could afford to procure and wear in battle, because in the earliest ages of all nations, men armed themselves as they best could, at their own expense, not that of the state, and consequently the richest were the best armed. As brass was the metal of which weapons of war, either offensive or defensive, were first formed, brass or copper, so many pounds weight, according to an estimate of the weight and value of the armour, formed the principle by which the successive classes were divided and arranged. Of these the first class contained all whose property amounted to, or exceeded, one hundred thousand pounds weight of copper. The soldiers of this class were required to be completely armed with greaves, coat of mail, helmet and shield of brass, besides the sword and the long pike. And as these were necessarily to advance in the front, and bear the shock of battle, and formed the flower of the troops, so their influence in the great military assembly was proportionate. They formed eighty centuries; forty between the ages of fifteen and forty-five, to serve in the field; and forty between forty-five and sixty, for the defence of the city. To this, the first class, the eighteen centuries of knights were added, so that it amounted in all to ninety-eight centuries. The second class contained those whose property fell beneath 100,000 asses, or pounds of copper, and above 75,000. These formed twenty centuries, and were less completely and expensively armed. The third class contained also twenty centuries, and its qualification was properly between 75,000 and 50,000 asses, or pounds of copper. Its armour was inferior to that of the preceding class. The fourth class contained those whose property was not beneath 25,000 asses; it amounted to twenty centuries, and its soldiers were not required to provide more than a pike and a javelin. These four classes composed the main body or phalanx of the army, when it was drawn up in that order of battle previous to the formation of the legion. The fifth class consisted of those whose property was between 25,000 asses, and 12,500; it formed the slingers and archers, or light infantry of the army, and was divided into thirty centuries.

The poorest citizens, whose property fell short of 12,500 asses, were regarded as supernumeraries in this division. Those who had above 1500 asses were still regarded as taxpayers, *assidui*, and were formed into two centuries, called the *accensi* and *velati*. They merely followed the army, and were only required to supply the places of those who fell. Below these came one century of the *proletarii*, whose property was between 1500 and 375 asses. These paid no taxes, had no military duty, and were only liable to be called on in great emergencies, as extraordinary levies, when arms were furnished to them at the public expense. One century more included all whose property, being less than 375 asses, was not worthy of being estimated, and who were called *capite censi*, and not liable to military service.

Three centuries of a different character completed the division, but these were not rated by their property, but by their occupation. These were,—one century of carpenters and smiths attached to the first class, and two of hornblowers, *(cornicines)*, and trumpeters, *(tubicines)*, attached to the fourth class.

From this brief outline of the comitia centuriata, the new national constitution given to Rome by Servius Tullius, it will be seen that it was a proof of very remarkable political wisdom in that legislator. The new citizens of Rome had been rapidly increasing in numbers and importance. A new tribe, the Luceres, had recently been raised to the possession of full political power. Three new equestrian centuries had been called into existence, though still in a subordinate position; and the body of the commons, the plebeian body, augmented by the arrival of free citizens from recently conquered Latin states, was gradually rising in importance, so as to point to the necessity of its obtaining a recognised position in the state; and at the same time to give to the hereditary patrician body no slight cause of alarm, lest it should soon become the most powerful body at Rome. By the Servian constitution, if we may so term it, the danger of any such revolution was averted by the admission of the plebs into a national council, without disturbing the proportions of influence due to the different bodies of which such a council was to be formed. The wealthiest men of the plebs would naturally be desirous of obtaining some share of that patrician dignity which they had enjoyed as Latins, before the annexation of their native states to Rome; and this desire was met by the creation of twelve centuries of knights, added to the equestrian order from amongst the plebeian tribes. These twelve centuries constituted a *nobility*, but yet were so connected with the eighty centuries which formed the great body of the first class, that they could not degenerate into an oligarchy. The first class, again, being formed of the wealthiest persons in the state, though far the least numerous, prevented the government from becoming a democracy of that ultra kind, in which numbers form the *ruling element*. In truth, property formed the *ruling element* in the Servian constitution; for the first class, containing ninety-eight centuries, even, without the addition of the *fabri*, formed the majority of the comitia centuriata, so that if all the centuries of that class were agreed on any point, it was carried without the votes of the other classes. The mere numbers of the lower classes very greatly exceeded those of the first class; but as property was assumed as the principle by which a century was to be formed, it required a great number of individuals to form a century of the requisite wealth. The proportion seems to have been regulated thus: the votes allotted to each class bore the same proportion to the collective sum of votes, as the taxable property of its members bore to the total taxable property of all the five classes; while the number of the citizens contained in each, stood in an inverse ratio to the numbers which designated their property. Although, therefore, the plebeians were now admitted into the full rights of citizenship, and to a voice in the government, still the power of deciding was vested in those who possessed the chief rank, wealth, and that natural influence which those who occupy a superior station always enjoy.

Perhaps the only fault of this new constitution was its premature establishment. It was in advance of the period to which it is always referred. The necessity of conferring the franchise upon the plebeians had not been sufficiently felt, consequently the patrician order, the ancient Roman populus, could not endure the admission of a new and recently conquered people to any thing even approaching an equality. Hence their enmity against Servius, and their concurrence in the ambition of Tarquinius, afterwards surnamed Superbus. On their part, it was a plot to overturn the new constitution, and deprive the plebeians of the rights and privileges conferred upon them by that wise and patriotic monarch. The introduction of the plebeians may perhaps have been too early even for their own good, as they had been too recently united to Rome to have thoroughly acquired the true Roman spirit; and they needed to purchase their privileges more dearly, by a lengthened and fluctuating struggle, in order that they might sufficiently prize them. For men always value most what they have with the greatest difficulty acquired. And, besides, the arrangement was too completely military to be perfectly adapted to the more peaceful spirit and structure of a purely civil economy. It was also of too sudden formation, not only that the people were not ripe for it, but that it did not, by its deliberate growth, tend to ripen them. In its gradual formation afterwards, every sucessive stage was sharply contested, and hardly won. The principles of law and justice, municipal and natural, on which they rested, were all made manifest in the course of the contest; so that not only a sound civil polity was at length established, but, at the same time, there was formed a code of laws based on principles so profound and true, as to entitle them to be retained as the foundation of all laws, to all civilized nations, from that period to the present, and probably to the end of time.

SECTION II.

C. 388.

Scarcely had the Romans succeeded in raising a portion of the city out of its ashes, when they were again involved in war. The various states and nations who had been reduced to subjection in previous wars, seemed to regard the humbled state of Rome as affording a propitious opportunity, not only of recovering their freedom, but of crushing a dangerous neighbour. The next year after the burning of Rome by the Gauls, the Latins and Hernicans revolted; while the Volscians declared open war, and invaded the lands of their weakened antagonist. But Camillus was at the head of the state, and his military genius enabled him to lead the feeble remains of the Roman armies to victory over their ungenerous foes. The Æquians had themselves suffered from the march of a part of the Gauls through their country into Apulia; yet they also took up arms against Rome, and were defeated. Meanwhile the Etrurians assailed the Romans in another quarter; and Camillus was compelled to march against them, when again victory crowned his exertions.

In a short time afterwards, the Latins and Hernicans having united their forces, struck such apprehension into the Romans, that as Camillus could not be spared from Rome, on account of the dissensions by which the state was agitated, Cossus was appointed dictator, and sent against them. He not only gained a complete victory over them, but also established a colony at Satricum. The Prænestines sustained a severe defeat; and on all sides the Romans repelled their assailants, and even began to extend the boundaries of the republic.

But while victory attended the Roman arms in these contests, the dangers arising from intestine broils became more and more urgent. The state of confusion in public matters, caused by the destruction of all public records, rendered it possible for the ruling orders to levy taxes and contributions from the plebeian order beyond their due proportion. That they did so may be fairly conjectured from the fact, that no accurate census was taken during fifteen years after the burning of the city, while taxes were levied by rates merely conjectural, and, we need scarcely add, with partiality and oppression. The building of the houses being, in a great measure, a public work, was done at the public expense, and the commons were, in many instances, enjoined to bear their proportion of the pecuniary burden, even after their whole property had been assigned to the patricians to whom they had been indebted. This necessarily plunged them deeper and deeper into debt; until the dungeons in the houses of the patricians became filled with their ruined countrymen in the sad condition of *nexi*, or persons assigned to slavery for life, for the payment of their debts. Censors had indeed been appointed, but no census was taken, so that the oppressive effects of continuing to exact a heavy tax from people whose property had already been alienated by debt, as if that property were still their own, continued unabated.

Manlius.

Manlius, the brave defender of the Capitol, took upon himself the dangerous task of defending the oppressed people. His seeming patriotism was, in all probability, increased by disappointed ambition, the influence of Camillus being too powerful for him. He publicly sold an estate, and with the produce paid the debts of a number of the oppressed plebeians. He next proposed the sale of public lands for the same object; and also accused the government of having concealed the money said to have been recovered from the Gauls, for the purpose of appropriating it to themselves. For this and similar conduct, he was accused of sedition and cast into prison; but so formidable was the appearance of his friends, that the senate restored him to liberty. This only encouraged Manlius to persevere in his violent course; and at last availing himself of his house in the Capitol he seized on that citadel, and was immediately accused of aiming at kingly power. On this accusation he was condemned to be thrown from the Tarpeian rock; his house in the Capitol was razed to the ground, and it was decreed that no member of the Manlian house should ever afterwards bear the name of Marcus. Such is the most common account given of this transaction; though there are others which differ considerably, both representing the conduct of Manlius in a much more favourable light, and relating his death differently. His death, however, unquestionably occasioned an accession of strength to the patricians, and in a corresponding degree weakened and dispirited the plebeians. Additional taxes were levied for the rebuilding of the walls; and by a sad consequence, additional debts were incurred by the oppressed commons, and greater numbers thrown into prison, or reduced to a state of servile dependence. All the privileges and rights for which the commons had so long and perseveringly striven, were wrested from them one by one, and the city seemed to be on the point of sinking into the wretched and powerless condition of being the abode of tyrannous patrician citizens, and degraded plebeian slaves.

Licinian law.

But two men, equal to the emergency, were raised up to rescue the Roman state from its danger. These were two of the tribunes of the people, Caius Licinius Stolo and Lucius Sextius. In their patriotic endeavours they were aided by the influence of Marcus Fabius Ambustus, whose daughter had been given in marriage to Licinius. By their energetic and persevering efforts these tribunes so ingratiated themselves with the commons, that year after year they were re-elected tribunes, gained over their colleagues, concentrated public opinion, met and counterbalanced the influence of the patricians, and after a struggle of five years, carried three new laws, which may be said to have completed the fabric of Roman liberty. One of these was an agrarian law, prohibiting

B. C. 366

any Roman citizen from holding more than five hundred acres of national lands; and also fixing the rent of public lands at the tenth of grain, and the fifth of the vintage and other fruit-produce. Another law ordained that one of the consuls should be chosen from the body of the commons. The third provided, that in cases of outstanding debts, all the interest which had been paid should be deducted from the capital, and that the remainder should be paid by equal instalments in three years. For the public influence thus obtained by the commons, the patricians endeavoured to compensate by the appointment of a prætor from their own body, and of curule ædiles; but the plebeians having obtained so much, could not any longer be prevented from attaining a perfect equality in point of eligibility to all public offices. In a short time afterwards, their participation in the other magisterial offices followed as a matter of course; the dictatorship, B. C. 353, the censorship, 348, the prætorship, 334, and even the priesthood, 300.

Thus at last the object of political equality between the patricians and plebeians was attained; and though the difference between patrician and plebeian families still subsisted, they gradually ceased to form political parties distinguished by origin and descent, yet there still remained the elements of strife between the wealthy and the poor, in which character all subsequent civil contentions at Rome ought to be considered. This we here deem it expedient to state distinctly, in order to guard the reader from the error of viewing the popular contests in which the Roman people were frequently engaged, after the passing of the Licinian laws, as merely a revival of the old feuds between the privileged patrician populus, or exclusive citizen-nobility of Rome, and the unprivileged, yet personally free commons, the growth of conquest, and forming the real strength of Rome. The early feuds were caused by the endeavours of the patrician populus to engross and retain all political power and privilege, and of the plebeian commons to secure personal liberty, and acquire civic and political equality. This was accomplished directly by, or soon in consequence of, the Licinian laws. But no public law can produce equality of wealth and influence: oppression may be prevented, sufferings may be mitigated, the growth of exorbitant wealth and power may be checked by wise enactments; but moral laws alone can prevent those inequalities of wealth and influence which must always exist, from becoming injurious, and finally destructive to any state, whatever be the excellence of its civil and political code.

Immediately after the conclusion of these civic struggles, the Romans were again engaged in hostilities against the Gauls and the Etrurians. Over both they were victorious; and in one of the battles with the Gauls, Titus Manlius, son of the consul, distinguished himself by slaying, in single combat, a Gaul of huge stature, despoiling him, in sight of both armies, of a gold chain, which the barbarian wore as an ornament, and throwing the bloody trophy around his own neck. For this exploit he received the name of Torquatus. Another Roman champion, Marcus Valerius, in another battle also slew a huge Gaul in single combat; in which, as tradition relates, he was assisted by a crow, and thence was named Corvus, or Corvinus.

Samnite war.

But while Rome was extending her dominions, and raising her military reputation in these conflicts, she was maturing her strength for struggles more formidable than any in which she had previously engaged. The Samnites, a people of Sabellian race, inhabiting chiefly a mountainous country, and celebrated for their courage and hardihood, made war upon the Sidicinians. They applied to the Campanians for aid against the Samnites; but both united proving too feeble, the Campanians applied to Rome; and the people of Capua declared themselves subject to Rome, that they might secure its protection. The Samnites refused to submit to the dictation of Rome, and prosecuted their hostilities against the Campanians. This produced a war between the Romans and the Samnites, by which the utmost strength of Rome was sternly tried. Several battles were fought, without producing any decisive results, though in general victory inclined to the Romans. On one occasion, the Roman army was in the utmost danger of being drawn into a disadvantageous situation in a narrow pass, and there surrounded, when it was rescued by the skill and courage of Decius, a military tribune, and a victory was gained over the Samnites. At length a truce was concluded for a period, both nations having suffered considerable losses

B.C. 343.

Latian war.

During the truce, the Latins continued to harass the Samnites; and when the Romans prohibited them, they declared war against Rome herself. This led to an unnatural war between nations that had for some time been almost completely blended. Manlius and Decius were sent against the Latins, and, in order to prevent the confusion that might arise between nations similar in language, arms, and discipline, the consul Manlius prohibited any Roman soldier from leaving the ranks on pain of death. But a daring Latin chief having challenged any Roman to single combat, the consul's own son could not brook that the haughty defiance should remain unanswered, quitted the ranks, slew his antagonist, and returning, laid the spoils at the feet of his father. The stern consul, though he had obtained his own name, Torquatus, from a similar gallant deed, immediately commanded the youthful champion to be beheaded on the spot, for breach of orders; disregarding the cries and entreaties of the soldiers, when they saw their young hero bound, and in a few seconds extended a headless trunk before them.

Decius.

A desperate engagement almost instantly took place, both armies striving at once for victory and for empire. The wing commanded by the consul Decius being on the point of giving way, he threw aside his armour, assumed a flowing robe of white, devoted himself with due rites to the infernal deities, for the safety of Rome, then mounting his horse plunged into the heart of the conflict, while his white robe streamed loose around his unarmed body. He soon fell, pierced by innumerable wounds; but the Romans believed that such a sacrifice necessarily secured the victory, while the Latins regarded it as equally ominous to them of defeat. The event was not long doubtful. The Romans were victorious in every quarter, and the Latins sustained a complete defeat. This battle is remarkable as being that in which the peculiar tactics of the Roman legion are first described by Livy; but whether the arrangement was the invention of Manlius, is not stated. The author of such a decided improvement in the art of war ought to have been made known; as there can be no doubt that the peculiar qualities of the Roman legion were greatly instrumental in achieving the empire of the world. See article Army.

B. C. 33

The Romans prosecuted their success with such vigour, that in the three ensuing campaigns Latium and Campania were subdued, and annexed as provinces to the territories of the republic. But the conclusion of one war was to Rome the beginning of another. The Samnites again took up arms, and were joined by the Lucanians. To resist his dangerous confederacy, the Romans mustered all their power, and placed Papirius Cursor at their head as dictator. Papirius reduced the enemy so much that they were glad to sue for a truce. But this was of no long continuance; and the Samnite general, Pontius, succeeded in drawing the Roman army into such a position that it could neither fight nor flee, being completely surrounded in a narrow defile called the Caudine Forks. The Roman soldiers were compelled to surrender at discretion, and were disarmed, obliged to pass under the yoke, and then dismissed with disgrace. This dishonour served only to rouse the indignation and the pride of Rome. Papirius was again chosen dictator, and again led the Romans to victory and revenge. The hum-

B. C. 32

bled Samnites once more sought a peace, which was soon afterwards broken.

C. 290.

In the renewed war, the Samnites were aided by the Etrurians, the Umbrians, and the Gauls. Against these confederate nations the Romans were led by consuls of unusual ability; among whom the skill of Fabius Maximus, and the self-devoting patriotism of Decius, rendered them conspicuous. After many gallant exploits, Decius, imitating the heroic deed of his father, devoted himself to the deities of death for his country's sake, and purchased victory at the expense of a consul's life. After numerous vicissitudes of fortune, which we cannot afford space to specify, victory declared for Rome. The Samnites lost their skilful general Pontius, and the Romans, under the command of Curius Dentatus, were enabled to dictate terms to their subdued antagonists.

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The Tarentines, and other states in southern Italy, had aided the Samnites, and were now afraid that Rome would take vengeance on them for their interference. They procured the assistance of the Gauls, in order to avert the war from their own territories. This expedient was crowned with but partial and temporary success. The Gauls were finally vanquished by Dentatus and Fabricius; and preparations were made for waging war against the Tarentines. Alarmed at the near approach of that vengeance which they had thus doubly provoked, the Tarentines applied for aid to the famous Pyrrhus king of Epirus. This brave and skilful, but rash and impolitic warrior, being desirous of emulating Alexander the Great, listened readily to the invitation of the Tarentines, cherishing a secret hope of conquering all Italy, and founding a western empire. He at first sent his favourite and political adviser Cineas to Tarentum, and soon afterwards followed in person, at the head of a large army, bringing with him also several elephants trained to war, the first time that such animals had been seen in Europe.

hus.

C. 279.

The first care of Pyrrhus was to increase his army, by the aid of as many auxiliary forces as he could procure, and to train them to the same discipline as his own. The Tarentines had expected him to bear all the toils and perils of the war, and to allow them to enjoy the pleasures of peaceful and luxurious indulgence. They soon found, however, greatly to their dissatisfaction, that their protector was resolved to be also their master; but their murmurs he suppressed without the slightest compunction. In the mean time P. Valerius Laevinus, the consul, at the head of a strong army, began to ravage the country of the Lucanians, who were in alliance with the Tarentines. This induced Pyrrhus to march against him, although his Italian allies had not joined him. A battle was fought on the banks of the Siris; and after an obstinate and bloody struggle, Pyrrhus obtained the victory, chiefly by means of his personal daring, his Thessalian cavalry, and his elephants, the Roman cavalry not being able to withstand the sight of these huge animals. But so desperate was the conflict, and so many of his best troops did Pyrrhus lose, that when his officers congratulated him on the victory, he exclaimed, "Another such victory, and I am undone!"

Soon after this encounter, Pyrrhus devastated the territories of the countries in alliance with Rome. He laid siege to Capua, surprised Fregellae, and invested Præneste, having advanced even within sight of Rome. Finding however that his march was producing no impression, he avoided an engagement offered him by Laevinus, and returned to Tarentum. What he had now learned of the Romans, convinced him that there was little prospect of an easy conquest over them; and he was very willing to enter into negotiations for a peace upon equal and honourable terms, his only stipulation being for an amnesty to the Tarentines, the Greek cities in Italy, and those states which had entered into an alliance with him. The senate seemed at first inclined to accept of these conditions; but they were dissuaded by Appius Claudius, who caused himself to be carried to the senate-house, blind as he was, that he might do his utmost to prevent a peace on any terms, except the immediate and unconditional departure of Pyrrhus from Italy. With this answer Cineas was obliged to depart from Rome, and both parties prepared for the renewal of hostilities. The consuls, P. Sulpicius and P. Decius, marched into Apulia, and were met by Pyrrhus near a little town called Asculum. There another battle was fought, which terminated in favour of the Romans, Pyrrhus finding it expedient to retire to Tarentum, and the Romans being in no condition to pursue, so obstinate had been the struggle, and so exhausted were both armies.

Pyrrhus, tired of a contest with such invincible foes, readily accepted an invitation from the Syracusans to assist them against the Carthaginians; and he passed over with a great part of his troops to Sicily. In that island he was at first successful; but fortune again began to frown upon him, and he was induced to relinquish his hopeless enterprise, and return to the aid of the Tarentines, who were nearly overpowered by the Romans. On his arrival, he recruited his army to the utmost of his power among the Samnites, Lucanians, and Bruttians, and prepared for a decisive effort. Nor were the Romans slack in their preparations: they sent the two consuls, Curius Dentatus and Cornelius Lentulus, at the head of two consular armies, the one into Lucania, the other into Samnium. Pyrrhus hastened to encounter Dentatus when separated from his colleague; and another desperate engagement took place near Beneventum. Pyrrhus had advanced incautiously in the hope of surprising the consul; and failing in this attempt, was obliged to risk a battle in a disadvantageous position, and where his phalanx had not proper room for its ponderous evolutions. The superiority of the legion over the phalanx, and of the soldier who fights for his country over the mercenary, were soon apparent. The elephants were scared by torches and driven back on the army of Pyrrhus; the phalanx was forced into a crowded confusion where it could not act, and from which it could not extricate itself; and in spite of the utmost skill and fierce valour of Pyrrhus himself, he sustained a complete rout, and fled with the wreck of his army to Tarentum. Thence he soon afterwards departed for Greece, leaving under the command of Milo, a small garrison in Tarentum, which shortly surrendered to the Romans. The Samnites were defeated with great slaughter, soon after the departure of Pyrrhus; and the Lucanians and Bruttians were also compelled to yield to the Roman arms. At the conclusion of this great war, Rome had established her supremacy over all the countries in Italy, from the northern frontiers of Etruria to the Sicilian straits, and from the Tyrrhenian sea to the Adriatic.

B. C. 272.

It cannot be doubted that the Roman arms triumphed in the Samnite, Latin, Etrurian, and Tarentine wars, very greatly in consequence of that cessation of civil dissensions which the Licinian laws had produced, and the corresponding accession of strength thereby gained. Yet even during these wars, there remained one grievance to be removed, and which was removed. The cruelty of a usurer towards one of his debtors, a youth of great personal elegance, excited the indignation of the people to such a degree, that the senate found it necessary to repeal the laws which gave creditors power over the persons of their debtors; and to enact, that thenceforth no person should be fettered and confined, except after conviction of a crime, and in order to punishment; and that for money due, the goods of a debtor should alone be answerable, and not his person. This enactment completed the charter of personal liberty to the Roman commons; but, as will afterwards be seen, it ultimately gave rise to consequences perhaps more fatal to public liberty.

B. C. 272.

The extensive conquests which arose out of these wars, gave occasion to the full development of the leading views of Rome, respecting the political relations in which it was her pleasure to place the conquered with regard to herself. The chief means to which, even from the earliest times, the Romans had recourse for the foundation of their dominion over the conquered, and at the same time for the prevention of the too great increase of the needy classes at Rome, was the establishment of colonies of their own citizens, which served also as garrisons in the captured cities in which they were settled. Each colony had its own internal constitution, formed generally on the model of that of the mother-city; hence it naturally became an object of Roman policy to keep the colonies in perfect dependence. This colonial system of the Romans, which necessarily arose out of the custom of depriving the conquered of their lands and liberty, assumed its main features in the Samnite war, and gradually embraced the whole of Italy. But the relations subsisting between Rome and the Italian nations were extremely various in kind.

A few cities and nations enjoyed the full privileges of Roman citizenship; in some instances, however, even these were precluded from the right of voting in the comitia. These were the municipal states. The privileges of the colonies were of a more restricted nature: they were indeed in possession of their own civic government, but had no share whatever either in the comitia or the magistracies of Rome. The other inhabitants of Italy were either federates *(socii, fœdere juncti)*, or subjects (*dedititii*). The federates preserved their own internal form of government, but were obliged to furnish tribute and auxiliary troops. Their further relation with Rome depended upon the specific terms of their league. The most advantageous of these terms were in favour of the Latins, though each of the Latin cities had its own separate league; as the rest of the Italian nations had their separate treaty, *(Jus Italicum)*. The subjects, on the other hand *(dedititii)*, were deprived of their internal constitutions, and were governed by Roman magistrates, annually renewed.

The internal constitution of Rome itself, now completed, bore the aspect of a democracy, inasmuch as equality of rights existed both for nobles and commons. Yet this democracy was modified by expedients so various and intricate; the rights of the people, the senate, and the magistrates, fitted so accurately into each other, and were so firmly supported by the national religion, connecting every thing with determinate forms, that there seemed to be no immediate reason to fear the evils of anarchy, or of military despotism; though the democratic character threatened the one, and the warlike temper of the nation the other, of these dangers. To obtain a right view of the constitution of Rome, thus modified, a few sentences stating the main outline may be given.

This constitution was not, as must already have been seen, the work of one great master-mind, but was the result of long contentions, innumerable temporary expedients, yielding successively as better were devised, aggressions mutually made by the opposing parties in their hour of strength, and concessions in that of weakness; and that steady equipoise obtained by the well-balanced action of opposing principles, knit together into the firmest and closest union by repeated heavings, subsidings, and conjunctions. The rights of the people consisted in the legislative power, so far as fundamental national principles were concerned, and in the election of the magistrates. The distinction between the *comitia tributa*, as independent of the senate, and the *comitia centuriata*, as dependent on the senate, still existed as to form, but had lost all its importance, the difference between patricians and plebeians being now merely nominal, and the establishment of the city tribes excluding the too great influence of the mere populace upon the *comitia tributa*. The rights of the senate consisted in administering and debating all ordinary national affairs, whether foreign relations, (war and peace only excepted, in which the consent of the people was necessary), financial concerns, or matters regarding domestic peace and security. But the manner in which the senate was supplied and maintained must have made it by far the most skilful political body at that time in the world. For a considerable period magisterial power had been the exclusive privilege of the patrician and senatorial order; but after the plebeians obtained equal access to these offices, the highest rank and power in the state offered a stimulus for exertion to the ambitious career of mental ability from every class and order, thus concentrating the collected mind of the nation, and from it forming a ruling body of unequalled wisdom, genius, and enterprise. The rights and rank of magistrates were founded on their right to the greater or lesser auspices, no public affair being undertaken without the auspices. He only, therefore, who was in possession of the rights of the greater auspices, could hold the highest civil and military power as dictator, consul, or prætor; such was not the case with those who held only the lesser auspices. The union of the highest civil and military power in the person of the same individual was not without inconvenience and danger; but military despotism was in some measure guarded against by the prohibition of any magistrate from possessing military command within Rome itself. But perhaps the most important of all the principles combined in the constitution of Rome, was the existence and recognised authority of its code of laws. To the sacred voice of public national law could appeal be made at all times, and on every occasion; and every civic struggle terminated by the addition of some new enactment, which defined the rights and privileges of the contending parties, and left a rule of conduct and a principle of appeal to succeeding ages. This ideal impersonation of law formed, on the one hand, a safeguard against the encroachments of the ruling power, or the deliberative body; while, on the other, the intemperate fervour of popular will was equally within its controlling influence. Religion and law were the ruling elements of the Roman constitution; and upon their inherent truth, purity, and power, or the reverse, depended the duration, or the ruin, of Roman virtue and Roman dominion.

Rome having now obtained the sovereignty of all Italy, was not long in finding employment for her victorious arms in another country. Sicily was the new field on which the strength of Rome was tried, and the Carthaginians were her new antagonists. It appears that a body of Samnite, or Sabellian youth, quitting their homes under the vow of a *sacred spring*,[1] had become mercenaries to Agathocles. After his death they seized upon the city Messina, in Sicily, and committed the grossest outrages upon the inhabitants. Having thus made the citizens, and indeed all the inhabitants of Sicily their enemies, these mercenaries (known by the name Mamertines, from the god Mamers, or Mars) sought the protection of the Romans. Some of them had previously applied to the Carthaginians; and while the Romans were hesitating about lending assistance to such disgraceful allies, the Carthaginians, somewhat less scrupulous, sent a body of troops, and took possession of the citadel of Messina. There had already been such intercourse between Rome and Carthage, as to make each city in some measure aware of the power and ambition of the other. The Roman senate speedily perceived, that if the Carthaginians obtained possession of Sicily, their own prospects of aggrandisement in that quarter would be at an end, and their formidable rival at the same time would have become their immediate neighbour.

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[1] For an account of the *ver sacrum*, see Niebuhr, vol. i. p. 92.

irst Punic ar. C. 264.

An army under the command of the consul Appius Claudius was sent to the assistance of the Mamertines; and notwithstanding the superior power of the Carthaginians at sea, the consul found means to elude their fleet, and to take possession of Messina. Several victories were soon afterwards gained by the Romans; and Hiero, king of Syracuse, abandoned the Carthaginians, and formed an alliance with Rome. Agrigentum fell into the hands of the Romans after the defeat of a Carthaginian army, which had come to raise the siege, and the greater part of the interior of the island yielded to the power of Rome, while the fleets of Carthage kept possession of the sea-port towns, and thus maintained an equality. It was now evident to the Romans that the contest could come to no conclusion so long as their antagonists retained the supremacy of the sea; and they directed their most strenuous endeavours towards the construction of a fleet.

uilius.

Being aware of their inferiority in naval affairs, the Romans first availed themselves of a large Carthaginian vessel driven ashore in a storm, as a model; and to counterbalance their deficiency in skill as mariners, they invented a machine called a *corvus*, which served both as a grappling-iron and a draw-bridge, the object of which was to enable them to come to close quarters, and encounter the Carthaginians man to man. Trusting to this new invention, the consul Duilius hazarded an engagement with the fleet of the enemy, rushed alongside their ships, locked them fast in the grapples of the corvus, and captured at the first onset, by boarding, no fewer than fifty gallies. The Carthaginian commander saved the remainder of his fleet by instant flight. To commemorate this their first naval victory, the Romans erected in the forum a column adorned with *rostra*, or beaks of ships. In a second naval action, fought near the island of Lipara, the Carthaginians lost eighteen vessels, of which eight were sunk and ten taken.

C. 260.

After the war had lasted about eight years, the Romans determined to invade Africa, being aware that the tyranny of Carthage had alienated many of the African nations. A fleet of three hundred and thirty ships was equipped for this daring attempt, and given to the consuls Regulus and Manlius. The Carthaginians were again defeated with great loss, sixty-four galleys being taken, and thirty destroyed. The victorious fleet was soon refitted, pursued its course, and landed the army near Clypea. A rapid succession of victories led the Romans to the very gates of Carthage. Tunis was taken, and the humbled enemy sought terms of peace. Regulus imposed demands so harsh, that they resolved to continue the war; to which they were the more encouraged, by the opportune arrival of a band of Greek mercenaries under the command of Xanthippus, a Spartan of high military talents. The army being entrusted to his command, he completely changed its tactics, formed it on the Lacedemonian plan, and sought an engagement with the Romans. A great battle was fought, the Romans were completely routed, and Regulus himself taken prisoner. A Roman fleet sent to succour the army defeated the Carthaginian fleet in its course; and the army, though reduced, routed the Carthaginians, no longer led by the brave Spartan. Being too weak, however, to remain in Africa, and distressed for want of provisions, the army embarked for Italy; but a violent storm wrecked on the coast of Sicily no less than two hundred and ninety ships, with all on board. A second fleet was also destroyed in a storm; and the Romans for a time abandoned the sea.

In Sicily Metellus defeated the Carthaginians with great slaughter; and the Romans gaining the ascendency in that island, laid siege to Lilybæum. The Carthaginians, weakened and dispirited with their numerous losses, sent Regulus to Rome along with their ambassadors, expecting that he would persuade the senate to grant a peace. Instead of this, he dissuaded the senate, and recommended war, though aware of the sufferings he would have to endure on his return to Carthage. Some historians relate, that on his return he was tortured to death in the most cruel manner; others say that he was merely retained in close confinement, and died a natural death before the conclusion of the war. Again was the contest renewed, and at first not to the advantage of Rome. One fleet was worsted in battle, and another entirely destroyed off the coast of Sicily. The command of the Carthaginian forces in Sicily was given to Hamilcar Barcas, father of the celebrated Hannibal. By his skill and conduct the sinking cause of his country was vigorously sustained, till it seemed as if Carthage might yet be victorious. The Carthaginians made a last desperate effort to supply him with forces, and fitted out a large fleet for that purpose. The Romans had also redoubled their exertions for the same reason. The two fleets met near the islands Ægates, and the fortunes of Rome prevailed. A decisive battle was fought; fifty of the Carthaginian ships were sunk, and seventy taken, the power of Carthage was laid prostrate, and the empire of the seas transferred to Rome. Carthage was now obliged to accept whatever terms of peace Rome thought proper to propose: these were, that they should evacuate all the islands in the Mediterranean, restore the Roman prisoners without ransom, and pay for the defraying of the expenses of the war a thousand talents of silver immediately, and two thousand two hundred in the space of ten years, in equal payments.

B. C. 241.

Thus ended the first Punic war, after a contest of nearly twenty-four years' duration. Its vicissitudes had severely tried the strength and the resources of Rome; but it extended her reputation and her political connexions very widely, preparing her for a career of foreign conquest. It awoke also in both republics, Rome and Carthage, an inextinguishable hatred of each other, such as could never be appeased but by the ruin of the one; and it inspired Rome with a desire of foreign conquest and dominion, and of the wealth to be thus gained, which speedily introduced corruption into the state, along with that accumulation of power in the hands of a few families, which in every country long wars inevitably confer on able warriors. In this manner the seeds of Roman greatness and Roman decay were sown at once, and began to grow up side by side. Their further progress we shall afterwards have occasion to notice and explain.

The peace which Rome enjoyed at the termination of the first Punic war was of no lengthened duration. The first hostilities in which she was engaged were directed against Teuta, queen of Illyricum. The Illyrians had been successful in a war against the Ætolians; and in the pride of their victory, they caused their fleets to scour the seas, and pillage those of every other nation without distinction. In this piratical warfare some Roman ships were taken and plundered; and the Illyrians laid siege to Issa, a city which had put itself under the protection of Rome. When the Roman ambassadors demanded restitution, and required Teuta to restrain her subjects from such piracies, she both returned a haughty answer, and procured the murder of the ambassadors. Upon this the Romans declared war against the Illyrians. In the course of the war they gained the naval supremacy over the Adriatic, subdued the Illyrians, and entered into alliance with the various states of Greece which had suffered from the depredations of the Illyrian pirates. This alliance was of the utmost importance to Rome, not only in opening the way for her future interference in the affairs of Greece and of Asia, but also in enabling her to divide her enemies, and prevent the formation of dangerous confederacies against her, when not prepared to meet them.

B. C. 230.

The Illyrian war had scarcely terminated when one of a more formidable character commenced with the Cisalpine Gauls. Tribes of that great people had repeatedly served as mercenaries against Rome during the Etruscan and Samnite wars. After the conclusion of these wars, the Romans subdued the Livonian Gauls, and planted a colony in their country near Lena. A new influx of the Transalpine Gauls B. C. 226. gave courage to their countrymen to renew the war, and a furious contest soon began. The Gauls were at length defeated with great slaughter near Clusium; and the Romans following up their success, invaded the Gallic country around the Po. The Gauls were again defeated by Marcellus, and compelled to sue for peace, which the Romans granted, establishing at the same time colonies at Placentia and Cremona. It seems worthy of record, that the number of men capable of bearing arms throughout the Roman dominions in Italy, as ascertained by the levies of that dangerous juncture, amounted to 800,000.

Meanwhile the Carthaginians had been making great exertions to recruit their strength for another struggle with their great rival. Being prohibited from extending their influence in Sicily, they had sought compensation by attempting the subjugation of Spain. The command of their armies in Spain had devolved upon Hannibal, the son of that Hamilcar who had distinguished himself towards the close of the former war in Sicily. The father of Hannibal had made him swear perpetual hostility to Rome; and from his boyhood his mind had been continually engaged in devising the ruin of that detested city. He had prosecuted his conquests in Spain with the view of obtaining a veteran army, and a source of auxiliary supply from the warlike nations in that country; and when his designs were matured, Second Punic war. B. C. 218. he laid siege to Saguntum, which was understood to be under the protection of Rome. Having treated with contempt the remonstrances of the Roman ambassadors, he took possession of this city. The senate of Carthage having approved of his conduct, war was declared, and both parties prepared for the impending conflict, well knowing that its progress must be sanguinary, and the result ruinous to the one or the other of the rival republics. (As this war is detailed at some length in the article Carthage, we must refer to it for a more particular account of the contest.)

Hannibal having completed his preparations, set out from Spain, for the invasion of Italy, at the head of a veteran army of 50,000 foot, and 9000 horse. He rapidly traversed Gaul, crossed the Rhone, and commenced the passage of the Alps, led by Insubrian guides. This almost impracticable attempt he achieved in fifteen days; and, on mustering his army in the plains of Insubria, found it reduced to 20,000 foot, and 6000 horse. His army was soon considerably increased by the Gallic nations; and, in a comparatively slight encounter near the Ticinus, he worsted the consul Scipio, and soon afterwards completely defeated Sempronius near the Trebia. The victorious Carthaginian then advanced towards Rome, devastating the country through which he was marching, and making it his object to irritate the impetuous spirit of the consul Flaminius. In this he was completely successful, and having drawn him into an ambush at the lake Thrasymenus, entirely defeated B. C. 217. him. The consul himself fell in the battle, with 15,000 of his bravest troops, and a great number were taken prisoners. Such was the fury of the encounter, that the combatants were insensible of the shock of an earthquake which happened during the engagement.

Rome was now in a state of great alarm, having suffered successive defeats in Italy itself, and seeing the victor pursuing his course unchecked through the land. Fabius Maximus was chosen dictator, and immediately adopted a totally different plan of opposing the enemy. He studiously avoided battle, kept his army on the hills, watched Hannibal, cut off his supplies, and did every thing calculated to wear out an invading army, which is necessarily remote from its supplies. By this skilful policy he both saved his own army, and greatly harassed that of his antagonist; and from it was surnamed Cunctator, the Delayer.

The Romans having recovered from their consternation, raised another levy of troops, augmenting their armies to 87,000 men, under the command of Terentius Varro and Æmilius Paullus, of whom the former was rash and headstrong, the latter a cautious imitator of Fabius. Availing himself of the impetuosity of Varro, Hannibal obtained his B. C. 216. wish in a general engagement near Cannae in Apulia, where, by his superior skill, he inflicted on the Romans the most dreadful overthrow they had ever sustained since the battle of Alia. The consul Æmilius, and about 45,000 men, of the very flower and strength of his army, were left dead on the field, and about 10,000 were taken in the pursuit. Rome seemed now open to the conqueror; but his army had suffered too severely to venture on so hazardous an enterprise, and he turned aside to Campania, and wintered in Capua.

It was manifestly Hannibal's object to encourage the states of Southern, or Lower Italy, to revolt against Rome, that he might recruit his forces from among them, and so be enabled to continue the war with renewed strength. To a considerable extent he was successful, especially among the Lucanians, Bruttians, Apulians, and even Campanians. He sent Mago to Carthage, to urge them to transmit supplies with all possible despatch, that he might follow up his blow, before Rome should have recovered from her consternation. But though the Barcine party predominated in the Carthaginian senate, such was the influence of the opposite faction, that he obtained only a very limited number of supplies; and these were to be sent to Spain, whence he might draft a corresponding number of the veteran troops stationed there. This, indeed, was part of Hannibal's original plan, that he might have at least one resource beyond the caprice of faction, though greatly too remote from the scene of action to be immediately or securely available.

At Rome the greatest exertions were made to remedy the disastrous consequences of the terrible defeat of Cannae. All ranks and every age, from the boy of seventeen to the retired veteran, were enrolled; and nearly all the gold ornaments worn by persons of wealth and distinction, were voluntarily given up to meet the exigencies of the state. In a short time an army was raised, superior in numbers to that commanded by Hannibal; and the celebrated Marcellus was placed at its head. In vain had Hannibal waited at Capua for supplies from Africa; none were sent, and he was obliged to prepare to contend singly against Roman courage and Roman despair. He sustained a check at Nola; and not long afterwards Marcellus inflicted on him a partial defeat, by which the courage of the Romans was greatly restored. The tide of success began now to recede from Hannibal. He was unable to prevent the Romans from besieging and taking Capua, though he both attempted to storm their camp, and, failing in that, marched to Rome, to call away their armies for the defence of the city. They disregarded his threatening demonstration, continued the siege, took the city, and inflicted severe punishment on the Capuans.

The fall of Capua was highly injurious to Hannibal, tending to discourage other Italian states from joining an ally who could not protect them against the fierce vengeance of Rome. On this account he failed to obtain supplies to his waning army, while the Romans speedily replaced every loss with fresh recruits. These hopes being frustrated, Hannibal entered into an alliance with Philip king of Macedon; but here the fortunes and the policy of Rome likewise prevailed. The Illyrian war had caused the Romans to be regarded as protectors by the Grecian states, who, at the same time, were jealous of the power of Philip. No sooner, therefore, did the Macedonian king manifest his disposition to form a confederacy with Hannibal against Rome, than the Roman ambassadors were able to excite against him such hostility among the neighbouring states of Greece, as to prevent the possibility of his making a descent on Italy to aid the terrible Carthaginian. This is a very striking instance of the deep policy of Rome; by means of which she was always able to keep a powerful enemy in check till she might have leisure to collect her strength for a decisive effort.

Notwithstanding these disappointments, Hannibal continued to maintain his ground, repulsing the most daring assailants, and out-manœuvring the most skilful. Marcellus, who had conquered Sicily, and again returned to Italy, and who was the most gallant opponent ever Hannibal met, was at last drawn into an ambush and slain. But still, without supplies, the Carthaginian army must melt away; and Hannibal's hopes of ultimate success now depended upon the army led by his brother Asdrubal reaching him safely from Spain. His hopes from Sicily, Macedonia, and Africa, had failed; though it was doubtless to secure them that he had made Lower Italy the basis of his operations; and he now waited eagerly the arrival of his brother. Asdrubal had in the mean time left Spain, crossed the Pyrenees, and the Alps, and entered Cisalpine Gaul, where he was joined by considerable numbers of the natives. A messenger, whom he sent to apprise Hannibal of his approach, was intercepted; the consul Nero hastened to join his colleague Livius, and assailing Asdrubal on the banks of the Metaurus in a disadvantageous position, they completely routed his whole army. B. C. 207. Asdrubal himself was slain, and 56,000 of his army fell with him on the fatal field. The first tidings which Hannibal received of his brother's defeat and death, was by the head of that luckless brother being thrown into his camp. From that time forward the contest was without hope on the part of the Carthaginians. The Roman consuls were not indeed able to cope with even an enfeebled army commanded by Hannibal; but the youthful Scipio, having been sent to Spain, speedily overran it, and reduced the greater part of it to complete subjection, putting an end to Carthaginian power in that quarter. On his return he obtained permission, against the opinion of Fabius, to transfer the war to Africa.

The invasion of Africa by Scipio, so alarmed the Carthaginians, that they immediately recalled Hannibal from Italy for the defence of Cathage itself. To this command Hannibal most reluctantly submitted; and quitted Italy with expressions of the utmost mortification and regret. In the mean while, Scipio had approached to the near vicinity of Carthage. The two armies met at Zama, to decide the fate of Rome and Carthage, and, with them, of the world. The battle was obstinate and bloody, but the Roman army was decidedly superior in numbers, and still more so in that high hope which so often determines the day; so that, in spite of the utmost exertion of his unrivalled military skill, Hannibal saw his army completely overthrown. Carthage had now no resource but in peace; and she was compelled to submit to the terms dictated by Scipio. These terms were abundantly severe; that the Carthaginians should retain in Africa only the territory annexed to their government; that they should yield up all their elephants, and all their ships of war, except ten triremes; that they should pay at specified times ten thousand talents of silver; that they should commence no war without the consent of Rome; and that they should restore all Numidia to Massinissa, and give an hundred hostages for the performance of the treaty. Thus ended the second Punic war, after having shaken Rome to her centre, and threatened for a time to change the destinies of western Europe, and, with that, the destinies of mankind; yet the result was exactly correspondent to the character and resources of the two great rival republics.

B. C. 201. Rome had now removed her mighty rival from the strife of nations, and saw the sceptre of universal dominion but little removed beyond her own grasp. The Roman senate had fully entered upon that course of far-sighted policy, which enabled them to gratify and amuse the nation with foreign conquest, the wealth and powers of which they almost wholly engrossed. Such was its aspect and aim at home; while with regard to foreign nations, the constant policy pursued was to grant assistance to the weaker states against the stronger, and by taking them under Roman protection, to have at all times the means of provoking a contest, whenever it seemed conducive to her interest. The character of Rome, as a great military republic, was now completely developed, as the overbearing friend or the jealous foe of every other state.

Macedonian war.

The next field of Roman warfare was Macedon. Philip, the king of that country, ambitious of obtaining the sovereignty over Greece, made some aggressions on the Athenians. They complained to Rome, which soon led to a declaration of war against that monarch, and the sending of an army to carry hostilities into his dominions. The management of the war was entrusted to T. Quintus Flaminius, whose diplomatic skill was still more conspicuous than his military talents. After several inferior engagements, a great battle was fought at Cynoscephalæ, in which the Macedonians were completely routed, B. C. 197. and Philip compelled to submit to such terms as the conqueror pleased to dictate. The chief of these were the reduction of his fleet, and his abandonment of all pretensions to the sovereignty of Greece, the various states of which were taken under the protection of Rome. B. C. 196. At the conclusion of this war, the politic Roman, or rather the wily Italian, caused the liberty of Greece to be publicly proclaimed at the Isthmian games; while the lavish expressions of gratitude uttered by the thoughtless crowds were the gilding of the chains by which they were securely fettered.

Syrian war.

Rome still regarded Carthage with a jealous eye, and could not feel secure so long as the dreaded Hannibal influenced her councils, and might again lead her armies. Fearing that his dispirited countrymen would surrender him to his implacable enemies, that great man fled to the court of Antiochus, king of Syria. About the same time the Ætolians, being dissatisfied with the conduct of the Romans, besought the aid of Antiochus, who was already quite disposed to interfere in the affairs of Greece. He accordingly seized upon Eubœa, and proceeded to take measures for additional aggressions on states which claimed the protection of Rome. War was immediately declared against him, and an army sent into Greece, under the command of the consul Glabrio, who defeated the Syrians at the pass of Thermopylæ. Next year Lucius Scipio, brother to the conqueror of Carthage, Africanus, was sent against Antiochus, accompanied by his brother as legate. B. C. 190. They reduced Greece to subjection, and crossing into Asia, defeated Antiochus in a great battle at Magnesia. Antiochus purchased peace, by resigning all his possessions in Europe, and those in Asia north of Mount Taurus, paying 15,000 Eubœan talents, and promising to give up Hannibal. The latter vindictive article caused the flight of Hannibal to Prusias, king of Bithynia; B. C. 183. but being still pursued by the remorseless hatred of Rome, he put an end to his mortal existence by swallowing poison, which for such an emergency he always carried with him.

The war with Antiochus fairly introduced Rome to the beginning of her oriental sovereignty; and the battle of Magnesia may be viewed as the event which terminated the Grecian or Macedonian sway as a universal empire. Little absolute territory was indeed gained by Rome in this preliminary war; but at its conclusion she saw both Macedon and Syria reduced to a state of dependence on her imperious will, with the Grecian states in the condition of ready instruments in her hands of future aggrandisement, whenever she might be disposed to take or make an opportunity.

B.C. 183.

It is even painful to state, that after the conclusion of the Antiochian war, the two Scipios were accused of having received bribes from that monarch, and of having embezzled the public money. Africanus went into voluntary exile at Liternum, where he died the same year that Hannibal fell a victim to the cruel and mean revenge of Rome. Asiaticus refused to pay the fine exacted, and all his property was confiscated.

B.C. 170.

B.C. 168.

A new Macedonian war soon arose, caused by the imperious authority assumed and exercised by the Roman ambassadors over the conduct of the king. Philip had endured their control with impatience; but his son Perseus was less able to suppress his dissatisfaction, and hostilities were soon commenced. The war for a time was favourable to the Macedonians, who gained one considerable victory, and were successful in several conflicts of smaller importance. At length the command was given to Paulus Æmilius, an old and skilful general, under whose care the aspect of affairs changed. A decisive battle was fought near the city Pydna, remarkable as the conclusion both of the Macedonian kingdom and the Macedonian phalanx. In the first shock of battle the phalanx was irresistible, and bore down all opposition; but the skilful Roman general, by causing his men to retire fighting, and lead the phalanx upon broken and uneven ground, obliged it to open its dense array of serried pikes, when the legionary soldiers immediately penetrating these openings like a wedge, rent asunder the unwieldy mass, and scattered it into hopeless and irretrievable confusion and rout, like the bursting of a cloud of vapour by a whirlwind. Perseus was captured soon after the battle, and reserved to grace the victor's triumph. Macedonia, Epirus, and Illyricum, were reduced to the condition of provinces, and the foundation of a foreign territorial empire laid, was instead of one merely of influence and military power.

Third Punic war.
B.C. 150.

The utter destruction of Carthage was next resolved upon, partly through the vindictive remembrance of the terror which Rome had formerly felt from Carthaginian prowess, partly from the instigation of the stern, haughty, and implacable Cato the censor. A pretext for a war was not difficult to find, though the Carthaginians endeavoured to avert their fate by even the most abject submission. But when the Romans, after inducing them to yield up their weapons, informed them that they must abandon their city, witness its demolition, and remove to a new position remote from the sea, despair itself roused them to make the fiercest resistance. They sprung at once into an attitude of the most determined defiance, forged new weapons, framed new military engines, the women cutting off their hair to form ropes to work their machinery; and clad in glittering panoply, they manned their walls, and met the unappeasable hatred of Rome with hatred not less keen and mortal. The Roman armies sustained several reverses; but under the command of Scipio Æmilianus, son of Paulus Æmilius, and adopted son of Scipio Africanus, victory again began to crown their efforts. After a fierce and protracted struggle, the Romans forced their way into the city on the side next the port, and obtained possession of the city wall. But the conflict was not over though the city wall was seized. The Carthaginians fought from street to street, from house to house; and the Romans gained the city but by yards and inches, every house being contested from the ground floor to the roof, like a separate fortress. At length all was carried but the citadel and the temple of Æsculapius. These the Romans were prepared to storm, when the citadel surrendered, Asdrubal, who had the command, yielding to Scipio, on condition that his life should be spared. Those who had fled to the temple, some of whom were deserters from the Roman army, prepared to destroy it and themselves by fire, rather than fall into the hands of the Romans. Among these was the wife of Asdrubal, who had been placed in the temple before her husband yielded to Scipio. Seeing Asdrubal along with the Roman general, and detesting his cowardice, she arrayed herself in her richest attire, took her two children with her, and displaying herself on the top of the temple, upbraided her husband, stabbed her two children before his face, and threw them into the flames, which were now bursting furiously from the interior. She then sprung after them into the heart of the blazing ruin. Thus perished Carthage, leaving Rome to pursue unrivalled her guilty and self-destroying career.

B.C.

B.C. 1

While the third Punic war was still raging, hostilities again broke out in Macedonia, excited by an impostor named Andriscus, who, pretending to be the son of Philip, instigated the disaffected Macedonians to throw off the Roman yoke, and forming an alliance with the Thracians, strove to accomplish his purpose by force of arms. Metellus, after a short struggle, overpowered the insurgent Macedonians, and then attempted to procure the dissolution of the Achæan league. This led to the Achæan war, which terminated in the complete subjugation of Greece, and its reduction to the form of a Roman province. Mummius the consul, who conducted this war, sacked and burned Corinth; and after having pillaged the city of its most valuable effects, its rich paintings and beautiful sculptures, demolished its walls, temples, and public buildings, and reduced it to a heap of blackened ruins. The plundered ornaments of Corinth were sent by the consul to Rome; and it has been recorded, proving at once his care and his ignorance, that he stipulated with the masters of the vessels employed in transporting these matchless treasures of art, that "if they suffered any of them to be lost or injured, they should furnish others in their stead."

War in Spain.

B.C. 1

Another enemy of still more stubborn mould continued to engage the attention of Rome, and to put to the severest test the courage of her armies and the skill of her generals. The wars and conquests of the Carthaginians in Spain had directed the attention of the Romans to that country; and a war for the awowed purpose of its subjugation was begun soon after the expulsion of the Carthaginians. Partly in consequence of the defensible nature of the country, abounding in mountain ridges and deep and rapid streams, and partly from the brave and determined character of the inhabitants, the war was protracted, obstinate, and bloody. Repeatedly did the arms of Rome sustain signal reverses; and still with invincible energy of will was the contest maintained. At length the Lusitanians obtained a leader under whom they seemed likely to secure their possession of liberty and independence. This was Viriatus, a shepherd, a hunter, a robber, and finally a military hero, almost unrivalled in fertility of resources under defeat, skill in the conduct of his forces, and courage in the hour of battle. Like the guerilla leaders of modern times, he knew how to avail himself of the wild chivalry of his countrymen, and the almost impenetrable fastnesses of his country; but, superior to them, he was equally able to guide a troop and to marshall an army. Six years did he maintain the contest; and at length the consul Cæpio, unable to subdue him in the field, procured his assassination. The Lusitanians, deprived of their brave leader, were soon afterwards completely subdued.

Undismayed by the overthrow of their countrymen, the Numantines still maintained the unequal conflict against the collected might of Rome. Pompey was baffled; his successor Mancinus shared a similar disgrace; and at length the Romans raised Scipio Æmilianus, the conqueror of Carthage, to the consulship, and assigned him Spain as his province, and even prolonged his command, after the expiration of his year as proconsul. At the head of a large army he closely invested the town, and began the siege. The Numantines made the most desperate defence; and after more than six months of almost incessant assault and repulse, the citizens destroyed their wives and children, set fire to the city, and by the flames or mutual slaughter perished to a man, leaving to Scipio to triumph, not over Numantia, but over the smouldering tomb of its unconquered children.

B.C. 133.

Attalus.

Amidst these triumphs of her arms, the policy of Rome obtained an acquisition more important in some respects, but also of darker omen. Attalus, king of Pergamus, at his death, bequeathed his dominions to the Roman republic; and the senate, disregarding the remonstrances of Aristonicus, the natural heir, immediately took possession of this valuable inheritance. By what means Attalus had been induced to make this strange bequest, has never been accurately stated; but thus, by some deep stroke of policy, Rome acquired possession of the largest and fairest portion of Asia Minor. The extensive provinces now held by Rome caused a very great and fatal alteration in part of her international policy. The inhabitants of these countries were entirely subject to Rome; and the administration of them was conducted by those who had enjoyed the office of consuls, and by prætors, subordinate to whom were the quæstors, or collectors of the revenue. Till about this time prætors were expressly appointed to each province; but it now began to grow customary for the prætors who had vacated office to succeed to the provinces, under the name of proprætors. The highest military and civil powers were united in these governors; and being thus prolonged in a species of self-appointed and irresponsible tenure of office, the consequence was equally injurious to the provinces, in the oppression and extortion inflicted on them, and to Rome, in the degeneracy thus fatally introduced. From this time forward Roman virtue was little but a name; while the armies and generals of the haughty and corrupt republic fought not so much for fame and dominion, as for the means of gratifying licentiousness and avarice.

Seditions of the Gracchi.

The destructive consequences of Roman corruption and degeneracy soon became but too manifest in the seditions and civil broils which sprung up, and found no end but in the overthrow of the republic itself. It may be expedient to devote a few sentences to an explanation of the causes and the nature of the dissensions by which the very existence of the state was endangered; especially, as owing to the resemblance which they bear to the ancient contests between the patricians and the plebeians, they are liable to be misunderstood, as if they were merely a renewal of those ancient broils.[1] They were, however, essentially different. The contests between the patrician populus and the plebeian commons of Rome's earlier days was for the possession of the rights and privileges of citizenship, which was at first enjoyed by the patrician order alone, and for an equal share in which the plebeians strove. These contests had terminated soon after the passing of the Licinian law, and the admission of all orders alike to an equality in rights, privileges, and eligibility to all offices in the state. From that period, though the designations of patricians and plebeians might still be retained, the essential distinctions between them had ceased to exist; and whatever contests arose, sprung from causes entirely different.

Although there had long ceased to be any legal distinction between the patricians and the plebeians, so that they could not accurately be regarded as different orders in the state, yet there continued to subsist the great difference between wealth and poverty, aggravated by the fact, that the senate wielded the entire power of the republic, and in general engrossed its emoluments. In consequence of this exclusive possession of power, the senators had gradually acquired the almost equally exclusive possession of that portion of the lands of conquered states which the laws of Rome devoted to the commonwealth. The Licinian law had been passed to prevent this unjust seizure of the public lands by the patricians, but was insufficient for that purpose, even its author being convicted of violating it soon after its enactment. While the attention of the state was almost incessantly occupied with the management of public wars, the senatorial body imperceptibly gained possession of the public lands, by grants, by pretended purchase, or in some instances by fair means, farming them from the state, in others by forcible seizure. In this manner the patricians, though no longer a peculiar order, possessing distinctive privileges in the state, became a wealthy and powerful aristocracy, engrossing nearly all public influence by means of their wealth, as their ancestors had done by means of their exclusive citizenship.

On the other hand, the great body of the citizens, deprived of their due share of the public lands, and not permitted by law to engage extensively in commerce, which was the privilege of the equestrian order, possessed the rights of freemen, and the privilege of voting, as citizens in all public matters in the comitia, notwithstanding their extreme poverty. Not obtaining their due share of the public lands, and not being permitted by the wealthy patricians to farm them, which they rather entrusted to their slaves, these poorer citizens were reduced to the necessity of resorting to Rome, and attaching themelves to one or other of the more powerful and wealthy of the patricians, by whom they were supported in return for their votes in the comitia. Thus the wealth of the one partly enabled them to purchase, and the poverty of the other obliged them to sell, those rights of voting on all public matters, which, instead of being the safeguards of freedom, became the very elements of tyranny and licentiousness. This consequence seems to have been foreseen, and partly guarded against, by the institution of the city tribes, for the purpose of preventing the undue influence of what was truly a city rabble, devoid of the means of subsistence, although voting in the public assemblies. But this preventive measure was not sufficient. The immense wealth which flowed into the public treasury from the tribute of conquered provinces, and into the coffers of the chief senators, from their public lands, the command of armies and of provinces, together with other public employments, enabled the state, as such, to maintain in idleness, by donations of money and provisions, great numbers of the people, whose votes they thus secured; and the wealthy families to maintain great numbers more, who might be either added to the supporters of the senate, or employed as the partizans of ambitious individuals. In this manner did it come to pass, that the main body of the citizens of Rome had sunk to the very lowest depth of poverty and venal degradation, and was ripe for any sedition or the perpetration of any crime. At the same time these idle and dependent citizens must have been often exposed to the real ills and sufferings of poverty; and must have been often impelled to view with bitter envy the excessive wealth of their more fortunate countrymen, whose equals nevertheless they knew themselves to be in the eye of the law. That feelings fiercely democratical should spring up in the breasts of those who were at one time supported, and at another time trampled on, by a proud and avaricious aristocracy, which the senate had become, was both natural and inevitable; and that some measure should be framed to check the increasing disparity between the wealthy and the poor, and to prevent the enormous accumulation of wealth in the hands of the senate as a body, or of a few families in that body, was absolutely indispensable to the permanent well-being of the republic. But such a measure would have required to be framed with the most consummate judgment, and conducted with the utmost skill, caution, and prudence, as its failure could not but aggravate all the evils which it had been intended to cure.

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[1] See Heeren's History of the Revolution of the Gracchi.

B.C. 133.

Tiberius Sempronius Gracchus.

In this crisis of affairs at Rome, when a conflict was on the eve of bursting forth, not between patricians and plebeians, as distinct orders in the state, but between the rich and the poor, on account of the unequal distribution of property, Tiberius Sempronius Gracchus appeared on the scene, and assumed the advocacy of popular rights. He was a man of great natural abilities, which had received the utmost degree of cultivation, through the care of his mother, the celebrated Cornelia, and the example of his relatives, the Scipios. Circumstances had led him to mark the baneful practice of the wealthy families, in assigning to slaves the cultivation of their lands, and thus causing the removal to the city of that class of free and privileged men, who ought to have been the main proprietors and tenants of the soil, which the valour of their fathers and of themselves had won for Rome. The evil consequences of thus forming a population of agricultural slaves, and needy citizens prepared for every enormity, both by their degradation and their distress, arrested the attention of Gracchus; and he resolved to exert himself for the removal of that corruption which was already preying so deeply on the vitals of the commonwealth. His desire was to relieve the distress of the lower orders, and to prevent the danger of their relapse into an equally unfavourable condition. Having been elected tribune of the people, he availed himself of his official power, and proposed a better division of the public lands. At first he sought merely the re-enactment of the Licinian law in a modified form, somewhat better suited to the altered circumstances of the republic. In this he was strenuously opposed by the senate, and also by one of his colleagues in the tribunate, Octavius. The opposition, instead of inducing Gracchus to adopt more prudent methods of conciliation, roused his indignation, and from a patriot, anxious only to promote the public weal, converted him into a demagogue, determined to effect his purpose by whatever means and at whatever hazard to his country's welfare. He brought forward a new law much more harsh in its provisions than the Licinian; and being still opposed by Octavius, he procured his ejection from the tribuneship, contrary to the principles of the constitution, which he thus himself set the example of violating. He then carried the new law, and got himself, his brother, and his father-in-law appointed as commissioners for surveying the public lands, and taking steps preparatory to a new division.

Had Gracchus contented himself with these enactments, and done his utmost to carry them into peaceful execution, he might after all have been regarded as a true patriot, and might have been the preserver of his country; but he now found himself in the position, into which, sooner or later, every demagogue finds himself driven. It had become necessary for him to retain popular support, even for his own personal safety, if he should remain at Rome after the expiration of his year of tribuneship. He therefore introduced other measures more calculated to maintain his popularity, than to promote the true interests of the community. He proposed a distribution of the treasures of Attalus among the people; a reduction of the period of military service; and the right of appeal from the sentence of the judges to the people. Measures so glaringly democratic incensed the senate to the very highest degree; and as his tribuneship was now nearly expired, during which his person was inviolable, he endeavoured to procure his re-election as a tribune, both that he might retain the power of pressing forward his proposed enactments, and for the security of his personal safety. The aristocratic party in the senate were now resolved to have recourse to any method of removing such a dangerous foe. They mustered all their partizans, disturbed the proceedings of the comitia, and interrupted them both by intrigues and violence. At length, on the second day of the comitia, held for the election of tribunes, when both parties had mustered in full force, Tiberius wishing to inform the people that his life was in danger, and the tumult being too great for him to be heard, raised his hand to his head; this gesture the opposite party misinterpreted into a sign of his wish that the people should crown him; and Scipio Nasica rushed out of the senate-house at the head of the most determined of its members, loudly accusing Gracchus of a conspiracy to make himself king. A fierce conflict ensued, the friends of Gracchus dispersed and fled, and he was killed during the confusion of the tumult. About three hundred of the democratic party fell along with their leader, and their bodies were cast into the Tiber.

B.C. 13

Thus terminated the attempt of the elder Gracchus to reform the abuses which were rapidly destroying the virtue of the Roman state and people; and like all unsuccessful attempts, it but served to consolidate more firmly what it had shaken, but not removed. The senate did not indeed venture directly to repeal the Sempronian law for the division of the public land, which had superseded that of Licinius, but left it to fall into desuetude like its predecessor. In the contest, however, both parties had been guilty of the most glaring violations of both law and justice; both parties contemned the fundamental principles of the constitution; and both manifested an utter disregard for the true welfare of the republic, in their eager endeavours to prosecute their self-interested views. How different from the early struggles between the patrician and plebeian bodies, in which no blood was shed by either party, and the utmost that even the oppressed plebeians threatened, was to forsake the city which denied them the rights of citizens! But the love of country had perished in the sordid pursuit of wealth; and there no longer remained enough of true patriotism to impel the contending parties to resort to mutual concessions for the general good. A contest so begun and so waged, could have no other termination than in the complete destruction of the one or the other of the contending bodies, or in the overthrow of both by some designing and powerful usurper, and thus in the total subversion of the constitution and the extinction of Roman liberty.

Caius Gracchus.

B.C. 123

Within the course of a few years the contest was renewed, and with more determination and energy than before, under the conduct of Caius Gracchus, the younger brother of Tiberius. During the interval that elapsed between the death of Tiberius and the public appearance of Caius, the tribunes of the people had prosecuted their endeavours to increase their own power, especially in the renewal of their tenure of official dignity. The senate managed to impede their endeavours chiefly by bestowing on them such employments as required them to be absent from Rome; and Caius himself was detained as quaestor in Sicily, even beyond the legal term of that office. Immediately on his return he was chosen tribune of the people, and forthwith resumed with double energy the enterprise of his brother. His first object was to enforce the Agrarian laws of his brother, which had hitherto been kept in abeyance, and to renew the commission appointed to survey the public lands. Being chosen a second time to the tribuneship, he procured the enactment of a law transferring the judicial power entirely from the senate to the equestrian order; and he even attempted to procure the addition of three hundred knights to the senate, for the purpose of overpowering their deliberations by the votes of his own partizans. Another of his laws provided that the soldiers should be clothed at the expense of the public, without diminution of their pay; another secured the regular distribution of corn to the poor

B.C. 122

citizens; and another proposed the granting of the privileges of Roman citizenship to all the Italian allies, as also the formation of colonies, not only in Italy, but in the provinces, and in particular at Carthage. By these popular enactments he raised himself to such a height of power in the state, that the senate did not venture to oppose him by direct means, but first endeavoured secretly to diminish his influence with the people. For this purpose they encouraged Livius Drusus, another tribune, to rival Gracchus in the race of popularity, by producing measures of a still more democratic nature, which measures the senate readily consented to pass, thinking by this deep yet base policy to weaken the power of Gracchus before attempting any more direct attack upon him. Such was the fickleness and venality of the democratic party, that they soon began to applaud Drusus above their recent leader; and when Caius stood candidate a third time for the tribuneship, he was unsuccessful. The senate saw the hour of retribution at hand, Opimius, the most daring of the aristocratic party, was elected consul, and the two factions prepared for a final struggle.

An accidental quarrel, in which Antylias, one of the consul's lictors, was killed by the friends of Gracchus, precipitated the strife. The senate conferred the dictatorial power on Opimius in the usual terms. Gracchus with his followers took possession of the Aventine hill, and attempted to open a negotiation with the consul. This was refused, and an unconditional surrender required, which not being yielded, the consul attacked the insurgents, gained the hill, and slew great numbers of them; and Gracchus himself, B.C. 121. after a fruitless endeavour to save his life by flight, fell either by his own hand, or by that of a faithful slave who accompanied him, and from whom he exacted this bloody proof of fidelity. Not less than three thousand of the friends and followers of Gracchus fell in this ill-omened struggle; and their bodies were ignominiously cast into the Tiber, as those of traitors to the commonwealth, and conspirators against its laws and government.

These contests, known in history by the designation of "the seditions of the Gracchi," shewed but too plainly that the ancient patriotic spirit of Rome had departed, never more to return. The attempt to check the growth of the already exorbitant wealth and power of the nobles had utterly failed; failed, although all legal and constitutional means had been exerted for its enforcement; failed even partly in consequence of the violent methods pursued with a view to compel its adoption; failed by being met with at least equally subtle, unconstitutional, and violent opposition; and the two antagonist powers, wealth and poverty, avarice and wretchedness, equally corrupt and unprincipled, sunk for a time into quiescence, though unreconciled, waiting but for another opportunity to burst into fiercer and more implacable hostility. The fires of the feud were not extinguished by the defeat and death of the Gracchi; they were but covered up with deceitful ashes, beneath which they smouldered scarcely observed, but acquiring tenfold strength, and preparing for an eruption which should devastate not Italy alone, but every region of the Roman world.

Within a few years after the death of Caius Gracchus, the senate not only found means to evade the Agrarian law, but also to procure its repeal; and even the land-tax which had been introduced as an intermediate step, the produce of which was to be distributed among the people, was annulled; and on the one hand, the extortion and rapacity of the nobles, and on the other, the degeneracy of the populace, proceeded with increased rapidity. Neither the authority of the censors, nor the enactment of sumptuary laws, could retard the luxuries of the wealthy; while the very means taken to support the poorer classes out of the surplus riches of the state and of great families, increased their venality, turbulence, and licentiousness.

This universal corruption of public morals was manifested in a very striking manner in the next great war into which Rome entered, which was that against Jugurtha. This crafty and far-sighted Numidian had served in the Roman armies, and made himself intimately acquainted with both the strength and the weakness of the Roman character.

Jugurthan war. B.C. 118.

Having been left joint-heir to the kingdom of Numidia, along with his two cousins, the sons of Micipsa, he resolved to sieze the whole, and procured the murder of the one, while the other fled for safety and redress to Rome. But at Rome Jugurtha's gold was more powerful than the appeals of the wronged Adherbal; and the senate decreed that the kingdom should be divided equally between the two. Scarcely had Adherbal returned to Numidia, when Jugurtha, stimulated to fresh crimes by his recently experienced impunity, declared war against his cousin, obtained possession B.C. 112. of his person, and put him to death in violation of the terms of his surrender. The tribune Memmius constrained the senate to declare war against the usurper; which was frustrated by his purchasing a peace of the consul. He was then ordered to repair to Rome, under safe conduct, to answer for his guilt. Once more was the Numidian gold too powerful for the course of justice, and Jugurtha would have been acquitted, had he not again embrued his hands in the blood of another kinsman. He was now ordered to quit B.C. 110. Rome, return to his dominions, and there prepare either to submit unconditionally, or to meet the utmost hostility of the offended and outraged republic. The war was conducted for a time with little success on the part of the Romans, till the command was entrusted to Metellus, a man of great military skill and incorruptible integrity. When this general had almost completed the conquest of Numidia, he was supplanted in the command by Caius Marius, a man of the lowest extraction, but of great abilities, courage, and force of character, and of at least equal perfidy, deceitfulness, and ferocity, who, by his popular talents, and his intriguing spirit, had got himself raised to the consulship. Marius speedily reduced Jugurtha to the necessity of taking refuge with Bocchus king of Mauritania, defeated the united armies of these two monarchs, and began to treat with Bocchus for the surrender, or rather betrayal of Jugurtha. This, however, was accomplished by Sylla, who was at that time quaestor in the army of Marius, and who so far succeeded in depriving Marius of the honour arising from the capture of Jugurtha, as Marius had done Metellus. This incident, in all probability, laid the foundation of that rancorous animosity between those two formidable rivals, which afterwards blazed out so fiercely, and spread such extensive devastation throughout the Roman dominions. Jugurtha was at length brought captive to Rome, and after being exhibited in the B.C. 106. triumphant procession of Marius, was cast naked into a dungeon, and left to perish in the agonies of hunger.

Marius.

The elevation of Marius to the consulship was an event of a very momentous character, both in itself and in its consequences. In his previous tribuneship he had shewn himself to be fully qualified to act the part of a demagogue in every respect. Being himself a person of the most obscure origin, all his habits and feelings were thoroughly adapted to those of the very lowest of the people; and yet the consciousness of great native powers of mind, gave him a certain haughtiness of bearing which could not brook control either from the senate which he braved, or the people whom he at once led and governed. Upon his appointment to the consulship, and previously to his departure for Numidia to supersede Metellus, the senate gave him little encouragement in the raising of those levies which were requisite for the vigorous prosecution of the war, being probably willing to see the popularity of the new demagogue abated, though at the expense of their country's military reputation. But Marius was not a person to be easily baffled. Instead of confining his levies to the wealthier citizens, as had always hitherto been the case, he raised it almost entirely from among the very lowest class in the state, the *capite censi*, B. C. 107. the indigent, the desperate, and the mercenary. An army formed of such materials was a fitting instrument for accomplishing any design, inasmuch as it was utterly destitute of every moral virtue and every patriotic feeling, owing no allegiance except that enforced by military discipline, or purchased by occasional indulgence in military excesses. This most unpropitious innovation secured for the time the ascendency of Marius and the popular party; but it laid the foundation of that military despotism which ultimately destroyed the last lingering remains of Roman liberty; as indeed it must do sooner or later when the military spirit becomes purely mercenary, the love of country expires, and the citizen is lost in the soldier.

This dangerous innovation might not have been so completely confirmed, had it not been for a new, and most formidable foe with which the republic was at this juncture threatened. The Cimbri and Teutones, two of those northern nations which, occasionally bursting from their forests, overran contiguous countries, exterminated the native inhabitants, and became the origin of new races and nations, had penetrated into the Roman provinces, and come into B. C. 103–109. contact with the armies of the republic. In Styria they defeated the consul Papirius Carbo; in Gaul, Junius Silanus had no better fortune; and, finally, the two consuls, Manlius and Cæpio, were routed with immense slaughter, eighty B. C. 105. thousand men perishing in the conflict. The tidings of this defeat caused the utmost consternation at Rome; and such was the military reputation of Marius, that both senate and people concurred in nominating him a second time to the consulship, even before the expiration of his first year of command. He immediately levied new forces; and in the extreme terror of the republic, no opposition was made to his enrolment of great numbers of the city populace, by which this innovation was confirmed, and the precedent established, of mustering troops from the very dregs of society, and whose character was altogether base and mercenary. For a time, however, the tide of the Cimbrian war rolled past, and spent its force on Gaul, though still continuing to threaten Italy. During this interval, Marius continued to increase his army, and to perfect the discipline of the new recruits, his tenure of the consulship being prolonged for four successive years, in consequence of the continuation of the same dread which had at first caused his illegal reinstatement in that office. In his fourth year, the Teu- B. C. 102. tones having entered the Roman territories, were defeated by Marius, near Aix, with immense slaughter, more than two hundred thousand of the invaders having perished. Next year he was equally successful against the Cimbri, in a battle fought near the Po; in which, however, his colleague Ca- B. C. 101. tulus, and, what more annoyed him, Sylla, shared the honours of the victory.

Marius had now enjoyed the consulship for the unprecedented term of five successive years, and might have retired with an unrivalled reputation; but the possession of power had only stimulated him with the eager desire of prolonging his enjoyment of it. Soon after his return to Rome he began to intrigue with the popular party, in order to obtain the consulship a sixth time, in opposition to his old rival Metellus; and having formed a strict confederacy with the tribune Saturnius, and the prætor Glaucias, two demagogues of the most unprincipled character, partly by their aid, and partly by means of the most extensive bribery, he procured his re-election to that dignity. There was now no check to the designs of the democratic faction, the people being led on by a tribune of the most abandoned and reckless character, and the senate being headed by an ambitious demagogue. But at length the extreme measures of Saturnius alarmed and disgusted even Marius; and with his usual force of character, he resolved to oppose the factious tribune. A great commotion ensued. Saturnius and Glaucias seized the Capitol, but were closely besieged, their supplies of water cut off, and being forced to surrender, they were condemned and executed as traitors. Thus did the extreme licentiousness of the popular faction compel even their own most powerful leader to interpose, and to put forth his iron strength to crush them as disturbers of the public peace, and enemies of their country.

This interposition in behalf of the republic cost Marius nothing less than a temporary loss of that power of which he was so ambitious. After the expiration of the sixth consulship, he found himself unable to retain his influence; his old antagonist Metellus was recalled from banishment; and he withdrew into Asia in a species of voluntary exile. A temporary cessation from the civil broils which had convulsed Rome, gave leisure for the reformation of the state from some of the abuses which had been forcibly introduced, or had insensibly sprung up. Some salutary laws were enacted against the systematic oppression under which the provinces groaned. Another measure, also of a reforming character, led to a less propitious result. This was an attempt to control the conduct of the equestrian order, which had become hurtful to the community, especially since C. Gracchus bestowed upon them the judicative authority. They had also obtained the farming of the leases, and consequently the collection of the revenue in the provinces, by which means they were enabled not only to oppose every reform that was attempted in the provincial administration, being judges in their own cause, but also to hold the senate itself in a state of dependence. The tribune Livius Drusus procured the enactment of a law, the effect of which was to restore to the senatorial body the half of the judicative power; but the means by which this law was passed, and by which it came into operation, involved an infringement of the constitution. Three hundred knights were added to the senate; and from the body thus raised to six hundred, the judges were selected. Unhappily this tended more and more to render the senate an aristocracy of wealth, and thus to increase the chasm, already but too wide, between the wealthy and the poor classes of the community, and to prevent the growth of a MIDDLE CLASS, one of the most fatal wants by which the republic was afflicted; a want which clearly indicated, and speedily caused, the total disruption of the social fabric.

But the most immediately disastrous subject of contention, was that which proposed the admission of all the Italian states in alliance with Rome, to the privileges of citizenship. Great numbers of the citizens of these states had either flocked to Rome upon losing their own property when conquered, or had been allured thither during the seditions of the Gracchi, by those popular leaders, with the view of strengthening their adherents, under the prospect of obtaining portions of the re-divided lands, or at least an idle maintenance from the gratuitous distribution of grain. To gratify these, and to procure a new accession of strength, Drusus proposed to admit all the Italian allies to the full rights of citizenship. This project roused the pride and the jealousy of the whole body of the people, who thought they foresaw in it the overthrow of all their peculiar privileges and powers, and who, however democratic at Rome, wished to be the aristocracy of all the world beside. The proposal was rejected by the unanimous voice of the people; and Drusus B. C. 91 himself was soon afterwards killed in a popular tumult.

The Italian states, however, were not disposed to relinquish so easily the hopes which had been thus excited. They held private intercourse with each other, interchanged hostages, and prepared deliberately for a general revolt, unless their demands should be conceded. The chief states of this social alliance were the Marsi, the Pelagi, the Samnites, and the Lucanians. Having assumed arms, the allies sent to

Social war. B. C. 91.

B. C. 88.

Rome, to demand a participation in the privileges of Roman citizens; and upon receiving a peremptory refusal, war was immediately declared against Rome. The war thus commenced, commonly termed the Social war, raged for the space of three years, the allies being as well disciplined and led as the Romans themselves; and many very sanguinary battles were fought, in which Rome sustained several severe defeats, and was for a time exposed to great danger. In this war, Cato, Marius, and the elder Pompey, greatly distinguished themselves; but the chief glory was unquestionably reaped by Sylla, who proved himself to be possessed of abilities of the very first order, equally as a politician and a warrior. The bloody struggle was at length terminated, rather by Roman policy than Roman arms. The freedom of the city was first granted to those states which had aided Rome; it was then offered to those who should first discontinue hostilities; and finally, it was given to the whole of the Italian states; so that whosoever was a citizen of any free town in Italy, became a citizen of Rome, provided he lodged his claim within sixty days after; and in this manner even many foreigners were subsequently admitted to Roman citizenship.

To counterbalance the influence of these new citizens, and to preserve to those resident in Rome itself the preponderance of political power, the new citizens were formed into only eight tribes, completing the number of thirty-five, of which they formed but a small minority, even when joined by the six turbulent city tribes. It was, however, a complete revolution, and tended to infuse a more healthy vitality into the Roman constitution, which it might have prolonged, had it not already been corrupt at the very core.

Mithridatic war.

C. 88.

Before the entire termination of the Social war, another arose in a different quarter of the world, by which the strength of Rome was severely tried. The bequest of Attalus king of Pergamus had given to the Romans extensive and wealthy dominions in Asia; and had at the same time stimulated their ambition and their avarice by the still more extensive regions which it placed almost within their grasp. The Grecian, or rather Macedonian empire had sunk before the growing power of Rome; and out of its ruins various monarchies arose, one of the most considerable of which was that of Pontus. For a time it remained tributary to its more powerful neighbours, till under Mithridates the Great, it became sufficiently strong not only to reduce the adjacent kingdoms, but even to wage an even-handed warfare against Rome itself for a number of years. Mithridates, seeing Rome weakened by the Social war, deemed it a convenient juncture to make himself master of her Asiatic dominions, and prosecuted his undertaking with such vigour and success, that he had subdued the whole of Asia Minor, and all the adjacent islands, with the exception of Rhodes, before the Romans were sufficiently at leisure to attend to his movements, occupied as they were with civil broils and social wars. But the loss of their rich Asiatic territories was what the cupidity of neither senate nor people could brook; and upon the termination of the Social war, all parties were equally eager to commence hostilities against Mithridates, anticipating vast wealth from the pillage of these opulent regions. Marius and Sylla warmly contended for the command of this important war; but the fame recently acquired by the latter in the war of the allies, enabled him to triumph over his rival. Scarcely had Sylla been nominated to the command, when fresh tumults arose in Rome, instigated by the envy of Marius, and the daring and lawless conduct of Sulpicius, tribune of the people. The object of these new tumults was to procure sufficient popular influence to remove Sylla from the command to which he had been appointed; and they were so far successful, that while he was yet in Campania with the army destined for Asia, a decree was passed in an assembly of the people, transferring the command to Marius. But Sylla's army were too much devoted to their general to submit to this capricious change. They put to death the commissioners who came to deprive him of his office; and Sylla, confiding in their adherence to him, marched directly on Rome, obtained possession of it, and put to the sword without mercy all those who had rendered themselves conspicuous by their support of his rival. Sulpicius was slain, notwithstanding the law which declared the person of a tribune inviolable; and it was with the utmost difficulty, and after sustaining innumerable hardships, and experiencing almost incredible hair-breadth escapes, that Marius himself eluded the keen pursuit of his enemies.

B. C. 87.

Sylla having thus crushed the opposite faction, and proscribed Marius, his son, and his chief adherents, re-established the power of the senate, and appointed his friend Octavius, and his enemy Cinna, to the consulship, set out against Mithridates. The relief of Greece was the first object of Sylla; and this he accomplished after taking Athens by storm, and defeating the armies of Mithridates in two great battles. Weakened and dispirited by these reverses, the king of Pontus readily concluded a treaty with the Roman general, who, on his part, was equally desirous of a peace, that he might return to Rome, where the Marian faction had regained the ascendancy.

Sylla had probably expected to produce a comparative equilibrium at Rome, by the appointment to the consulship of one from each of the contending factions. Here, however, his policy failed, probably from being too refined, or from his not taking into consideration the new element which had been introduced, by the admission of the Italian states to the citizenship. He had in a great measure exterminated the democratic party in Rome itself, and restored the power of the senate; but Cinna perceived the means of raising a powerful body of new adherents, by proposing to throw open all the tribes to the Italian states, which would have given them a preponderance in every popular assembly. This the other consul, Octavius, opposed; and Cinna was compelled to withdraw to the country, where he soon mustered a powerful army of the disaffected allies. Marius, who had fled to Africa, being informed of the turn which affairs had taken at Rome, conceived hopes of recovering his power, and immediately returned to Italy, joined Cinna, and at the head of an immense horde of robbers and semi-barbarians, the very dregs of the populace of all Italy, who flocked to his standard from all quarters, advanced against the city. At his approach Rome was thrown into consternation; and there not being any forces sufficient to oppose him, the senate offered to capitulate, on condition that the lives of the opposite party should be spared. During the progress of these negotiations, Marius entered the city at the head of his armed and barbarous adherents, secured the gates that none might escape, and gave the signal for slaughter. On rushed his barbarians like wolves, sparing neither age nor sex, while Marius gazed on the horrid scene with grim and savage delight. During five days and five nights, the hideous massacre was continued with relentless ferocity, while the streets were deluged with blood, and the heads of the murdered victims were exhibited in the Forum, or laid before the monster himself for his peculiar gratification. At length Cinna grew sick of the protracted butchery; but the barbarians of Marius could not be restrained till they were themselves surrounded and cut to pieces by Cinna's soldiers.

B. C. 86.

Having gratified his revenge with this bloody butchery, Marius nominated himself consul for the seventh time, and chose Cinna to be his colleague. This he did without the formalities of a public assembly, as if to consummate his triumph over the liberties of his country, thus trampled upon by an act at once of violation and of insult. But a short time did he enjoy his triumph and revenge. In the seventeenth day of his seventh consulate, and in the seventieth year of his age, he expired, leaving behind him the character of having been one of the most successful generals, and most pernicious citizens of Rome.

Sylla.

Sylla having concluded a treaty with Mithridates, returned at the head of his victorious army, prepared and determined to inflict the most signal and ample vengeance upon the Marian faction, whom he deemed equally foes to himself and to the republic. Before his arrival in Italy, Cinna had been killed in a mutiny of his own troops; and none of the other leaders possessed talent and influence enough to make head against him. After a short but severe struggle, Sylla prevailed, and immediately commenced his dreadful, deliberate, and systematic course of retribution. All who had either taken part directly with Marius, or who were suspected of attachment to the democratic party, were put to death without mercy, and, what was almost more terrible, apparently without wrath. Sylla even produced publicly a list of those whom he had doomed to death, and offered a reward for the heads of each. He thus set the example of proscription which was afterwards so fatally imitated in the various convulsions of the state. His next step was to depopulate entirely several of those Italian states which had joined the Marian faction, and to parcel out the lands among his own veteran troops, whom he thus at once rewarded and disbanded in the only manner likely to reconcile them to peaceful habits. Having thus satiated his revenge, his next care was to reform and re-construct the constitution and government of the state, shattered to pieces by long and fierce intestine convulsions. He caused himself to be appointed dictator for an unlimited time. He restrained the influence of the tribunes, by abolishing their legislative privileges, reformed and regulated the magistracy, limited the authority of governors of provinces, enacted police regulations for the maintenance of public tranquillity, deprived several of the Italian states of their right of citizenship, and having supplied the due number of the senate by additions from the equestrian order, he restored to it the possession of the judicative power.

Having at length completed his career as a political reformer, Sylla voluntarily resigned his dictatorship, which he had held for nearly three years, declared himself ready to answer any accusation that could be made against him during his administration, walked unmolested in the streets as a private person, and then withdrew to his villa near Cumæ, where he amused himself with hunting and other rural recreations. Whether his retirement might have remained long undisturbed by the relatives of his numerous victims, cannot be known, as he died in the year after his abdication of power, leaving, by his own direction, the following characteristic inscription to be engraved on his tomb: "Here lies Sylla, who was never outdone in good offices by his friend, nor in acts of hostility by his enemy."

B.C. 78.

The civil wars between Marius and Sylla may be considered even more worthy the careful study of the historian, than those between Pompey and Cæsar, for a right understanding of the circumstances which led to the destruction of Roman liberty, as the latter but concluded what the former had begun. Indeed, the strife between Marius and Sylla was itself the natural sequel of that contest between the aristocratic and the democratic factions, if they ought not rather to be termed the factions of wealth and poverty, which gave rise to the sedition of the Gracchi, and which being conducted on both sides with no spirit of mutual concession, none of mutual regard for the public welfare, deepened into the most bitter and rancorous animosity, such as could end in nothing but mutual destruction. Of the worst spirit of democracy, we see in Marius what may be called a personification; fierce, turbulent, sanguinary, relentless; brave to excess, but savagely ferocious; full of wily stratagems, in order to gain his object, then dashing from him every hard-won advantage by his reckless brutality. On the other hand, the aristocratic spirit had its representative in Sylla; haughty, cautious, and determined, forming his schemes with deep forethought, prosecuting them with deliberate perseverance, and abandoning them with cold contempt when his object was accomplished. He held his dictatorial sway till he had satiated his revenge, and re-established, as he thought, the government on an aristocratical basis, then scornfully laid aside his power, and yielded himself to voluptuous indulgence. By these men it was made clearly evident that Rome no longer possessed sufficient public or private virtue to maintain her republican institutions; that she was tottering on the very brink of a complete and final revolution, leading with fatal certainty to a military despotism; and the only question was, whether her despotic ruler should be a Marius or a Sylla; whether he should spring from among the democratic populace, or the aristocratic nobility; a question not long to be left in doubt.

Many of the laws enacted by Sylla were of a very wise and beneficial character, though their general aim was too manifestly the restoration of aristocratic power to the senate. What effect his personal influence, had his life been prolonged, might have had in consolidating his political reforms, cannot certainly be known, though it may very safely be conjectured that not even his power could long have prevented new convulsions. The malady lay too deep to be reached by any merely political measures of a remedial nature. It had its essence in the degeneracy and moral turpitude of the entire body of the republic, both nobles and people, which there was nothing in their external circumstances to prevent, or in their national religion to heal. Besides, as in the recent wars and revolutions, almost all property had experienced a change of possessors, there were vast numbers throughout all Italy eager for a counter revolution. Several young men also of abilities and ambition, were prepared to emulate the career of Marius or of Sylla, which could not be done without a renewal of that contest, the heavings of which had not yet wholly subsided. Of these, the chief were Lepidus, Crassus, Pompey, and Sertorius, and perhaps Lucullus.

Lepidus

Very soon after the death of Sylla, the consul Lepidus, made an attempt to rescind the laws of Sylla. In this he was opposed both by his colleague Catulus, and by Pompey, who was now the head of the aristocratic party, to which he had attached himself before its final triumph over the Marian faction. Lepidus was declared a public enemy, defeated in battle, fled to Sardinia, and there died.

Sertoriu

A more dangerous and protracted contest was waged in Spain, to which country Sertorius had withdrawn, and gathered around him the relics of the Marian party. For six years did this virtuous and heroic republican maintain a successful struggle against the whole power of Rome, defeated successive consular armies, and baffled even the experience of Metellus, with the skill and energy of Pompey. At length he was basely assassinated by Perpenna; and upon the loss of their leader, his forces were easily subdued by Pompey, and Spain was reduced to obedience.

B C. 7

War of
gladia

Before the termination of the Spanish war, one still more dangerous commenced in the very heart of Italy. Spartacus, a celebrated gladiator, a Thracian by birth, escaped from the gladiatorial training school at Capua, along with some of his companions, and was soon followed by great numbers of other gladiators. Bands of desperate men, slaves, murderers, robbers, pirates, flocked to him from all quarters; and he soon found himself at the head of a force able to bid defiance to Rome. Four consular armies were successively defeated by this daring adventurer, and Rome itself was considered in imminent danger. But subordination could not be maintained in an army composed of such materials. Spartacus purposed to march into Gaul, invite Sertorius to join him, and then together march on Rome. Had this plan been carried into effect, Rome in all probability must have fallen into the hands of the combined forces; but the tumultuous followers of Spartacus, longing for the pillage of the capital, compelled their leader to abandon his intention, and bend his course towards that devoted city. He was met and completely routed by the prætor Crassus, who thus acquired some renown in war, in addition to the influence which he possessed from his unequalled wealth. Pompey, on his return from Spain, encountered and destroyed several scattered bodies of the gladiatorial army; and thus, with his usual good fortune, obtained a claim to divide the honour with Crassus. From this period, these two powerful individuals cherished sentiments of envious rivalry against each other, the effect of which proved ruinous to the commonwealth.

B.C. 71.

Crassus.

The enormous wealth of Crassus enabled him to purchase the support of the people, by bestowing upon them large donations of money and corn. To counterbalance his influence, Pompey, although attached to the aristocratic party, proposed the repeal of some of Sylla's laws, and the enactment of others of a more popular character; in particular, the restoration of the powers and privileges of the tribunes. By these means he so ingratiated himself with the people, that, with powers never before entrusted to any general, he obtained the command of the armament prepared against the pirates by which the seas were so greatly infested. In this war he distinguished himself in a very remarkable manner, by his skill, courage, and activity, and raised himself to a height of power and of military fame, at that time beyond all rivalry.

Lucullus.

During the progress of these events in Spain and Italy, Mithridates had renewed the war in Asia Minor. Lucullus, to whom the command in the Mithridatic war was now given, defeated the fleet of the Pontic king, relieved Cyzicus, and overthrew the combined forces of Mithridates and Tigranes in two great battles, bringing the struggle to the very brink of a successful conclusion. But the mutinous spirit of his own army, and the hostility which he aroused against himself, by his reform of the financial administration of the provinces, occasioned his recall. Pompey was next appointed to the command of the armies in Asia; and thus again was he favoured by fortune to obtain the crowning glory of a victory already all but won. Mithridates finding all his efforts ineffectual, and being in danger of immediate captivity from the defection of his son-in-law, Tigranes, and the treason of his own son, Phraates, killed himself, that he might not fall into the hands of the Romans. After the conclusion of the war, Pompey spent some time in Asia, settling its affairs, and arranging it into different provincial districts. By the fall of Mithridates, and this settlement of Asiatic affairs, the republic may be considered to have reached the highest pitch of her power; but when the summit has been gained, the next step is inevitably downward. The very existence of the republic, as such, now depended, partly upon the caprice or the moderation of Pompey himself, partly upon the judicious or the erroneous measures which Crassus might adopt, in his endeavours to counterbalance the power of his mighty rival.

B.C. 63.

Pompey.

Unfortunately for Rome, the two rivals saw no better method of maintaining each his own influence in opposition to that of his antagonist, than by separately or jointly courting popularity. Pompey had led the way in this injudicious procedure, by his partial restoration of the tribunitian power; and this restoration was completed by the joint influence of him and Crassus during their united consulship. It had been found by ambitious men, that they could not obtain their objects of pursuit, whether those objects were chiefly aristocratic or democratic, without becoming demagogues; and therefore unhappily it was considered by them necessary to re-establish in all its power an office, of which the very nature pointed it out for such a pernicious abuse. But as extremes in all things meet, these very demagogues necessarily became an oligarchy; and while they pretended to promote the interests of the people, such men as Pompey and Crassus engrossed the whole powers and emoluments of the state.

Cataline's conspiracy.

Before this rivalry had reached its crisis, and during the absence of Pompey in Asia, Rome was threatened with a new convulsion, and new competitors for public favour began to appear on the scene. Lucius Sergius Catilina, a young man of noble birth, but of desperate fortunes, and of the most depraved character, formed a conspiracy to destroy the chief men of the state, seize on all public property, restore the Marian faction, and, placing himself at its head, to invest himself with supreme power. Not only the profligate of the youthful nobility, and the indigent of the populace, joined in this conspiracy, but even Crassus and Julius Cæsar were accused of having been so far implicated in it. After several failures and postponements, the conspiracy was partly detected, and partly forced into a premature disclosure by the failure of Cataline in his attempt to obtain the consulship, and the prudent preventive measures of his successful rival, Cicero, who also at that time began to act a distinguished part in public affairs. Not all the daring, nor all the secret attempts of Cataline could overawe, or elude the energy and vigilance of Cicero; and at length the desperate and baffled conspirator fled from the city, and raised the standard of revolt in Etruria. His associates in Rome were seized and put to death, and he was himself defeated and slain in a desperate battle, after having performed deeds of the most determined valour. So highly had Cicero distinguished himself by his detection and suppression of this dangerous conspiracy, that the senate unanimously bestowed upon him the honourable title of *Father of his Country*.

Cicero.

B.C. 62.

Cato.

Cæsar.

During the progress, and in the suppression of this conspiracy, several very remarkable men had come prominently forward. These were Cicero, unmatched for eloquence, learning, and philosophical wisdom; Cato, a true republican of the ancient mould, simple, severely virtuous, and uncompromising; and Cæsar, unrivalled in the versatility, extent, and power of a genius, equally fitted to attain preeminence in the pursuits of literature, philosophy, politics, and war. The two former adhered to the aristocratic party in the state, who were headed by Pompey; the latter made the democratic party the basis of his power, although he was himself descended from one of the most ancient and noble families of Rome. He had the address both to extricate himself from the conspiracy of Cataline, and to make himself at the same time the person to whom the survivors of that party looked for protection. From that period it was evident, that whatever might be the destinies of Rome, Cæsar must exercise a potent influence over them, for evil or for good.

The return of Pompey from Asia caused a renewal of the contest for power between that general and the party which sought to maintain the independence of the senate. Of this party, Cato, Lucullus, and Metellus, were the chief adherents; but their efforts only caused Pompey to throw his influence more into the popular scale, and thus unconsciously to promote the ambitious views of Cæsar. That sagacious man, perceiving the necessity of acquiring both the skill and the renown of a general, and having hitherto in a great measure abstained from military affairs, got himself appointed to the governorship of Lusitania, where he soon acquired a high reputation for warlike talents, and at the same time repaired his dilapidated fortunes.

During the absence of Cæsar, the contest between Pompey and Crassus continued, each endeavouring to weaken the influence of the other; and the independent party in the senate, led by Cato, and occasionally aided by Cicero, availing themselves of this struggle to diminish the undue power

B. C. 59.

of both. But upon the return of Cæsar, this contest was brought to a termination. The two rivals began to perceive that their power was in danger of being equalled, if not surpassed by a third; and Cæsar, to lull their jealousy asleep, till his own designs should be matured, pointed out to them the risk they incurred of merely ruining each other, if they did not speedily compose their differences. He at first paid most court to Pompey, as his most formidable rival, and affected devotion to his cause, till by his aid, seconding his own rising fame, he procured the consulship. During his tenure of that office, he still more increased his popularity by the enactment of several salutary laws, and some of more ambiguous character. In particular, he carried an Agrarian law for the distribution of large tracts of land in Campania among the indigent people, and had the address, in spite of the opposition of the senate, to induce both Pompey and Crassus to aid him in passing it, and to act as commissioners in the distribution, thus sharing the odium of the measure, while the entire popularity remained his own.

The first triumvirate.
B. C. 59.

The schemes of Cæsar required a new element for their further development. He well knew that he could not gain the supreme power without an army to support his pretensions, or depend on an army without having previously made it completely his own. It was therefore necessary for him to obtain the command of a warlike province, and that, if possible, adjacent to Rome. Gaul was exactly suited to his purpose; and he now directed his efforts to the obtaining of that appointment. Neither Pompey nor Crassus seems to have penetrated his views; and a secret but strict alliance was formed between these three powerful and ambitious men, commonly known by the name of "the first triumvirate." The province of Gaul was allotted to Cæsar for a term of five years, while Pompey and Crassus remained at Rome; and the compact between Cæsar and Pompey was confirmed by the latter marrying the daughter of the former.

To complete the triumph of the triumvirs over the independent party in the senate, Cato was appointed to the government of Cyprus, and Cicero was banished through the intrigues of the infamous Clodius, who had obtained permission to relinquish his patrician rank, that he might be eligible for the tribuneship; an example which was afterwards repeatedly followed by designing demagogues. After having accomplished this object, Clodius became so troublesome even to his own party, that to keep him in check, Pompey procured the recall of Cicero from exile, which he could not effect without the strenuous aid of the tribune Milo.

In the mean time, Cæsar had arrested the migration of the Helvetians, expelled the Germans from Gaul, subdued the Belgæ, the Aquitani, the Nervii, and other warlike Gaulish nations, and had also both penetrated into Germany itself, and crossed the sea to Britain, till then almost unknown to the Romans. By these exploits he raised his military reputation to an equality with that of Pompey himself, and formed a hardy and well-disciplined veteran army, entirely devoted to his will. Nor was he inattentive to the course of events at Rome. He found means to maintain his influence there to such a degree as to rouse the dormant jealousy of his rivals, and almost to precipitate the struggle. A reconciliation, however, took place; and he obtained a renewal of his command in Gaul for another term of five years, while Crassus chose Syria for his province, and Pompey Spain and Africa. Crassus appears to have chosen Syria for the purpose of gratifying his passion for the acquisition of wealth; and Pompey preferred those provinces which he could govern by his lieutenants, while he remained at Rome to rule the republic.

B. C. 5

This new arrangement was not destined to a lengthened existence. On his arrival in Asia, Crassus found himself compelled to enter into hostilities with the Parthians, to whose vicinity the overthrow of Mithridates had extended the sway of the republic in that continent. Even to the best of the Roman generals, the Parthians would have proved a formidable foe; but Crassus was altogether destitute of the military talents necessary for the conduct of such a war. His army was entirely routed in Mesopotamia, and himself taken prisoner and put to death soon after the battle, by the Parthian general Surena.

About the same time died Cæsar's daughter, the wife of Pompey; and thus not only was the triumvirate dissolved by the death of Crassus, but the alliance between the two survivors was greatly weakened by the death of Julia, who had possessed considerable influence over both her father and her husband. The period for the termination of Cæsar's command in Gaul had nearly arrived; and all things seemed to indicate the approach of a mortal crisis.

Each party strove to throw on his rival the odium of beginning the fatal contest; and its actual commencement was for a time retarded by their mutual machinations. At length it began by Cæsar's demanding permission to hold the consulship while absent. This was strenuously opposed by Pompey, and advocated by Cæsar's partizans, Curio, Marcus Antonius, and Quintus Cassius, tribunes of the people. Curio succeeded in placing Pompey in what is termed, "a false position," by proposing that both he and Cæsar should resign their offices and retire into private life, which he averred that Cæsar was willing to do. Repeated but insincere offers were made by both parties for an accommodation; but the senate at length passed a decree, commanding Cæsar to disband his army before a certain specified day, under the penalty of being declared a public enemy. The two tribunes, Antony and Cassius, interposed their veto; but their prerogative was violently set aside, and the decree passed by a large majority. Upon this Antony and Cassius fled from the city disguised as slaves, and sought refuge in the camp of Cæsar, who shewed to his soldiers the tribunes thus insulted by his enemies at Rome.

Civil wa

B. C. 49.

The conduct of Cæsar had hitherto appeared to be chiefly defensive, that of Pompey and his party aggressive. It had now become necessary for Cæsar either to relinquish his long-cherished visions of ambition, or to become the assailant. He had completely foreseen and anticipated the crisis. At the head of but a small division of his army, not sufficient to create alarm, he had approached the banks of the Rubicon, the boundary of Italy proper, on the side of Cisalpine Gaul, and which he could not cross in a hostile manner without avowing himself a traitor to his country. His schemes were ripe for execution, his enemies were thoroughly roused, concealment was no longer practicable, his troops had declared their readiness to support their general and avenge the wrongs of the tribunes, all things urged him to the crisis; but the dark destinies of the fateful hour hung heavy upon Cæsar's spirit.[1] He retired early from a supper where he had entertained some of his principal officers, and paced to and fro on the banks of the Rubicon, in the deep silence of midnight, oppressed with thought. It probably was not the ruin to himself, should he now hesitate, still less the perils of the undertaking; it was the long, black, direful train of miseries that must sweep remorselessly over his country and the world, all summed up, concentrated, and rendered almost visibly present in the one simple and brief act of that most awful hour, this it was that shook and appalled the heart of even the mighty Cæsar. He at length exclaimed, "the die is cast," sprung furiously across the slender stream, and spread to the morning breeze the banner of civil war.

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[1] See Suetonius in Vita Jul. Cæs.

Before the close of that day Ariminum was seized by Cæsar. With the speed of a torrent, and the gathering strength of an Alpine avalanche, he advanced on Rome. City after city opened its gates at his approach, their garrisons swelling the number of his troops. Pompey and his party were paralyzed by his boldness, and terror-struck by the celerity of his movements. They abandoned the city and fled to Capua, leaving the public treasure behind them. Thence they fled to Greece, without daring once to turn upon their swift pursuer. Corfinium alone seemed disposed to make a show of resistance; but the garrison declared for Cæsar, and their commander, Domitius, surrendering at discretion, was treated with the kindness due to an honourable foe. Cæsar then retraced his course to Rome, and entered it without opposition, having subdued all Italy in sixty days. He assembled such members of the senate as had remained in the city; declared himself driven to hostilities by the machinations of his enemies, yet still a friend to the republic; seized upon the funds in the public treasury, and after a short delay of six days, set out to attack Pompey's lieutenants in Spain.

In his march through Gaul he was joined by his veteran troops, at whose head he had gained so much glory, and whom he had doubtless been training for that enterprise in which he was now engaged. On his arrival in Spain he began a series of manœuvres surpassed by nothing in the history of war, for the purpose of compelling Afranius and Petreius, not to a battle, but to a capitulation of their entire army, which he wished thus to preserve and make his own. This he at length accomplished; and on his return through Gaul reduced Massilia, which had till then held out against him. But these successes, where he commanded in person, were somewhat counter-balanced by some severe defeats sustained by his generals in Illyricum and Africa.

Returning victorious to Rome, he was named dictator, a title which he soon afterwards exchanged for that of consul; and after spending a short time in the arrangement of public affairs, he prepared to sail for Greece, in order to bring the struggle to a close, by encountering his great rival in person. Pompey had assembled an immense army, drawn from the various Asiatic states where Roman troops had been stationed; and his camp was dignified by the presence of great numbers of the fugitive senate. Cæsar with much difficulty and danger transported his army from Brundusium to the vicinity of Dyracchium, where Pompey was encamped. For some time the contest between these two great generals was a war of tactics, each endeavouring to out-manœuvre his antagonist, before putting the final issue to the hazard of a decisive battle. As Pompey's fleets had the command of the sea, he was enabled to act on the defensive, without the danger of falling short of provisions, to which Cæsar was much exposed. Cæsar therefore used his utmost efforts to draw his adversary to a general engagement; in which he had almost succeeded, when he was himself surprised, one division of his army thrown into confusion, and the whole so greatly endangered, that nothing but the most desperate efforts made by himself in person, prevented a total rout.

Soon after this hazardous encounter Cæsar withdrew from Dyracchium, and marched to Thessaly, where he had better access to both provisions and reinforcements. He was followed by Pompey, who still abstained from battle, hoping to exhaust his foe. But this wary policy of Pompey was disliked by the young nobility, who longed for the fight, especially since their partial success at Dyracchium. At length Pompey drew out his army on the plains of Pharsalia, and offered Cæsar the opportunity which he had so long sought, of deciding the empire of the world. In this great battle the superior skill of Cæsar was manifest. Being deficient in cavalry, in which the strength of Pompey's army lay, he altered the usual form of drawing up the army in three lines, placing a fourth in reserve for the support of his cavalry, with particular directions how to act. When the signal was given, the troops of Cæsar rushed on with their usual impetuosity; those of Pompey stood still to receive the shock. The cavalry of Pompey at first repulsed that of Cæsar; but being unexpectedly assailed by the reserve, they were thrown into confusion, and fled, leaving the flank of the main body exposed, which was instantly assailed by Cæsar's victorious wing. This decided the fate of the day. Pompey's legions were thrown into irretrievable confusion, driven to their camp, the entrenchments carried by storm, and the whole either scattered over the country, or compelled to surrender at discretion. Cæsar finding the victory secure, hurried from place to place across the bloody field, calling aloud to spare the Roman citizens; and all who yielded were treated with the utmost clemency.

tle of
rsalia.
C. 48.

Pompey, as if bereft of his usual courage and presence of mind, made no effort to retrieve the fortunes of the day. He at first retired to his camp, and when its entrenchments were forced, he fled in disguise from the scene not more of ruin than of disgrace. He directed his course to the Ægean sea, purposing to renew the war in Syria; but finding the Asiatic states not inclined to support what they now deemed a falling cause, he altered his plan, and steered for Egypt, having taken on board his wife Cornelia. When he drew near the Egyptian shore, he found the young king besieging Pelusium, and sent intimation of his approach, and of his intention of joining his forces with those of Egypt. The perfidious Egyptians resolved to allure him on shore, and then put him to death, as the safest mode of escaping the danger of his own resentment, if they should refuse him succour, or that of his rival, if they should grant it. Achillas, the commander of the Egyptian forces, and Septimius, a Roman soldier who had formerly served under Pompey, proceeded in a boat to the galley to conduct him to land. He left his vessel with strong forebodings of what might follow; and as the boat drew near the shore, Septimius stabbed him in the back, and the others falling upon him, completed the treacherous and bloody deed. The galley in which he came had anchored so near the shore, that the murder of Pompey was distinctly visible to those on board. The wild shriek of anguish raised by Cornelia as she beheld her beloved husband fall, reached even to the shore; and on the instant, the Roman galley cutting her cable, and putting to sea, escaped the pursuit of the Egyptians. Thus perished Pompey the Great, a fugitive and alone on a barbarian shore, after having held for many years a scarcely divided sway at Rome, which he failed in making his exclusively and permanently, only because his rival and antagonist was Cæsar.

Death of Pompey.

Immediately after his victory at Pharsalia, Cæsar commenced a close pursuit of Pompey, knowing that the war could only end with his death or captivity. Tracing the course of his defeated rival's flight, he arrived at Alexandria, where he not only received the tidings of his death, but the Egyptian messengers laid before him the head and ring of Pompey. From these melancholy memorials of his mighty rival Cæsar turned away with strong shudderings, and with bursting tears of pity; and gave orders that near Pompey's tomb, a magnificent temple should be erected to Nemesis. He next employed himself in settling the disputed claims for the succession to the Egyptian throne, which he bestowed on the celebrated Cleopatra, influenced more by the beauty of her person than the superiority of her pretensions. While in Egypt, he was exposed to great danger, from an insurrection of the dethroned king's partisans; but the opportune arrival of his forces enabled him completely to subdue it, and to establish the sovereignty of Cleopatra. From Egypt he marched into Asia, against Pharnaces, son of Mithridates the Great; and in the short space of thirty days, completely annihilated his army, and subdued his dominions. It was in giving an account of this brief war, that he used the famous words, *Veni, vidi, vici.* "I came, saw, conquered."

During Cæsar's delay in Egypt, and expedition into Pontus, great disturbances had broken out in Rome; to remedy which he repaired thither with his usual promptitude and speed. Upon his arrival, he was again nominated dictator, and strenuously applied himself to the reform of the abuses which had been committed in his absence by ill-judging and intemperate partisans. No proscriptions followed his arrival, no blood was shed, no injustice perpetrated; and this clemency, so different from the conduct of Sylla and Marius, induced numbers of the most distinguished men of what had been the independent party in the senate, to return to Rome, and there to renew the semblance of a regular form of government. He then turned his attention to Africa, where a strong body of his antagonists had been drawn together by Cato and the sons of Pompey. The struggle was severe, but not protracted. A decisive battle was fought at Thapsus, where the Pompeian party were completely overthrown. Despair filled the hearts of the routed leaders. Cato died by his own hand in Utica; Scipio, being intercepted in his flight, stabbed himself and fell into the sea, while Cæsar's men were boarding his galley; and Juba, king of Numidia, and his general Petreius, fell by each other's hands in single combat. The two sons of Pompey escaped and fled to Spain, where they endeavoured once more to rekindle the embers of the expiring war.

B. C. 46.

Upon his return victorious from Africa, Cæsar was received at Rome both by senate and people with great adulation, and he celebrated his triumph with uncommon pomp and splendour. He was again created dictator for ten years, and honours were heaped on him with lavish hand. Again did he renew his acts of clemency and generosity to all who had been opposed to him, thus confirming his popularity and consolidating his power.

But Pompey's sons, Cneius and Sextus, having collected a considerable force in Spain, Cæsar found himself once more obliged to quit Rome. The two armies met in the plains of Munda, and prepared for the final struggle with all the energy of hope on the one side, and on the other of despair. So furious was the conflict, that Cæsar was compelled to put himself at the head of his favourite tenth legion, and to fight as a common soldier, not for victory merely, but for life. Victory at length declared for him; a vast number of his most eminent and determined enemies fell in the battle, or in the flight, and among the latter was the eldest son of Pompey. With this sanguinary conflict the war was at once terminated, and Cæsar returned in full triumph to Rome.

B.C. 45.

Having now completed the subversion of the republic, Cæsar assumed the undivided sway of Rome, although he tolerated the continuation of the forms of republican government. In his own person he concentrated those offices which were requisite for the conduct of public affairs, such as the dictatorship, the consulate, and the offices of tribune, censor, and pontifex maximus. Thus possessed of all authority and power, he commenced a number of reforms, improvements, and public works of utility, which did honour to his genius, his judgment, and his spirit of enterprise. He reformed the calendar, and undertook to drain the Pontine marshes, to deepen the channel of the Tiber, to form a capacious harbour at Ostia, to cut a canal through the isthmus of Corinth, and to revenge the defeat of Crassus, by an expedition against the Parthians. In the midst of these schemes and undertakings he gave offence to the senate by his haughtiness, and to the people by his too evident assumption of regal dignity, and almost of the regal title. They could better brook the loss of liberty in reality than in appearance; they retained their love of the form of the republic, when its spirit was gone; they could not endure the name of king, while they were willing to submit to real monarchy under the name of a perpetual dictatorship.

Influenced by these feelings, a large body of the senators began to regard Cæsar as an usurper, and many even of the people, who had formerly supported him as their leader against the aristocratic party, became also disaffected. Mark Antony's offer of a crown at the feast of the Lupercalia, put forth in all probability for the purpose of ascertaining the bias of the popular mind, was met by such decided disapprobation, as to cause Cæsar himself to hesitate, and to wait for a more propitious juncture for the completion of his designs. Meanwhile, a conspiracy was formed for his destruction, and at the head of it were Brutus and Cassius, who had both experienced his clemency and additional marks of his favour. After having narrowly escaped detection, they resolved to strike the blow in the senate-house itself, on the ides of March. No sooner had he taken his seat than the conspirators crowded round him, preferring various requests, and one of them, apparently in extreme urgency, seized him by the robe. At this preconcerted signal, they all rushed upon him with their daggers, and Cæsar, perceiving resistance fruitless, muffled up his head in his mantle, and fell at the base of Pompey's statue, pierced by three-and-twenty wounds. At this moment, Brutus waved aloft his bloody dagger, hailed the senate, and in particular Cicero, and proclaimed aloud the recovered liberty of Rome.

Death
Cæsar.
B. C.

But instead of joy and gratitude, a general terror pervaded the senate and the citizens. They had felt secure in the well-known clemency and the settled power of Cæsar; they knew not what scenes of anarchy and bloodshed might follow his death, nor what might be the temper of his successor in the chief power. A dull dead calm brooded over the city for some days; till, on the day of Cæsar's funeral, Antony inflamed the smouldering passions of the populace to such a degree, that they burst into the senate house, tore up its benches, and raised an immense funeral pile for the body, sacked in their fury the houses of the conspirators, and wreaked their vengeance on all of that party whom they could seize. Alarmed by these proceedings, the chief conspirators fled from the city, and prepared to vindicate their deed, and defend the republic by arms.

Previously to this tumult, Antony had concurred with Brutus and Cassius in passing an act of amnesty, granting forgiveness to all who had been implicated in any of the former proceedings. But having stirred up the populace, and being joined by Octavianus, or Octavius, the grand-nephew and heir of Cæsar, he now entered boldly on his turbulent and ambitious career. Brutus and Cassius retired to Macedonia and Syria, to which provinces they had been appointed, leaving Italy in the power of Antony and Octvaius. A jealousy soon arose between these two leaders of the revolutionary party; and Octavius joining the senate, Antony retired into Gaul, raised an army, and came to an engagement with the two consuls near Mutina, where he was defeated, but both the consuls fell in battle. Antony fled to Spain, and joined Lepidus; but before renewing the war, he represented to Octavius that their hostilities would only secure the triumph of the senate and the conspirators. In consequence of this suggestion, Octavius, Antony, and Lepidus, came to an interview in a small island in the river Lavinus, not far from the modern city Bologna, and there formed a confederacy, called the "second triumvirate." In the course of their proceedings, these three ruthless men drew up a list of those whom they wished to be put to death, each, without compunction, permitting relation or friend to be proscribed, if required by the others. This bloody proscription was followed by the murder of not less than 300 senators, and 2000 of the equestrian order. Among the former was the illustrious Cicero, whose death was occa-

Second triumvirate.
B C. 43.

sioned by his invectives against the dissolute and infamous Clodius, and the unprincipled and tyrannical Antony.

tle of lippi. C. 42.

Soon after the formation of this blood-cemented compact, Octavius and Antony prepared to wage war against Brutus and Cassius, who had combined their forces, and were in Macedonia. The rival armies met near Philippi; and two separate battles were fought before the victory was decided. In the first, the division commanded by Cassius was defeated; and he, thinking the battle lost, slew himself in despair. Brutus, however, had been victorious with his division; and the two antagonist armies, rallying each on its unbroken half, remained ready for another trial of strength. This took place within about twenty days after the first, and on nearly the same ground. The struggle was fierce, obstinate, and bloody; but at length the troops of Brutus gave way, fled, and were scattered in total rout and dismay. Brutus, disdaining to survive this, the last convulsive effort of the republic, fell on his own sword, and died. The conduct of Octavius and Antony, after their victory, bore a greater resemblance to that of Sylla and Marius, than of Cæsar, whose memory they would have more honoured by imitating his clemency, than by a bloody revenge of his death.

The utter ruin of the republican party was followed by a period of disgraceful intrigues, jarrings, and contests, among the usurpers, and their corrupt friends and followers. Antony traversed Greece, and part of Asia, luxuriating in the pomp, the homage, the flatteries, and the voluptuousness of the East. At one time he meditated a war against the Parthians, to redeem the fame of Rome, which had been tarnished by the defeat of Crassus; but meeting with Cleopatra, he abandoned his dreams of glory, and resigned himself to the debasing delights of loose licentiousness, beneath the syren spell of this abandoned beauty.

Octavius, on the other hand, returned to Italy, and prosecuted his deep-laid schemes for securing the sole possession of despotic power. He was repeatedly disturbed by the intrigues and the violence of Lucius, the brother, and Fulvia, the wife, of Antony; but at last, the rupture having come to an open war, they were defeated; their chief strength, Perusia, was taken, and Octavius secured in the undisturbed command of Italy. The tidings of this contest drew Antony from Egypt, and a war between him and Octavius seemed on the point of breaking out. At this juncture Fulvia died; and instead of a war, a new alliance was formed between the jealous triumvirs, Antony receiving in marriage Octavia, the sister of Octavius. In this new division of the Roman dominions, Sextus Pompey was admitted to a participation.

C. 39.

But their hollow agreement was of no long duration. New jealousies arose between Octavius and Lepidus, and new wars with Pompey. Being defeated by Octavius, Sextus Pompey fled to Asia, and was there slain by one of Antony's lieutenants. Lepidus was soon afterwards deprived of his share in the triumvirate; and Antony and Octavius divided the whole power between them. Little cordiality subsisted between these partners, or rather rivals; but a decided quarrel was delayed in consequence of their distance from each other, and the different regions in which they sought for an extension of fame and dominion. Antony was still desirous of triumphing over the Parthians, but he met with little success, except where his troops were led by Ventidius. Octavius found employment for his legions in Dalmatia and Pannonia, into which the arms of Rome had scarcely before penetrated. At length the conduct of Antony thoroughly disgusted all his friends at Rome. Octavia set out for the East, hoping to recall her husband to some sense of his duty to Rome, to her, and to himself; but the infatuated man, unable to break through the fascinations of Cleopatra, refused to see Octavia, ordered her to return home, and even sent her a divorce. This insult Octavius could not brook. Antony was deprived of his consulship by a decree of the senate, and both parties prepared for another war.

Battle of Actium. B. C. 31.

Mutual jealousy had long anticipated such a contest, and they were both in readiness at once to rush to the arbitration of arms. The forces of Antony were the more numerous; those of Octavius the better disciplined, and led by generals of great skill and judgment. Their armaments, both military and naval, came within sight of each other on the opposite sides of the entrance to the gulf of Ambrasia in Epirus. For some time they remained comparatively inactive, watching each other's movements. At length the two hostile fleets met off the promontory of Actium, that of Octavius led by Agrippa, that of Antony by himself and Cleopatra. The battle began, in sight of the land forces on either side, and was continued with equal courage and fortune, till Cleopatra, terrified by the dreadful scene, turned her galley and fled, followed by sixty of the Egyptian vessels, and soon after by Antony himself. The deserted fleet of Antony maintained a brave resistance for some hours after his flight; but at length was completely overpowered and destroyed, three hundred ships being sunk or taken, and the whole strand covered with wrecks, and the bodies of the dead. For several days the army of Antony could not believe that he had deserted them; and remained in anxious expectation of his arrival, to renovate his fortunes on a more stable element. When at last assured of his flight, they entered into terms with the victor, who was now undisputed lord of both sea and land.

Death of Antony. B. C. 30.

After this fatal battle, Antony continued his flight to Egypt, a prey at once to shame and to ungovernable rage. For some time he refused to see Cleopatra, whom he accused of having caused his overthrow. But having exhausted his wrath, he returned to the embrace of the ensnaring syren, and again gave himself up to the excesses of voluptuous enjoyment. Meanwhile, the cautious Octavius was drawing his toils closer around his victim. The defences of Egypt were taken or surrendered; and in a short time Antony was reduced to such straits, that he could neither fight nor fly. Hemmed in, deserted by his own troops, suspicious of the Egyptians, distracted by jealousy and rage, he lost all self-control, bursting into fierce gusts of frantic passion, then sinking into the stupor of despair. Even Cleopatra became alarmed with these storms of the furious madman, and caused a report to be spread that she was dead. This report roused the Roman in the heart of Antony; and having nothing now on earth to love, and the path of ambition being closed, he threw himself on his own sword, but failed to inflict a wound immediately mortal. While struggling in the agonies of death, he was told that Cleopatra was still alive. Somewhat reviving at this intelligence, he caused himself to be carried into the presence of Cleopatra, where, calling for a draught of wine, and fixing his eyes on the fascinating woman, for whose sake he had lost the world, he expired.

B. C. 30.

Octavius was now left without a rival, sole master of the Roman world. On seeing the body of Antony he betrayed some emotion; but gave orders that the utmost attention should be paid to Cleopatra, and especially that she should be prevented from dying by her own hand, as he was anxious that she should adorn his triumph at Rome. She seems to have cherished the hope of gaining the same influence over him that she had enjoyed over Cæsar and Antony; but the cold and passionless temper of Octavius was proof against her blandishments. Disappointed in this expectation, and dreading the disgrace of being led in captivity to adorn the triumph of her conqueror, she eluded the vigilance of her Roman guards, and having imbibed poison, either from the bite of an asp, or from the point of an envenomed needle, death rescued her from that indignity.

Egypt was then reduced to the form of a Roman province; and its immense wealth was transported to Rome to replenish the exhausted treasury, and to pay the troops by whom the conquest was thus achieved. Soon after his return to Rome, Octavius received from the senate the appellation of Augustus, by which name he is henceforward to be known in history; and by an unanimous vote, they committed to him the entire government of the state. With this vote ended the Roman republic; and from this period was dated the commencement of the Roman empire, under its first undisputed sovereign, Augustus Imperator.

SECTION III.

Augustus Cæsar. B. C. 30.

Augustus Cæsar now found himself possessed of the undisputed sovereignty of Rome, every competitor having perished, and the servile senate being ready to bestow upon him all titles, honours, and privileges which he could desire. He had before him the contrasted fates of Sylla and of Cæsar; the former of whom died in peace after relinquishing the perpetual dictatorship, the latter was slain when in its full enjoyment. For a time, it is said, he hesitated whether to retire, like Sylla, into private life, or to retain imperial power; but by the sage advice of the politic Maecenas, his chief favourite, he was persuaded to retain it, and merely to govern under republican forms, though possessing a real and absolute monarchy. In consequence of the same advice, he laid aside the dictatorship, as too manifestly despotic, was annually chosen consul, and finally received the consular power in perpetuity; and by being created perpetual tribune, his person was rendered sacred and inviolable, which gave a conventional security, at least to his life, and led to the enactment of the *judicia majestatis*, or accusations of *high treason*. As imperator he retained the command of all the forces; and by assuming the censorship and the pontificate, he became possessed of the right of raising or depressing in rank, and of regulating every thing that depended upon religious ceremonies.

This supreme dominion, which his own power would have enabled him to seize and perpetuate, he pretended to be unwilling to retain, and made an offer in the senate of laying it down. This they requested him not to do; and upon their urgent entreaties, he consented to retain it for a period of ten years; on the expiration of which, the same form was repeated, and a similar prolongation conferred. This example, followed by succeeding emperors, gave rise to the *sacra decennalia*, festivals celebrated at every renewal of the imperial authority. It is not necessary to imagine that this decree of the senate was entirely the result of slavish submission to absolute power. Many of the senators could still remember the horrors of those contentions for supremacy which had taken place in the times of Marius and Sylla, and of the two triumvirates, and might be really apprehensive of equal convulsions and bloodshed, should he abdicate his power, and thus re-open the sources of contention, anarchy, and bloodshed. The wiser of them might see, that there did not now survive enough of republican virtue to render a republic any longer possible, and as Augustus, after the fall of all his antagonists, had displayed a great degree of mildness and clemency, they might fairly conclude, that his government was the best of which Rome was then capable, and might therefore desire its perpetuity, as the best method of securing the welfare of the empire. On his own part, his character had begun to assume an aspect very different from what it bore at the beginning of his ambitious career. At that time, its chief element appeared to be cold, remorseless cruelty; now it became mild, placable, benignant, alike respectful to the senate, and benevolent to the people. The truest patriot might therefore be most earnest in desiring the continuance of his power, however it might have been acquired.

But while Augustus received equal manifestations of attachment from the senate and the people, he was sufficiently aware, that to the army he owed his elevation, and that its favour must be secured. It could neither be disbanded nor retained in one place and body, with due regard to safety. Following the example of Sylla, he dispersed his veterans over Italy, settling them in thirty-two colonies, to make room for which, the former proprietors were in many instances dispossessed of their property. The settlement of one of these colonies near Mantua, was the cause of Virgil's removal to Rome. Eight entire legions were posted on the Rhine, four on the Danube, three in Spain, and one in Dalmatia. Eight more were stationed in Asia and Africa. The whole standing army of the empire amounted to upwards of one hundred and seventy thousand men. There were also quartered in Rome and its vicinity twelve cohorts, amounting to about ten thousand men; nine of these, called the prætorian bands, were intended as the imperial body-guard, the rest for the garrison of the city. These prætorian cohorts afterwards became not the guards merely, but also the dispensers of imperial power. Two powerful fleets were also maintained, the one in the Adriatic sea, the other for the protection of the western Mediterranean. As Augustus still allowed the senate a nominal share in the government, the appointment of lieutenants for the administration of affairs in some of the provinces was left to them, the others he himself retained; but as the imperial provinces were those on the frontiers of the empire, where the troops were stationed, the armies constituting the real power were still under his command. The financial affairs of Rome he also arranged anew, taking care to cause the treasures of the empire to flow chiefly into his own private and military coffers. At this period, the state revenue of Rome is computed to have amounted to upwards of forty millions of our money. These revenues were drawn chiefly from tithes charged on conquered lands, tribute and customs from provinces, crown lands, taxations amounting to a twentieth upon inheritances, and fines of different kinds imposed by different laws. Of these the tributes and customs from the provinces, and the rental of the crown lands, were by far the most productive, directing the main stream of wealth into the imperial treasury.

The internal administration of affairs being thus arranged, Augustus had leisure to attend to its enlargement, by conquests on the frontier. Nor were these inconsiderable. Western Gaul, and the mountainous districts in the north of Spain, were completely subdued. An expedition into Armenia, if of little consequence in itself, was nevertheless very gratifying to Roman pride, by being the means of recovering from the Parthians the standards that had been lost in the unfortunate campaign of Crassus. In Africa, the boundaries of the empire were extended into very remote regions, productive however of little else but empty fame. But the most important of these conquests was that of the regions south of the Danube, Rhætia, the country of the Vindelici, and Noricum, as well as Pannonia, and afterwards Mœsia. The arms of Augustus could not, however, penetrate far into Germany, defended as it was both by the determined valour of its inhabitants, and by its extensive forests and marshes. The chief successes in Germany were obtained by the valour and skill of Tiberius and Drusus Nero, especially the latter, sons of the empress Livia by her former husband. A peace being at length concluded with the Germans, and Augustus not being desirous of extending his dominions beyond the territories over which he had obtained complete possession, and which were comprised within well-defined boundaries, the world obtained repose, and with great rejoicing, the temple of Janus was formally closed, to intimate the existence of universal peace.

During this period of general tranquillity, when the world was at rest, and a deep calm was brooding over the nations, in this "fulness of the times," there was born at Bethlehem in Judæa, of the lineage of David, the *Prince of Peace*, the *Saviour of the World*, whose coming thus brought with it both a foretaste and earnest of what it was destined to secure, "on earth peace, and good-will towards men."

.D. 9.

But this universal calm was of brief duration. The Roman forces in Germany had been entrusted to the command of Quintilius Varus, who exercised his power in a harsh and oppressive manner. This the high-spirited Germans could not brook, and a revolt was planned and executed under the management of Arminius (Herman), who succeeded in drawing the Roman army into a position in which they could neither fight nor fly. Varus himself, with three legions and six cohorts, perished on the field, or in an ineffectual attempt to secure a retreat. The destruction of this army preyed deeply on the spirits of Augustus, who nevertheless exerted himself to remedy the disaster, by sending first Tiberius, and then Germanicus, the son of Drusus, into Germany, at the head of a more numerous force. These German wars were continued with more or less vigour throughout the remainder of the reign of Augustus, and with more or less success, generally under the brave and skilful command of Germanicus, who acquired for himself a very brilliant renown, and the esteem of the whole empire.

In addition to these public troubles, Augustus suffered great affliction from the misconduct and the calamities of his family. Not having a son to succeed him in the empire, his wife Livia engaged in the most restless intrigues to secure the succession to her own children by her former husband. Augustus, on the other hand, destined the empire to Marcellus, his nephew and son-in-law, to whom he had given in marriage his only daughter Julia. Upon the early death of Marcellus, a youth of high promise in every respect, Augustus manifested his intention of leaving the empire to his grandsons, the sons of Julia by Agrippa, to whom she had been married after the death of Marcellus. He gave them the title of "princes of the youth;" and this undisguised favour so much offended Tiberius, that he withdrew from the court. The premature death of the two young princes, not without suspicion of having been poisoned by the empress Livia, to make way for her own son, caused the recall of Tiberius. Augustus bestowed upon him his daughter Julia, the widow of Marcellus and Agrippa, requiring him at the same time to adopt Drusus Germanicus, the son of his brother Drusus. The infamously licentious conduct of Julia at length so much disgusted her father, that he banished her to the island of Pandataria. Thus harassed by domestic troubles, the master of the world found that imperial power could not secure happiness, or lessen one of the pangs that waste the weary heart. He was seized with a dangerous illness while at Naples, and becoming worse while on his return, was unable to reach Rome, but expired at Nola, in the seventy-sixth year of his age, after having swayed the sceptre of imperial power during forty-four years.

D. 14.

berius.

The vacant throne was now ascended by Tiberius Claudius Nero, son of Livia, and latterly adopted son of Augustus. Almost the first act of Tiberius was to secure the empire by causing the murder of Agrippa Posthumus, the third son of Agrippa by Julia, thus completing the bloody policy by which his mother had opened his way to the sovereignty. He was in his fifty-sixth year when he succeeded to the empire; and though he had given evidence of the possession of by no means contemptible talents in his younger days, especially in his German wars, he had so long practised the arts of dissimulation and guile, that all his better mind seemed to have perished, and his baser qualities alone remained, or rather to have been stimulated into unnatural strength. Though now possessed of absolute power, he still continued to practise the subtle wiles of a dark and crooked policy, and to seek to accomplish by deceit what he could easily have done by strength. The murder of young Agrippa removed the most formidable rival; but the high renown of his nephew Germanicus, then waging successful war in the country whence he acquired his name, excited at once his envy, his hatred, and his fear; and he recalled him, on pretence of giving him the honours of a triumph. The residence of Germanicus at Rome could not long be endured by Tiberius; he was therefore sent into Syria, to quell the disorders of the east. Along with him were sent Piso and his wife, whose secret directions may be conjectured from their actual conduct, which was to harass him by every means in their power; and when he died, there were not wanting pregnant causes of suspicion that his death had been hastened by poison. The death of Germanicus was deplored by the whole Roman people, as a great public calamity, which none seemed more to deplore than Tiberius, while he inwardly rejoiced in the success of his atrocious villany.

Death of Germanicus.

In public life Tiberius was equally deceitful and cruel as he had been in private, and to his own relatives. Towards the senate he professed great respect, at the very time when he was depriving them of even the slender power which Augustus had left. Any remains of public virtue, which the senate had hitherto possessed, died rapidly away; and ceasing to exercise an independent authority in a free state, it became the passive instrument of the most brutal tyranny. Every deceitful person is necessarily at the same time suspicious. Full of guile himself, the dark-hearted emperor suspected every other man to be equally guileful. Hence his encouragement of innumerable spies and informers, who were ready fabricators of accusations, when they could detect no real criminality. The constant terrors of the suspicious tyrant increased his natural cruelty, till he ripened into a perfect monster of barbarity, delighting to glut his eyes with the agonies of his tortured victims.

But the most suspicious of tyrants must trust some person, were it but to have an instrument to execute their crimes; and as none but abandoned persons can be their instruments, they never trust without being betrayed. Tiberius reposed his chief confidence on Sejanus, præfect of the prætorian guard, a man whose crimes, if possible, surpassed those of the emperor himself. For eight successive years did Sejanus retain an undivided influence over the mind of Tiberius; and during that period he contrived to procure the death or banishment of almost every person who might have checked his progress to the possession of imperial power, which was the object of his treacherous ambition. The death of Drusus, the emperor's son, is attributed to Sejanus, as also the death of the two eldest sons of Germanicus, and the banishment of their mother Agrippina. The youngest son probably escaped in consequence of his almost constant residence with the army. But the master-stroke of policy by which Sejanus strove to secure his object, was his persuading the emperor to remove from the cares and dangers of Rome, and to indulge his passions in a retirement where he would have none around him but his depraved ministers of vice. Tiberius retired to Capreæ, where he abandoned himself to the perpetration of the most disgusting and unnatural vices, leaving Sejanus at Rome, in the possession of all but the name of imperial power. To this base and bloody favourite the senate displayed the utmost servility; the people gave him honours second only to those of the emperor; and the sceptre itself seemed on the point of passing into his grasp, when he was accused to Tiberius of plotting his death. The imperial dissembler conferred the consulship on Sejanus; and by the messenger who conveyed this honour, sent a letter to the senate, accusing him of treason. When Sejanus came to the senate to receive his official dignity, he met his accusation, was instantly condemned, dragged through the streets, and put to death with the utmost ignominy by those who a few hours before followed him with acclamations.

Sejanus.

Fall of Sejanus.

The fall of Sejanus seemed only to increase the suspicions and the barbarous cruelty of the debauched and monstrous tyrant. He felt he had no friend; he knew he could not be loved; he was content to be hated, provided he were feared. At length, feeling the approach of death, he named as his successor Caius Caligula, the only surviving son of his murdered nephew Germanicus. Still, though consciously dying, the consummate dissembler strove to deceive not only his courtiers, but even his physicians. Pretending to feel a restoration of health and strength, he made a sumptuous feast, and continued at table, as if in the height of enjoyment, till he was seized with a fainting fit which threatened to be mortal. His courtiers forsook him in haste to flock to Caligula; but Tiberius reviving, they became alarmed lest he should recover, and Macro, the captain of the guard, smothered the helpless wretch, whose fate was thus hastened by the recoil of his own deceit and cruelty.

A.D 37.

Caligula.

Caius Cæsar Caligula (so surnamed from the common military buskins, *caligæ*, which he was accustomed to wear), was joyously welcomed to the throne by both the senate and the people, on account of the deep love and regard still cherished for the memory of his father Germanicus. His first acts served to confirm the hopes which had been entertained of him. He liberated all the state prisoners, and drove from the court and senate all the spies and informers whom Tiberius had employed. His voyage to the islands of Pandataria and Pontia in the midst of tempestuous weather, to remove the ashes of his mother and brothers, seemed also an amiable proof of a sincere filial and fraternal piety. He restored some of the most equitable of the decrees of Augustus, which Tiberius had repealed, and gave other proofs of his intention to act in all respects for the promotion of the public welfare. But these hopeful symptoms were doomed to suffer an early and a fatal blight. He had been only about eight months on the throne when he was seized with a severe and dangerous illness, from which he recovered, so far as bodily health was concerned; but his mental sanity appears to have sustained an irremediable shock.

From that time forward, animal passions of the fiercest kind domineered over him uncontrolled, or, if not animal passions merely, with no more of intellect than was enough to render them fearfully malevolent. To enumerate his crimes would be too hideously revolting, so utterly and excessively unnatural were the murders, the incests, and the brutalities in which this insane, or demon-possessed monster revelled. Murder was his daily amusement; and he took a fiendish delight in witnessing the dying pangs of his victims, whose sufferings he strove to protract, that they might, as he said, "feel themselves dying." He assumed divine honours, erected a temple to himself, and instituted a college of priests, to superintend the worship of the new god. He likewise deified one of his sisters; and on her death, it was equally dangerous to rejoice in her divinity, and to mourn for her death. It was customary for him to invite his favourite horse to sup with him; and he was only prevented by death from raising the animal to the dignity of consul. His prodigality was equally extravagant with his other crimes. In one year he expended the almost boundless wealth which had been accumulated by Tiberius, in shows of the most lavish and wasteful kind. One of these was a vast bridge of vessels at Puteoli, across an arm of the sea, three miles and a half broad, and so formed as to resemble a street at Rome. A feverish dream of military glory next seized his distempered brain; and he made great preparations for an expedition against the Germans. Like all his undertakings, it ended in consummate folly. Instead of conquering Germany, he led his army to the sea-shore at Boulogne in France, drew out his troops in order of battle, then causing them to fill their helmets with shells, which he termed the spoils of the ocean, he returned to Rome, and demanded from the senate the honours of a triumph for his warlike exploits.

Rome at length grew sick of enduring the frantic guilt and reckless tyranny of Caligula. A conspiracy was formed against him, and he was assassinated by Cassius Chærea and Cornelius Sabinus, two officers of the prætorian guards. His body was allowed to lie for some time exposed to public contumely, but was finally thrown into a grave, without any marks of honour or respect. His wife and infant child were also slain by the conspirators, who thought thus to secure themselves against the danger of future punishment.

A.D. 41.

Upon the death of Caligula, the senate began to cherish hopes of altogether abolishing the imperial power, and restoring, if not a republican, at least an aristocratic form of government. But the populace had too long enjoyed the donations of grain, and the amusements of the amphitheatre, supplied to them by dictators and emperors, to be disposed to favour a restoration of power to the senate. And the prætorian cohorts, stationed on the Quirinal hill, were too well aware that the continuation of their power depended upon the continuation of a monarchy, to be willing to tolerate any such revolution. Numbers of the conspirators, or those who were suspected to be such, were slain by the excited populace and the soldiers; and when the soldiers accidentally discovered Tiberius Claudius, brother of Germanicus, and uncle of the late emperor, they dragged him from his hiding place, and resolved to raise him to the vacant throne. The senate found it impossible to resist; and thus a person who had hitherto passed his life in unregarded obscurity, despised on account of his mental imbecility, was placed at the head of the empire. Thus raised to the throne by the power of the prætorian guards, Claudius set the pernicious custom of rewarding their deed by granting them a donative. This weak man was governed, as usually happens, by worthless favourites, and abandoned women. The infamous conduct of the empress Messalina has rendered her name proverbial; and her cruelty and rapacity were as unbounded as her licentiousness. At her instigation, it was but too common for the emperor to put to death some of the most wealthy of the nobles, and to confiscate their estates, with the money arising from which she pampered her numerous paramours. To such a pitch of unblushing effrontery did this abandoned woman proceed, that she at length openly married Silius, a noble youth, one of the partners of her crimes, purposing to complete her guilt by the murder of the emperor; but Claudius having received private information, gave orders for her death, and she was slain in the gardens which she had so long polluted by her unequalled criminality.

Claudius.

Death of Messalina

War in Britain.

Messalina had accompanied Claudius in an expedition to Britain, and given birth to a son named Britannicus, whom he exhibited to the army as his destined successor in the empire. This expedition was occasioned by the previous success of one led by the prætor Aulus Plautius, and by Vespasian, who, after a succession of severe battles, subdued all the country south of the Thames. After the emperor's return to Rome, Ostorius Scapula continued to conduct the war in Britain with great vigour and success, extended the province to the banks of the Severn, and finally succeeded in taking prisoner the celebrated Caractacus, or Caradoc, who had so long withstood the power of Rome. The native grandeur of soul displayed by this comparatively rude hero, excited in the mind of Claudius so much admiration, that he ordered his fetters to be struck off, and treated him with the most marked distinction.

Caractacu

The fall of Messalina was brought about in a great measure through the intervention of Narcissus, the emperor's freedman, who, along with Pallas, another manumitted slave, engrossed the chief favour of the weak-minded sovereign of Rome. The power wielded by this race of men, was a new feature in the degeneracy of the imperial court, but one which thenceforward was but too common, and as baneful as it was disgraceful. In men of this denomination, there was almost of necessity the most complete blending of abject sycophancy to the emperor, with despotic tyranny and insolence to all his subjects.

grippina.

D. 54.

Not long after the death of Messalina, Claudius married his own niece, Agrippina, daughter of Germanicus, a woman of strong natural abilities, but of insatiable avarice, extreme ambition, and remorseless cruelty. Her influence over the feeble emperor was boundless, and was displayed in the most glaringly ostentatious manner. She prevailed on him at last to set aside his own son Britannicus, and to adopt her son, Domitius Ahenobarbus, by her former husband, giving him the name by which he is best known, Nero, and constituting him heir to the imperial throne. To secure the succession in this channel, she gained over Burrhus, præfect of the prætorian bands, to whom she entrusted the charge of the youthful aspirant, thus giving him a reason to maintain his fidelity to one over whom he was sure to obtain influence. But Claudius having shewn some disposition to change the succession, and to restore it to Britannicus, Agrippina caused him to be poisoned by one of his own slavish favourites. His death was concealed by the empress till she had completed all her machinations for securing the throne to her son, who was then produced to receive the congratulations of his subjects.

ero.

th of ippina.

Nero Claudius Cæsar, through the devices of his mother, and by the support of the prætorian guard, ascended the vacant throne at the early age of seventeen. During the first four or five years of his reign, he acted generally under the advice of his tutor, Seneca the philosopher, and Burrhus, præfect of the prætorian guard, and for that period he maintained a comparatively favourable character. The turbulent and ambitious conduct of his mother gave him great annoyance; and the opposition which she experienced from Seneca and Burrhus, together with the mortification of perceiving the rapid decline of her influence over her son, served only to stimulate her to more dangerous and wicked conduct. She threatened to excite a revolution in behalf of Britannicus, son of the late emperor; and this was the signal for the murder of the unfortunate youth, by the orders of Nero. The depravity of Nero was now beginning to shew itself. Poppæa Sabina, a woman of infamous character but of great beauty, had acquired greater influence over him than was possessed by either his mother or his sage counsellors, Seneca and Burrhus. A hideous rivalry began between this aspiring woman and Agrippina. To secure her influence, Poppæa instigated Nero to the murder of his mother; and to recover her power, Agrippina began to amass wealth, bribe the troops, and prepare measures for a conspiracy against the life of her own son. At length Poppæa prevailed, and Nero gave orders that his mother should be put to death, which was perpetrated while she lay asleep. After her murder, the monster himself gazed on the dead body, and expressed his admiration of her beauty.

He soon afterwards divorced his wife Octavia, daughter of Claudius, and married the infamous Poppæa. The death of Burrhus, which happened about the same time, gave him an opportunity of raising to the command of the prætorian guards a man whose disposition was more congenial to his own, Tigellinus, the corrupt and bloody tool of a depraved, licentious, and cruel tyrant. In his early youth Nero had paid some attention to the study of music, and even of poetry; and his excessive vanity led him to be covetous of public applause as a musician. He first exhibited publicly on the stage at Naples; and being extremely gratified with the vehement applause that followed his performance, he frequently afterwards appeared in the theatres, and played on his lute, in the guise of a common musician. In a tour through Greece he received such unbounded applause, conveyed in such flattering terms by the polished natives, that he declared none but Greeks were worthy to hear him play and sing. Yet from these skilful flatterers he exacted the most oppressive contributions, for the supply of his lavish prodigalities.

War in Britain.

Boadicea.

During his reign the war in Britain was renewed, under the command of the brave and skilful Suetonius Paulinus. This politic commander, perceiving the influence which the Druids exercised over their countrymen, determined to put to death the whole druidical order, and to extirpate their religion. For this purpose he seized upon and devastated the isle of Mona, or Anglescy, their chief seat, cut down the sacred groves, and burned numbers of the Druids on their own blood-stained altars, and with their own homicidal fires. While he was thus engaged, a general insurrection of the conquered province broke out in consequence of the barbarous outrages inflicted on Boadicea, queen of the Iceni. Instigated by her wrongs, the natives everywhere flew to arms, destroyed several Roman stations, and among others the considerable colony of Verulamium (St. Alban's). Not less than 70,000 persons are said to have fallen victims to their vengeance. Suetonius hastened back to the support of his countrymen, and defeated the insurgent Britons with terrible slaughter. He was soon afterwards recalled by Nero, and the war in Britain was for a time suffered to languish.

Burning of Rome. A. D. 64

Persecution of the Christians.

In the tenth or eleventh year of Nero's reign, Rome was visited by a vast and dreadful conflagration, which continued for six successive days, and laid waste the greater part of the city. Nero himself gazed on the progress of the devouring element with a strange and wild delight, reciting aloud in a theatrical manner some verses descriptive of the destruction of Troy. Great numbers of the people, and immense treasures perished in this conflagration, which, partly from his conduct at the time, and partly from some expressions which fell from him a short time before, Nero himself was suspected of having caused. To remove the odium of this dreadful suspicion, Nero not only began to rebuild the city in greater splendour than before, maintaining meanwhile the homeless inhabitants at his own expense, but also caused the Christians, who were now become numerous, to be accused of having set the city on fire. This false accusation caused the first persecution of the Christians, in which great numbers were put to death with tortures of unprecedented cruelty. The details of this bloody persecution come, however, more properly within the province of the ecclesiastical historian. Availing himself of the space left unoccupied by the devastations of the flames, Nero indulged his extravagant disposition in the erection of his celebrated golden palace, of which the dimensions were prodigious, and the materials so costly as to drain the wealth of an empire. To replenish his treasury, he exacted the most oppressive tribute from the provinces, and thus excited a spirit of strong disaffection, which at no distant period threatened almost the dissolution of the empire.

Death of Seneca and Lucan.

In the mean time a conspiracy at Rome, headed by Piso, was detected before it was ripe for execution. This gave occasion to Nero to display the worst qualities of his ferocious mind. Not only all who were really implicated in the conspiracy were put to death without mercy, and their effects confiscated to the use of the emperor, but great numbers were doomed to similar destruction for no other apparent cause than because they were wealthy, or in some manner had incurred the dislike of the tyrant. In this wholesale butchery perished the philosopher Seneca, and the poet Lucan, with many others of the best and noblest men of Rome.

Notwithstanding these horrible barbarities, Nero was almost a favourite with the corrupt and mercenary populace. A very large proportion of the inhabitants of Rome had been accustomed, even from the turbulent days of the Gracchi, to be supported almost solely by the donations and distributions of corn, bestowed upon them by designing demagogues. Marius set the example of composing armies out of this degenerate city rabble; and even when this example was not followed, it was still found necessary to continue the distributions of corn, together with the public shows of gladiators and wild beasts in the amphitheatre. To these Nero had added supplies of wine and animal food *(congiaria et viscerationes)*; so that the populace was both amused and fed at the public expense, while the weight of the tyranny was chiefly borne by the most distinguished class of citizens, the senate, and the nobility; and heaviest by the most illustrious. To such a state of affairs the degenerate populace had little to object; but men of rank and merit groaned beneath an oppression no longer to be endured.

The provinces, however, were the first to make an attempt to throw off the intolerable yoke. Julius Vindex raised the standard of revolt in western Gaul. The army in Spain proclaimed their general, Galba, emperor; and they were joined by the troops in Lusitania, commanded by Otho. The intelligence of these revolts filled Nero with consternation; from which he was somewhat relieved by the tidings of the defeat of Vindex by Virginius, who had maintained his allegiance. This joy was of short duration; for Nymphidius, colleague of Tigellinus in the command of the prætorian guards, found means to persuade these troops to declare for Galba. The ruin of the emperor was now inevitable. Bereft of friends, of courage, and of presence of mind, he fled in trepidation disguised from the city, found a temporary refuge in the house of his freedman, Phaon, and hearing the trampling of horsemen who had been sent in pursuit of him, stabbed himself in the throat with a dagger, and miserably ended his miserable life.

A. D. 68.

Galba.

Servius Sulpitius Galba was universally received as emperor after the death of Nero; although Nymphidius attempted to take advantage of his slow progress towards Rome from Spain, and to get himself raised to the throne by the prætorian guards. Virginius Rufus, who had defeated Vindex, voluntarily submitted to Galba, as did also the armies in other parts of the empire. Strengthened by this ready reception, Galba endeavoured to abridge the dangerous power of the prætorian guards. Habituated to the rigid discipline of the camp, he exerted himself to restore somewhat of the ancient and hardy virtues of the republic, discountenanced sloth, idleness, and luxury, and even exhibited a penurious meanness of temper, unbecoming his exalted station, giving colour to the accusations of avarice which were made against him. The legions stationed in upper Germany, who had been somewhat tardy in acknowledging his elevation to the throne, began to be more disaffected, and to threaten to raise their own general, Vitellius, to the possession of imperial power. With a view to strengthen his tenure of empire, Galba appointed Licinius Piso, a youth of high promise, to be his successor. To this Otho had aspired, and immediately plotted the death of Galba. He readily secured the favour of the prætorian guards, who equally feared and hated the rigid discipline of the emperor. A revolt speedily ensued; Galba prepared to defend his power; and a contest taking place in the forum, the aged emperor was thrown down and trampled to death, after a reign of only seven months.

A. D. 69.

Otho.

Scarcely had Otho seized upon the sceptre, when he found himself engaged in a contest with Vitellius, who had been proclaimed emperor by his soldiers. The new competitor for imperial sway was joined by Valens and Cæcina, and began his march towards Italy at the head of a powerful army. Otho marched to oppose him. The antagonists met at a little village called Bedriacum, near the banks of the Po, and a severe and bloody engagement took place. Victory was for some time doubtful; but the superior discipline of Vitellius's army prevailed, and Otho was defeated with great slaughter. Seeing his prospects desperate, Otho gave up the contest, thanked his troops for their fidelity, and put an end to his own life, after a brief reign of about three months.

A. D. 69

Vitellius.

Vitellius began his reign by endeavouring to conciliate the favour of the populace and the troops by large donations and expensive amusements. He then gave a loose rein to his own debasing appetites, of which the chief was absolute gluttony of the very grossest kind. It is almost incredible, though stated by historians, that in less than four months he expended on the mere luxuries of the table a sum equal to about seven millions sterling. This bloated and pampered ruler was soon regarded by all his subjects with contempt and disgust. The unrestrained licentiousness of the soldiery tended equally to make his reign hated and feared by all who were exposed to the insults and outrages in which they indulged. To supply the funds necessary for the maintenance of his excessive luxury, he resorted to the too prevalent custom of listening to the accusations of spies, and putting to death all such accused persons, that he might seize upon their property.

While thus wallowing in the indulgence of the most debasing appetites, Vitellius was startled by tidings of a very alarming nature. During the reign of Nero an insurrection had broken out in Judea, and Vespasian had been sent to take the command of the army in Syria. The Jews made a desperate resistance, disputing, with almost invincible hardihood and indomitable bravery, every inch of their sacred territory. But this resistance, while it detained Vespasian in that country at the head of a powerful army, served only to mature their own fate. He had sent his own son, Titus, to offer his allegiance to Galba; but before his arrival Galba was dead, and Otho and Vitellius were contending for the empire. Titus returned to his father for instructions; and though Vespasian appeared ready to acknowledge Vitellius, his own troops were eager to raise him to the sovereignty. Mucianus, governor of Syria, and all the tributary eastern monarchs, urged him to comply with the wishes of his army, and his reluctance, real or feigned, yielded to their joint remonstrances. No sooner had he commenced his march towards Europe, than the Illyrian and Pannonian armies declared in his favour; and that of Illyricum, under the command of Antonius Primus, crossed the Alps and marched towards Rome to dethrone Vitellius. The Vitellian army, commanded by Cæcina, encountered that of Antonius near Cremona, but was defeated with great loss, and the city was taken. Antonius continued to advance on Rome, and crossed the passes of the Appennines while the emperor was hastening to secure them. Vitellius fled to Rome, which was soon invested by the victorious army of Antonius. An insurrectionary tumult arose in the city itself, during which the Capitol was burned to the ground, and Sabinus, the brother of Vespasian, was killed. The troops of Antonius at length forced an entrance into the city, stormed the quarters of the prætorian guards, and put those turbulent bands to the sword. Vitellius endeavoured to conceal himself, but was discovered, dragged through the streets to the place of punishment for common malefactors, put to death in the most ignominious manner, and his mangled carcass cast into the Tiber amidst the execrations of the multitude. Eight months and five days had this despicable wretch seemed to sway the sceptre of supreme dominion, when thus overtaken by the due reward of his debauchery and crimes.

A. D. 69

Vespasia

Flavius Vespasian obtained possession of the throne in his fifty-ninth year, and became the founder of a dynasty which gave three emperors to Rome. He was a man of rare and excellent virtues, thoroughly matured by a life spent in the exercise of public duties, and with no object superior to that of promoting the public welfare. Being well aware of the glaring abuses which had long been perpetrated with impunity in all branches of the administration, he set himself vigorously to the dangerous task of effecting a thorough reform. He restored the privileges of the senate, and gave it once more an actual power in the government. The courts of law were also subjected to a most salutary reform, and rendered again, what they had long ceased to be, courts of justice. The insubordination of the army, which had been the main cause of so many bloody revolutions, he repressed with a firm and steady hand; and restored in a great measure the discipline which had made it so powerful in its better days. He directed his attention also to the treasury, which had been quite exhausted by the corrupt and prodigal expenditure of his predecessors; and in order to replenish its coffers, he regulated anew the tribute and custom-dues of the provinces, and imposed a number of taxes; by which means, though he was accused of avarice, he placed once more the revenues of the empire on a stable basis, and restored them to a flourishing condition. The large sums thus raised Vespasian did not expend in revelry, neither did he hoard up in useless masses. He rebuilt the temple of Jupiter Capitolinus, which had been destroyed during the tumults that accompanied the fall of Vitellius; and adorned the city with many other public buildings of great elegance and splendour, thus evincing, that though rigorous and exact in his methods of amassing treasure, he knew, on proper occasions, how to use it with no parsimonious hand. Under him the empire began to breathe with fresh life, and to exhibit signs of prosperity and happiness, such as it had not known since the reign of Augustus. His son Titus being raised to the dignity of Cæsar, by which name the successor to the throne was designated, the peace and welfare of the empire seemed secured on a stable basis.

Destruc- ion of erusalem.

A.D. 70.

During the reign of Vespasian the arms of Rome were prosperous in various parts of the world. Several states bordering on the Roman dominions were reduced by his generals to the condition of provinces. But the most celebrated, though not the most formidable war which distinguished his reign, was that in which he was engaged when he was called to the throne, the war against the Jews. This was conducted by his son Titus, after his departure to Rome to enter on the possession of imperial power. The events of this memorable war are so well known that they need not here be detailed. Suffice it to state, that after Jerusalem had been closely invested, the Jews refused all terms of capitulation, blindly trusted in some terrible interposition of divine power to save them and consume their enemies, butchered each other with inconceivable barbarity during every temporary cessation of warfare, endured the wildest extremes of famine, and after suffering every form and kind of misery, to a degree unparalleled in the world's history, their city was taken, and together with their celebrated temple, was reduced to heaps of shapeless ruins; and such of them as survived these awful calamities were scattered over the face of the earth, and rendered a mockery, a proverb, and a reproach among nations. In consequence of this victory over the Jews, Titus and the emperor enjoyed together the honours of a splendid triumph, while the rich vessels of the temple of Jerusalem were in gorgeous procession borne in the train of the conquerors.

ar in ritain.

gricola.

Soon after this triumph the Batavian war broke out, caused by the civil wars for the empire, and threatening Rome with the loss of a province. It was at length brought to a propitious conclusion by Cerealis, after several sharp encounters, and by a treaty rather than a conquest. The Roman arms were more successful in Britain, during the reign of Vespasian and his immediate successors, than they had previously been. In his younger days, the emperor had himself been engaged in British wars; and being desirous of reducing the island completely under the Roman yoke, he gave the command to Cneius Julius Agricola, a man of extraordinary merit, a general and a statesman worthy of the best days of Rome. Not only the southern division of the island was subdued by this distinguished commander, but even the more remote regions of Caledonia, hitherto impervious to the Roman legions, were laid open. The gallant resistance of the brave Caledonians, under their leader Galgacus, was ineffectual; their untaught valour could not withstand the steady discipline of the Roman army, and they sustained a severe overthrow at the base of the Grampians. The Roman fleet coasting along the shore, ascertained the insular character of Britain; but so formidable were the mountain fastnesses of Caledonia, that Agricola did not attempt to penetrate farther into the country, contenting himself with constructing a chain of forts between the Friths of Clyde and Forth, to defend the southern districts, and to restrain the recoil and assaults of the unconquered Caledonians.

A.D. 79.

Thus glorious abroad, and beloved at home, Vespasian's life began to draw near its termination. Feeling the effects of age and weakness, he retired to Campania, to enjoy the benefits of a purer air than that of Rome, together with some relaxation from the cares of state. There he was seized with a malady which his own sensations told him would speedily prove mortal. His anticipations proved true; and he expired in the arms of his attendants, in the seventieth year of his age, and the tenth of his reign. It is worthy of remark, that Vespasian was the second of the Roman emperors that died a natural death, and the first that was succeeded by his son.

Titus.

Titus Flavius Vespasian, the conqueror of Jerusalem, ascended in peace the peaceful throne of his father. The very first acts of his reign gave promise of a period of unexampled felicity. Previously to that time he had indulged slightly in pleasures of a somewhat licentious character. From that hour he discarded all the ministers of his looser days, and being resolved to reform the state of public morals, began by reforming himself. Although strongly attached to the beautiful Berenice, daughter of Agrippa, the last king of Judea, he relinquished her society entirely, because he knew that such a connexion was disagreeable to the Roman senate and people. He abolished also the law of treason, under the sanction of which so many acts of tyranny had been committed; and he not only discountenanced, but severely punished, all spies and informers. His whole time was devoted to the duties of his high station; his chief pleasure consisted in rendering services and kindnesses to his friends and to his people. His courtesy and benevolence would doubtless find ample scope; yet it is recorded of him, that one evening recalling to mind the events of the day, and not finding that he had done any thing during its course beneficial to mankind, he exclaimed in accents of regret, "My friends, I have lost a day!" This well-known exclamation, and the course of benevolent deeds by which it was accredited, procured for him the truly glorious title of *The delight of mankind.*

Great eruption of Vesuvius.

Death of Pliny.

Yet the reign of that gentle-hearted and benignant emperor was signalised by some remarkable public calamities. In its first year Campania was laid waste by the most dreadful eruption of Vesuvius ever recorded. It devastated the surrounding country for many miles, overwhelming several cities, of which Herculaneum and Pompeii were the chief. The remains of these cities, excavated in modern times, have supplied inestimable stores to the antiquarian, and thrown great light upon the habits and customs of the Romans in domestic life. Pliny, the celebrated naturalist and philosopher, lost his life in this eruption, being suffocated in consequence of allowing his curiosity to attract him too near the fearful and dangerous scene. This calamitous convulsion of nature was followed by a destructive conflagration at Rome, which raged for three days, and destroyed a great number of edifices, both public and private. Titus exerted

A.D. 81.

himself to the utmost to alleviate these visitations of suffering; and while so engaged, his sympathies were called forth afresh by a dreadful plague which carried away vast multitudes at Rome. These disastrous events deeply grieved the benignant heart of Titus, and he strove incessantly to lighten the weighty calamities which pressed so heavily upon the empire. In the midst of these exertions and anxieties, he was seized with fever, against the fatal effects of which neither the skill of physicians nor the strength of his constitution could avail. After a short reign of two years ten months and a few days, he died in the forty-second year of his age, leaving behind him the reputation of being, if not the happiest, at least the best of monarchs.

Domitian.

Flavius Domitian, the younger brother of Titus, now ascended the vacant throne without opposition. On his first accession to imperial power, he seemed desirous of emulating the conduct of his brother. He paid the strictest attention to justice, bestowing a large portion of his time in hearing causes that had been appealed, and shewing himself ready to reverse every inequitable sentence. Pretending great disregard for wealth, he refused to accept the property bequeathed to him, distributing it among the natural heirs. To prevent his chief officers of state from receiving bribes, he bestowed upon them large sums, that they might be raised above the reach of temptation. He was, at the same time, remarkably liberal in granting donations, and providing the most expensive shows and amusements to the people. He confirmed all the grants made by his predecessors to the soldiers, and increased their pay, thus securing their favour and support. All the public buildings which Titus had begun he caused to be finished, sparing no expenditure to have them completed in the most splendid manner.

Having by these popular displays and manifestations secured the favour of the army and the populace, Domitian began to throw aside the mask which he had for a short time uneasily worn. Vanity and timidity seemed to be the leading elements of his character. The first led him to be inordinately desirous of obtaining popular applause, or even private flattery, however gross; the second rendered him incapable of performing any noble exploit, constantly afraid of public danger or private conspiracies, and consequently cruel to excess, when his victims were completely in his power. For it is an obvious truth, that cowardice and cruelty are inseparably allied; and the opposite is equally true, that the bravest man is also the most merciful. The vanity of Domitian made him desirous of a military triumph; and in order to obtain it he made an expedition into Gaul, against the Catti, a warlike German tribe which had invaded the province. Without having even seen the enemy, he demanded a triumph; and the servile senate granted the request of their weak and inglorious sovereign.

Dacian war.

A. D. 90.

The intelligence of the really glorious exploits of Agricola in Britain, excited the envy of Domitian; and he recalled that celebrated general, under a pretence of appointing him to the government of Syria. Agricola was too prudent to require a triumph, and retired into private life, which, however, he did not long enjoy, his death being hastened, as some suspect, by the guile of the emperor. He was soon afterwards involved in a more formidable war, in consequence of an irruption of the Daci and Getæ, who, under the command of their brave king Decebalus, crossed the Roman frontiers, and defeated the armies sent to oppose them. Domitian had now an opportunity of acquiring the renown of a warrior, but he wanted a warrior's heart. He did indeed march against the invader in person, taking care to turn his course so as to encounter the less-dreaded Marcomanni, by whom he was nevertheless defeated. Not daring to come to an engagement with the Daci, he actually purchased a peace, agreeing to pay Decebalus an annual sum of money, provided he would withdraw from the Roman dominions. This war is memorable, as being the first in which the northern barbarians attacked the empire not only with impunity, but with success; the pernicious precedent being thus established of purchasing peace, not with steel, but gold, in direct contrast to the old Roman usage.

A.D. 95.

In proportion as Domitian became truly despicable, did he increase in the most absurd and preposterous vanity. He now deified himself, and commanded his own statue to be worshipped as a god, at the very time that his mind was agitated with constant dread of plots against his life. Surrounded with spies and informers, he became more and more cruel, reviving the law of treason, and putting into terrific force all its bloody provisions. An unsuccessful revolt of the army in Upper Germany gave an opportunity to the timid yet sanguinary tyrant to indulge his ferocity, by putting to death all whom he suspected of disaffection. About the same time, a persecution was commenced against the Christians, partly because they refused to worship the statue of the emperor, and partly because his ignorant and superstitious mind had formed some vague notion of their connexion with the Jews, coupled with the dread, not yet either extinct or understood, of the appearance of a person born in Judea, who was to obtain the empire of the world. In this persecution several persons of illustrious birth and station perished, among whom was Flavius Clemens, a relation of the emperor; which shews that Christianity was beginning to make progress among the higher ranks of society.

A.D. 96.

But the end of this weak, vain, and cruel tyrant drew near. In order to secure the support of the army, he had augmented the pay of the troops one-fourth; and in order to meet the increased expense, he increased the number of those judicial murders, by the law of treason, which caused the property of the victims to be confiscated and become his own. He was in the habit of inscribing on a roll the names of those persons whom he designed to put to death, and kept it carefully in his own possession, treating them, in the meanwhile, with the most flattering attention. This fatal roll was one day taken from under the cushion on which he was reclining asleep, by a child who was playing about the apartment, and who carried it to the empress. She was struck with astonishment and alarm at finding her own name on the dark record, together with the names of others apparently highest in his favour. To them she communicated the knowledge of their danger; and they immediately resolved to preserve their own lives by destroying that of Domitian. This was accordingly done, notwithstanding all the precautions which cowardice and cunning could suggest; and, with the connivance of the prætorian prefect, Domitian perished by the daggers of Stephanus and Parthenius, officers of his own household.

Nerva.

He was the last of the emperors commonly described as "the twelve Cæsars;" although, in reality, the Cæsarean family terminated with Nero, and even previously its continuation had been only in the female line. Marcus Cocceius Nerva was chosen by an unanimous vote of the senate, on the very day of Domitian's death, that they might anticipate any attempt of the prætorian guard to make an emperor. He was of foreign extraction, though a naturalized citizen and senator of Rome, and owed his elevation to the throne solely to his stainless reputation. He commenced his reign by punishing informers, redressing grievances, repealing iniquitous statutes, enacting good laws, and dispensing favours with boundless liberality. He had made a resolution that no senator should be put to death by his command; but this, together with proofs of equal unwillingness to inflict punishment, encouraged the turbulent to indulge in their evil practices. An insurrection broke out in the prætorian guard, and to appease it Nerva was obliged to yield up the murderers of Domitian to their vengeance. Feeling his inability to control these seditious troops, he resolved to adopt as his colleague and successor in the empire Marcus Ulpius Trajan, by whose firmness and decision they might be kept in awe. The effect proved the wisdom of Nerva's choice. So high was the character of Trajan, that no person could be named equally worthy of the empire; and even the seditious prætorian bands submitted without a murmur. This, as it was the best, was almost the last act of Nerva's short reign. He was soon after seized with a fever, of which he died, having reigned only one year four months and nine days.

A.D. 98.
Trajan.

The peaceful and virtuous reign of Nerva was the harbinger of happy days to the Roman empire. The selection of Trajan prevented any contests for imperial power at the death of Nerva; so that the new emperor entered without the necessity of bloodshed upon the discharge of his high functions. He was by birth a Spaniard, though of Italian extraction; and had been early inured to the discipline of the army under his father, a commander of considerable reputation. When he himself became a general, he continued to practise the simple habits of a soldier, excelling his troops not in personal indulgences, but in courage and virtue. On the throne he continued to exhibit the same excellencies, only enhanced by the acquisition of a wider scope for their full development. Being superior to fear, it was natural that he should also be above harbouring suspicion. He therefore abolished the law of treason, *(judicia majestatis,)* and prepared to restore as much of the free Roman constitution as was compatible with the existence of a monarchy. He restored the elective power to the *comitia*, complete liberty of speech to the senate, and to the magistrates their former authority; and yet he ruled the empire with unrivalled firmness, holding the reins of power with a strong and steady hand. Of him it has been said, not in the language of panegyric, but of simple sincerity, that he was equally great as a ruler, a general, and a man: and only such a man could with safety, as emperor, have used the remarkable words, when giving a sword to the prefect of the prætorian guards, "Take this sword, and use it, if I have merit, for me; if otherwise, against me."

cian
r.

Soon after the accession of Trajan, the Dacian monarch, Decebalus, sent to demand the tribute with which Domitian had purchased a disgraceful peace. This Trajan indignantly refused; and levying an army, marched against the Dacians, who had already resumed their predatory incursions. The hostile armies soon came to an engagement, for both were equally eager; and after a desperate struggle the Dacians were routed with dreadful carnage. But so great was the loss of the Romans, that for some time they were not able to follow up their victory. It was however decisive; and the Dacians were compelled not only to forego their demands, but even to become tributaries to Rome. But unaccustomed to servitude, and led by their gallant king Decebalus, they mustered fresh forces as soon as they had somewhat recovered from their overthrow, and prepared for another contest. The warlike emperor was equally ready for the shock of arms. Not satisfied with expelling the invaders, he now determined to carry the war into the country of the enemy. For this purpose he erected a stupendous bridge over the Danube, with a strong fortification at each end, defeated the Dacians in every battle, marched into the heart of their country, and made himself master of the capital. Decebalus, despairing of success, killed himself, and Dacia was reduced to a Roman province, and secured in subjection by several colonies and standing camps. On his return from the Dacian war, the emperor was honoured with a triumph which lasted for the unprecedented period of 120 days.

A .106.

P cu-
tio

The deepest stain which rests on the memory of Trajan is the sanction which he gave to the persecution of the Christians. This persecution raged chiefly in the Asiatic provinces, where Christianity was most prevalent; and when Pliny the younger, at that time proconsul of Bithynia, wrote to Trajan for instructions respecting a matter which was causing the death of so many men who could not be convicted of any public crimes, the emperor returned an ambiguous answer, the purport of which was, "that the Christians should not be sought for, nor indicted on anonymous information, but that on conviction they ought to be punished." Such an answer was contrary to every principle of justice; for if criminal, they ought to be sought for, if not criminal, they ought not to be punished. The persecution being somewhat discouraged, was gradually suffered to abate.

Parthian war.

Trajan's passion for military fame had been but excited, not satiated, by his Dacian conquests. He next directed his attention to the East, and resolved to wrest from the Parthians, the most dreaded foes of Rome, the empire of central Asia. The first scene of his glory was Armenia, which he speedily reduced to a Roman province. Hence he advanced into Mesopotamia, throwing across the rapid Tigris a bridge not less remarkable than that which spanned the Danube. The greater part of what had been the Assyrian empire was overrun by his conquering arms. Selucia yielded to his might; Ctesiphon, the capital of the Parthian kingdom, could not resist his prowess; all opposition appeared fruitless, and victory seemed the companion of his march. Following the course of the Tigris, he arrived at the head of the Persian gulf, where he fitted out a fleet, and sailed to the entrance of the Indian ocean. Having thus traced the steps of Alexander the Great, emulating his conquering career, and with almost equal celerity, he began to retrace his course, returned to Ctesiphon, and placed a new sovereign on the throne of Parthia.

Age had now somewhat tamed his ambitious spirit, and seriously diminished the vigour of his hardy but overworn frame. He began to make preparations for his return to Rome, which he intended to be celebrated in a manner that should far outshine the most glorious triumphs of any of his imperial predecessors. But this triumph he was not destined to see. He had only reached Cilicia when he was seized with an illness which proved fatal, after a few days of paralytic stupor. During this period of comparative insensibility, the empress Plotina, who had accompanied him, contrived to procure Trajan's signature to a will nominating as his successor in the empire P. Ælius Adrian, his cousin, who was at that time with the army.

A D. 117.

Adrian.

Adrian having been declared emperor by the soldiers, immediately communicated to the senate the intelligence of Trajan's death, and of his own accession, excusing his not having waited till their sentiments should be made known, by pleading the impatient impetuosity of his troops. The senate were but too happy that the army had made no worse choice, and gave their ready concurrence. Adrian not having either the ambition or the military talents of Trajan, was more desirous of securing peace than of extending the empire: he therefore abandoned all the conquests of his predecessor, broke down the bridge across the Tigris, and reduced the empire within the boundaries marked out by Augustus, with the exception of Dacia. On his return to Rome the senate offered him a triumph, which he declined on his own account; but as great preparations had already been made, the triumph was celebrated, the statue of Trajan occupying the most conspicuous position. The ashes of that imperial warrior were afterwards placed in a golden urn on the summit of a magnificent column, 140 feet high, erected in the Forum Trajani to commemorate his victories, and still known by the name of Trajan's pillar.

But though Adrian was of a pacific disposition, he well knew what was required for the protection of the empire. He therefore restored the discipline of the army, and kept it in complete subordination. He also effected a general and vigorous reform in the internal administration of affairs, and displayed great personal aptitude for the study of comprehensive politics. To him the jurisprudence of Rome was deeply indebted, for the systematic order to which he reduced it. Being aware that little reliance could be placed on the accounts received from the distant provinces, and stimulated by the curiosity of an active temperament, he resolved to visit every province in the empire. In his visit to Britain, he followed the same policy which he had shewn with regard to the East; and instead of attempting a further reduction of Caledonia, relinquished a portion of Agricola's conquests, and erected a new wall, as a boundary-line of defence, from the Solway Firth to the Tyne, near Newcastle. He traversed Gaul and Germany, and revisited Asia, where he allayed some commotions that had arisen during his absence. Africa was also honoured by his presence. He spent a winter at Athens, again traversed the eastern provinces and Egypt, and then gratified his learning and his taste by another temporary residence in Greece. He was passionately fond of literature and the fine arts, and possessed of no inconsiderable attainments; and by his patronage of the productions of genius, he called forth another Augustan age, though not of equal brilliancy.

Adrian's wall.

During his reign, the persecutions of the Christians were renewed with great barbarity; and the emperor scarcely seemed to think it worth his while to protect that most unoffending class of his subjects. To the Jews he shewed nothing but insulting cruelty. He gave orders that a Roman colony should be established at Jerusalem, and changed its name to Ælia Capitolina. These indignities led to a fierce insurrection of the Jews, headed by an impostor who pretended to be the Messiah, and assumed the name of Barcohab, (the son of a star). A furious and sanguinary war, of nearly three years duration, almost entirely destroyed the very name and nation of the Jews, and it was decreed a capital crime if any Jew should again come within Judea.

Jewish war.

After his return to Rome, he adopted Commodus Verus as his successor, and on his death, Titus Antoninus. He was soon afterwards seized with dropsy, and the sufferings he endured made him almost frantic. Neither the attention of his physicians, nor the company of philosophers and poets could sooth him. Death at length terminated his sufferings at Baiæ, in the sixty-third year of his age, and after a reign of twenty-one years.

A. D. 138.

Antoninus.

T. Aurelius Antoninus, the adopted son and successor of Adrian, next ascended the throne. The first care of his reign was to prevent the senate from dishonouring the name of Adrian, by whose somewhat peevish and cruel conduct during his last illness, they had been offended. Not only did he succeed in this attempt, but the amiable anxiety which he displayed to protect the memory of his predecessor, earned for him the honourable designation of *the pious;* hence the name Antoninus Pius, by which he is best known in history. It had been arranged by Adrian, not only that Antoninus should succeed him, but also that Antoninus should adopt both Marcus Aurelius as his immediate successor, and Cesonius Commodus Verus, the son of that Verus whom he had first adopted. This arrangement Antoninus Pius immediately ratified, by giving his daughter Faustina in marriage to Aurelius, while he tolerated the profligate conduct of Verus, solely out of regard to the memory of Adrian.

The reign of Antoninus Pius furnishes few materials for the historian, passing away like a placid dream in the midst of universal tranquillity. It was undoubtedly the most peaceful and happy period that ever Rome knew, whether as a republic or an empire. It seemed to realise the ideal speculations of those philosophical politicians who looked for good government or rational happiness then, and then only, when philosophers should be kings, or kings philosophers. It is no mean portion of his praise, that he put an end to the persecution of the Christians throughout the empire. Few and slight were the wars of this reign. Of these, perhaps the most memorable was that waged in Britain by Lollius Urbicus, who not only repressed the incursions of the Caledonians, but recovered the district between the wall of Adrian, and the line of forts erected by Agricola. By the directions of the emperor, the newly acquired territory was secured by a complete wall, consisting of ditch and rampart, along the line traced by Agricola, and since known as the wall of Antoninus, or Graham's dike.

Wall of Antoninu

But the character of Antoninus was a more powerful protection to the Roman dominions than armies and military ramparts: so highly were his virtues respected through the world, that contending princes referred their disagreements to his arbitration, rather than to the fierce decision of the sword. The administration of all public affairs was conducted with the same spirit as if under the eye of the emperor, because every instance of malversation was immediately checked by removal from office, every instance of fidelity and judgment rewarded by the perpetuation of official rank. While the financial department was managed with the utmost frugality, no expenditure was spared which was evidently beneficial to the welfare of the community, in the foundation or improvement of useful institutions, such as the erection of public schools, and the maintenance of teachers. A liberal and enlightened encouragement was also given to commerce, with the view of rendering Rome the mistress of arts, as well as of arms, the centre of an empire acquired by the sword, but consolidated by civilization.

A. D. 16

Thus peaceful, happy, and beloved, Antoninus Pius reigned for a period of about twenty-three years, and died of a fever at one of his villas, universally regretted, and leaving to his own family nothing but his private property, and the inestimable heritage of a name, against which not even calumny had dared to insinuate a charge.

Aurelius.

Marcus Aurelius, called also Antoninus from having been adopted by his predecessor, and the Philosopher, from his proficiency in learning and his attachment to the opinions of the Stoics, succeeded to the throne, with the cordial approbation of both senate and people. According to the arrangement of Adrian, Aurelius associated with himself in the empire Lucius Verus, a person of a very dissimilar character, to whom he gave his daughter in marriage. This dissimilarity however rendering any thing like rivalry impossible was perhaps the cause of the cordial harmony which subsisted between the colleagues during the course of their common reign. Verus took the command of the army which was sent against the Parthians, over whom, by the skill and valour of his generals, he obtained several considerable victories, and captured several towns, while he was himself revelling in debaucheries at Antioch. At the conclusion of this war, Verus returned to enjoy the honours of a triumph which he had no share in obtaining. Unfortunately, the eastern army brought with it to Rome the infliction of a pestilential disease which was then raging in Asia, and which soon spread its ravages throughout almost the whole of the Roman empire. A dreadful inundation of the Tiber about the same time laid a large part of the city under water, and swept away immense quantities of grain from the fields and the public storehouses. This was followed by a famine which consumed great numbers, in spite of the utmost exertions of the emperor.

While thus weakened by pestilence and famine, the empire was assailed by a most formidable confederacy of the Germanic nations. The Marcomanni, and other tribes of similar origin, began to press forward with great force upon the Dacian province. The two emperors left Rome to take the field in person against these dangerous antagonists. Verus died, however, soon after the beginning of the war, leaving Aurelius to take the sole command, and to exchange his philosophic studies for the din of arms. He proved himself not unequal to the task, although the war was protracted and chequered by various vicissitudes, victory not always inclining to the side of Rome. During this war there occurred an event which has engaged the pens of several controversial writers. The Roman army happening to be reduced to great straits, blocked up by the Quadi, and in want of water, were relieved, and their enemies entirely discomfitted by a sudden storm of rain, accompanied with thunder and lightning, which flashing fiercely in the faces of the barbarians, filled them with terror, and scattered them into headlong flight. This event was considered as miraculous, and it is said to have been immediately preceded by the prayers of the twelfth legion, which was composed of Christians, and which afterwards received the name of *the thundering legion.*

A peace, or rather a cessation of hostilities, followed the victory thus obtained, and the emperor having returned to Rome, triumphed along with his son Commodus. An insurrection which had broken out in Syria, probably hastened his return; but Aurelius was not required to march against the rebel Avidius Cassius, who was killed by his own soldiers. The emperor treated the insurgents with great clemency, and took the family of Cassius under his protection, forbidding the senate to doom to death any who were suspected of being implicated in the rebellion.

Notwithstanding the general mildness of the personal character and the administration of Marcus Aurelius Antoninus, his memory is greatly disgraced by the systematic persecution against the Christians which he encouraged. It was not now merely the consequence of tumultuary violence, arising out of the intolerance of the idolatrous pagans, but was deliberately resolved upon, for reasons of state; the philosophic emperor, although despising all religion in his stoic pride, yet strictly prohibiting all change from the religions and customs of former times. Among the most illustrious victims of imperial intolerance was Justin Martyr, celebrated for his writings in defence of Christianity.

igration nations.

The war against the German nations was soon renewed, and assumed the most formidable aspect. Not merely the tribes on the frontiers of the empire took up arms, but throughout the interior of all the northern nations there was a general commotion, a wide upheaving and unsettling of whole races, and a pressing forward of a living tide, which threatened to overwhelm every thing in its progress. This was in fact the first symptom of the great migration of nations, then beginning, and which ceased not till it completely subverted the Roman empire, filling it with a new population, whose descendants constitute the kingdoms of modern Europe.

D. 180

In order to stem, if possible, the progress of this barbarian innundation, Aurelius again left Rome, and marched to Germany. His first efforts were crowned with success; but before he could follow them up, he was seized with a dangerous illness, which terminated his life, in the fifty-ninth year of his age. With Aurelius, the glory and the happiness of the Roman empire may be said to have expired, and that not uncharacteristically, in the reign of an emperor who was distinguished by considerable acquirements in learning, taste, philosophy, and by external respect for all religions, but real regard for none.

mmo-
d.

The commencement of the reign of Commodus, son of the late emperor, was rendered disgraceful by a treaty which he formed with the Marcomanni, and which he obtained chiefly through the influence of money. Notwithstanding the care which M. A. Antoninus had bestowed upon his education, he was ignorant to an extreme degree, having neither abilities nor inclination for profiting by the imperial example and instruction. On his return to Rome he speedily shewed the bias of his natural disposition, giving himself up to the most unrestrained indulgence in the grossest vices. That he might do so without impediment, he entrusted all power to Perennis, præfect of the prætorian guard, a man of stern and cruel temper, who was at last slain by his soldiers for his severity. A conspiracy against the life of Commodus failed, and was followed by a long succession of judicial murders, to gratify the vengeance of the cowardly and vindictive tyrant. He was next threatened by a new danger of a very peculiar character. It had become customary for the licentious soldiery to desert in considerable numbers, especially in Gaul, and to roam about the country as bands of robbers and freebooters. A common soldier, named Maternus, put himself at the head of these banditti, and excited such terror, that he became an object of attention to considerable armies. Being surrounded, and in danger of ruin, Maternus formed the bold project of killing the emperor in the heart of his capital, and seizing the throne. Dispersing his adherents, they all hastened to Rome, individually or in small parties, and had nearly filled the city, when they were detected, and Maternus was put to death.

The cruelty and rapacity of Cleander, the freedman and new favourite of Commodus, excited a new insurrection, which nothing could allay, the prætorian cavalry being defeated in the streets by the populace, till the head of Cleander was, by the emperor's command, thrown to the insurgents. In the mean time, Commodus was indulging his base tastes and appetites, not only by gross sensuality, but by endeavouring to rival the gladiators in their savage occupation. Being a very skilful archer, and of great personal strength, he delighted in killing wild beasts in the amphitheatre, and thus pretending to rival Hercules. In the gladiatorial contests, he publicly engaged so often, that he was the conqueror in 735 combats. Within the palace itself, a conspiracy was at length formed by Marcia, one of the emperor's concubines, his chamberlain, and the præfect of the prætorian guards. Poison was administered by Marcia, in a cup of wine; and while under the influence of the deadly draught, he was assailed and strangled by a common wrestler, who had been prepared for that purpose.

A. D. 192.

Pertinax.

Immediately upon the death of Commodus being known to the senate, they elected Publius Helvius Pertinax to the vacant throne; a man of obscure birth, but of great personal merit, by which he had raised himself to a distinguished rank in the state, and in the estimation of all virtuous men. The undesired power thus offered to him, he reluctantly accepted; but prepared to use it for the general good of the empire. In order to accomplish this most desirable object, Pertinax was obliged to begin his reign by checking the lavish expenditure by which Commodus had sought to secure the support of the guards, and to introduce discipline and subordination into this turbulent band. This necessary reform was immediately followed by an insurrection, in which Pertinax was killed, after a brief reign of sixty-six days.

A. D. 193.

Didius Julianus purchases the empire.

During this scene of contest and blood, the citizens abstained as much as possible from all interference, though strongly attached to Pertinax; and after his death they remained quiet in their houses, waiting the new master whom the prætorian guards might nominate. These seditious troops having fortified their quarters, waited also to see what the senate would do; but finding themselves left in possession of imperial power, they issued a proclamation, offering the empire for sale to the highest bidder. Didius Julianus became the purchaser, and thus disgracefully acquired the throne. But the intelligence of these base and lawless transactions excited the indignation of the armies in the provinces, who considered themselves better entitled to appoint an emperor, than a factious band of only about ten thousand men. The army of Illyricum proclaimed their general, Septimius Severus; that of Syria, Pescennius Niger; and that of Britain, Clodius Albinus. A bloody civil war was the inevitable consequence of so many competitors for the sovereignty. In the mean time, the wretched Didius was still the nominal emperor. But the rapid advance of Severus towards Rome alarmed the senate, who passed a

Civil war

decree for his dethronement and death, which was almost instantly executed, thus depriving Didius of the enjoyment of his ill-purchased honours in the short space of two months. A.D. 193.

Severus. Severus began his reign by accomplishing what Pertinax was murdered for attempting. He disarmed and disbanded the prætorian guards, and banished them to a distance of one hundred miles from Rome, death being the penalty of a nearer approach. The murderers of Pertinax were executed without mercy, and some degree of order and subordination restored. But Severus, accustomed to military sway, knew no other method of maintaining his authority except by force of arms. Though he punished the late prætorian guards, he replaced them with a chosen body of his own troops greatly more numerous; not reflecting that the enjoyment of similar leisure, and the possession of similar favour, would soon render them equally licentious and turbulent.

Having thus seized the sceptre, it was necessary to defend it against those rivals who were eager to wrench it from his grasp. As he was most apprehensive of danger from Pescennius Niger, he wrote deceptive letters to Clodius Albinus, styling him Cæsar, and thus lulling him to inaction. He then marched against Niger, whom, after several contests, he finally defeated in a great battle near the Issus. Niger was soon afterwards slain; and Severus put to death, without remorse, all whom he suspected of being favourable to the cause of his competitor. He next attempted to compass the death of Albinus by assassination; but the plot being detected, Albinus prepared to defend himself by dethroning his enemy. Severus hastened towards Britain, and Albinus crossed from thence to Gaul. The two rivals met near Lyons; and a very bloody battle was fought between two disciplined and numerous Roman armies, which ended in Severus gaining a complete victory. When he saw that his hopes were destroyed, Albinus fell by his own hand; and Severus, after insulting the dead body of his antagonist, again displayed the innate ferocity of his heart, by murdering in cold blood all his friends and adherents. A second Parthian war demanded the presence of Severus in the East, where he was again victorious, and where his exploits almost rivalled those of Trajan.

The avarice and insolence of Plautianus, commander of the prætorian guard, produced great oppression and suffering, till he was killed by Caracalla, the son of Severus, in the very presence of the emperor. Severus next turned his attention to Britain, where the Romans had been losing ground, partly in consequence of Albinus having withdrawn a great portion of the army in his attempt to elevate himself to the throne. The emperor being at the head of a very powerful army speedily drove back the independent natives of Caledonia, and regained the country south of the wall of Antoninus, but lost so many troops in the successive battles which he was obliged to fight, that he did not think proper to push his conquests beyond that boundary. Feeling at length A.D. 211. his end approaching, he retired to Eboracum (York), where he appointed his two sons, Caracalla and Geta, to succeed him and reign conjointly, and soon afterwards expired, in the eighteenth year of his reign.

Caracalla and Geta. The two brothers, Caracalla and Geta, had scarcely begun their reign, when they also began their dissensions. After their return to Rome, the utter impossibility of any permanent reconciliation taking place between them, led to a proposal by mutual friends that they should divide the empire. To this neither would agree; and soon afterwards A.D. 212. Geta was murdered in the arms of his mother by the hand of the furious and savage Caracalla.

Having now obtained the undivided possession of a throne stained with the blood of his brother, he prosecuted his murderous course, exhibiting the tiger-like propensities of his savage nature, by destroying almost indiscriminately men and women, young and old, wealthy and humble. He lavished presents, treasures, and amusements among the soldiery with an unsparing hand, trusting by their means to maintain his power, and setting at defiance the hatred of senate and people. He traversed the provinces along the Danube, partly in a hostile, partly in a friendly manner; thence passed into Asia, where, by treachery, he obtained some advantages over the Parthians; thence to Egypt, where, being enraged against the Alexandrians, who had ridiculed his pretensions to be regarded as another Alexander, he almost depopulated the city by a dreadful massacre. Vengeance at length overtook the sanguinary tyrant; and A.D. 2 he was murdered by the orders of Macrinus commander of the prætorian guards.

Marcus Opelius Macrinus was next placed at the head Macrin of the empire, by the soldiers, who were not aware that he had been accessory to the death of Caracalla. The new emperor was soon engaged in a war against the Parthians, where he gained no laurels, being obliged to purchase peace on terms highly disadvantageous to Rome. Some attempts which he made to restrain the extreme licentiousness of the soldiery excited a spirit of disaffection, of which Maesa, maternal aunt of the late emperor, availed herself to procure the empire to her grandson, a youth of fourteen, said to be the son of Caracalla, and a priest in the temple of the Sun at Emesa in Syria. This youth, named Heliogabalus, was proclaimed emperor by the legionary forces, on account of their attachment to the memory of his reputed father, Caracalla. Macrinus was defeated in an attempt to crush this rebellion, A.D. 21 and fell while endeavouring to escape by flight. His son, Diadumenus, whom he had associated in the empire, shared his fate.

Heliogabalus, thus raised to the throne, repaired to Rome, Heliogab lus. and began a course of licentiousness unparalleled in the annals of depravity. He was, in short, the most infamous wretch that ever disgraced a throne; his very existence seemed a stain upon human nature. To form some check to his shameless conduct, his grandmother caused him to assume his cousin, Alexander Severus, as his partner in the empire; but the abandoned and brutal boy attempted to procure his assassination, an attempt which soon proved fatal to himself. The prætorian guards, disgusted with the effeminate, licentious, and cruel tyrant, mutinied, and discovering him in a loathsome hiding place, a cloaca, dragged him A.D. 22 through the streets, put him to death in the most ignominious manner, and threw his body into the river, loaded with weights, that it might not be found and buried.

The new emperor, Alexander Severus, was of a character Alexande Severus. diametrically opposite to that of his predecessor. Among the first acts of his sovereignty, he banished all the guilty and abandoned creatures of Heliogabalus, restored the authority of the senate, and chose his counsellors and ministers of state of the best members of that body, and revoked all the persecuting edicts that had been issued by his predecessor against the Christians. This just and merciful procedure is thought to have been adopted by the advice of his mother, Mammæa, who maintained an intercourse with some of the most distinguished Christians, among others the celebrated Origen, and who was perhaps herself a convert. She was unquestionably a woman of great virtue, wisdom, and amiability of character; and as Alexander paid the utmost deference to her opinions and wishes, to her may be ascribed much of what was meritorious in the conduct of this young and excellent monarch.

But however desirous of peace, that he might prosecute Revoluti in Persi his schemes of reform, Alexander was soon called to encounter the perils and toils of war. A revolution in the east, which began in the fourth year of his reign, was pro- A.D. 22 ductive of consequences deeply important to all Asia. Ardeshir Babegan, or Artaxerxes, who pretended to be descended from the imperial race of ancient Persia, raised a

Persian war.

rebellion against the Parthian monarchs, the Arsacidae. The Parthian dynasty was overturned, and the ancient Persian restored; and with its restoration was renewed its claims to the sovereignty of all Asia, which it had formerly possessed. This claim gave rise to a war against the Romans, and Alexander led his troops to the East to maintain their imperial sway over the disputed territories. In the army he displayed the high qualities of a warrior, and gained a great victory over the Persians, but was prevented from following up his success in consequence of a pestilence breaking out among his troops. The Persians, however, were willing to renounce hostilities for a time, and the emperor returned to Rome in triumph.

Scarcely had Alexander tasted repose from his Persian war, when he received intelligence that the Germans had crossed the Rhine, and were invading Gaul. He at once set out to oppose this new enemy, but he encountered another still more formidable. The armies in Gaul had sunk into a great relaxation of the rigid discipline necessary for even their own preservation. Alexander began to restore the ancient military rules, to enforce discipline, and to reorganise such an army as might be able to keep the barbarians in check. The demoralised soldiery could not endure the change. A conspiracy was formed against him, and the youthful emperor was murdered in his tent, in his twenty-ninth year, after a short but glorious reign of thirteen years.

A.D. 235.

Maximinus.

The sceptre was now seized by the chief instigator of the mutiny, Caius Julius Maximinus, by birth a Thracian peasant. He was a man of gigantic stature and strength, indefatigable hardihood, and great personal daring; but to the wily cunning added the savage ferocity of an ignorant barbarian. He began his reign by murdering all the friends of the late emperor, and sent orders to the senate to ratify his bloody deeds. Having thus, as he thought, fixed himself firmly on the throne, he prosecuted the war against the Germans with great success, routed them in several battles, and devastated an immense extent of the country, selling the inhabitants for slaves. He next marched against the Sarmatians and the Dacians, over whom he gained several victories; and elated with success he was resolved to subdue their country, till he should reach the northern ocean. But an insurrection arose in Africa, caused by his insatiable avarice, and Gordian, proconsul of Africa, was proclaimed emperor. On receiving this intelligence, Maximinus quitted Sirmium and began his march towards Italy, resolved to glut his savage heart with vengeance. In the meantime, Gordian was defeated and slain by Maximinus's lieutenant; but the senate, knowing it in vain to expect mercy, chose as emperors, Balbinus and Pupienus, who, to gratify the people, gave the title of Cæsar to the youthful Gordian, a boy of twelve years old. Maximinus had by this time entered Italy, and laid siege to Aquileia. He met with a gallant resistance; and his own troops suffering excessively during the siege, mutinied, and slew him while he lay asleep in his tent.

D. 238.
rdian.

The death of Maximinus left the throne in the possession of the youthful Gordian, and prevented the horrors of a civil war. But the empire continued to be assailed by the restless hordes of barbarians, the Carpi, who had crossed the Danube, ravaging the province of Moesia, while the Persians were invading the eastern dominions. In this emergency, Gordian was ably supported by his father-in-law, Misitheus, præfect of the prætorian guards, who possessed at once the qualities of a statesman and a general. Sapor, the second prince of the new Persian dynasty, the Sassanides, had made some daring and successful inroads upon the Roman dominions; but the emperor, aided by the skilful support of Misitheus, drove back the invaders, defeating them in every encounter, and penetrating to the very heart of their territories. These successes were dearly purchased by the death of the wise and brave Misitheus, to whom they are chiefly ascribed. Gordian appointed Philip the Arabian to the station vacant by the death of Misitheus; and prosecuted the war with undaunted courage and undiminished success. But Philip found means to raise in the army such a mutiny as could not be subdued, without his elevation to an equality with Gordian in the empire. This success in guilt stimulated Philip to additional crimes for the promotion of his lawless ambition, and he rested not till he procured the murder of this young emperor, who was giving such proofs of ability, and such promise of future excellence.

A.D. 244.

Philip.

Philip, to secure his tenure of power, concluded a peace with the Persians, and hastened to Rome, where he endeavoured to persuade the senate that the death of Gordian was caused by disease. He did not long enjoy his sovereignty undisturbed. Insurrections of a formidable character broke out in different parts of the empire, especially in Pannonia. Trajanus Decius, whom Philip had sent to suppress this insurrection, had scarcely reached his army when he was compelled to assume the imperial diadem. Philip marched against his unwilling antagonist, but was defeated and slain near Verona. In the reign of Philip the secular games were celebrated, in what was computed to be the one thousandth year from the foundation of the city.

A.D. 249.

Trajanus Decius.

Great persecution of Christians.

The reign of Trajanus Decius is memorable on two accounts. Its annals are stained by one of the most sanguinary persecutions that ever tried the sincerity and zeal of the Christian church. Almost innumerable multitudes of Christians were banished, imprisoned, or tortured to death with the most relentless cruelty. The revolution in Persia, which established the dynasty of the Sassanides, restored the worship and the tenets inculcated by the followers of Zoroaster; and caused the retreat of the Asiatic Christians into the dominions of the Romans, at that time more tolerant. But these Asiatic Christians brought with them many of the notions peculiar to the East, and thus gave rise to dissensions among the Christians themselves. Decius, a man of stern and unaccommodating temper, determined to put an end to all such discussions, by completely suppressing Christianity itself; and he published a bloody edict, prohibiting all innovations in religion, and strictly enjoining compliance with the ancient idolatrous worship of Greece and Rome. The horrors occasioned by this cruel edict could not be enumerated, and it is not our province to make the attempt. But it ought to be mentioned that the ascetic and mystic notions prevalent in the East, when driven to excess by this persecution, induced numbers to betake themselves to wild and desert solitudes to seek for safety; and from this excessive development of the ascetic spirit at length arose the monastic, that fertile source of so many errors and abuses.

Goths.

The other memorable event in the reign of Decius, is the first appearance of the Goths among the contending nations by whom the Roman empire now began to be regarded as a common enemy, or rather perhaps as a common prey. The origin of this mighty people is involved in deep obscurity, which the utmost researches of learned men have not been able entirely to remove. The most probable opinion, however, appears to be, that which regards them as a powerful branch of the great Indo-Teutonic race, by which both northern Asia and northern Europe were peopled, at some indefinitely remote period, before which the southern districts had already been inhabited, very probably by the Pelasgian race. After having been settled for ages in Scandinavia, they appear to have resolved on a southern migration, passed along the lower shore of the Baltic, followed the course of the Borysthenes, (Dnieper,) and the Tanais, (Don,) and took possession of the Ukraine. Thence they afterwards directed their course south-west, ravaged the province of Dacia, and crossing the Danube, appeared in great strength in Mœsia. When information respecting these new and formidable invaders was carried to Rome, Decius immediately marched against them. He was worsted in the first engagement, and the Goths succeeded in taking Philippopolis; but Decius having recruited his forces, defeated them, and reduced them to the utmost distress. It was his aim to inflict upon them such an overthrow as should deter them from renewing their invasions of the empire. A battle was fought, in which the Goths, animated with the terrible energy and courage of despair, and being skilfully posted on the edge of a morass, resisted all the efforts of the Roman forces to break them; and young Decius having fallen, the emperor, eager to revenge the death of his son, plunged furiously into the morass, sunk struggling into its absorbing depth, and disappeared. The Roman army suffered an immense loss, but the Goths were in no condition to prosecute their victory.

A.D. 251.

Gallus.

Gallus was proclaimed emperor by the surviving army, and having immediately concluded a dishonourable peace with the Goths, hastened to Rome to enjoy the gratifications of unrestrained indulgence. His son Voluscan he created Cæsar, and contrived to get the son of Decius into his power, and put him to death. His conduct excited a general indignation against him; and at length Æmilianus, commander of the forces in Mœsia, raised the standard of revolt against him. A battle was fought, in which Gallus was defeated and slain, his son sharing his fate. In three months, Æmilianus himself was deposed and killed, the army declaring in favour of Valerianus, general of the army stationed in Gaul.

A.D. 253.

Valerian.

Of Valerian, who had been distinguished by his virtues while in a private station, great expectations were formed. Having appointed his son Gallienus to be his associate in the empire, he left him to defend it against the incursions of the Goths and Germans, and marched to the East to oppose the Persian king Sapor, or Shah Pur. Valerian was defeated and taken prisoner by the Persians, who treated him with great and contemptuous cruelty. His degenerate son Gallienus made no effort to obtain his release, being apparently more satisfied to reign alone.

A.D. 259.

Gallienus.

The captivity of Valerian, and the accession of the feeble Gallienus, seemed to be the signal for a universal assault upon the defenceless empire. It was invaded on all sides by the hostile barbarians, who seemed to vie with each other in striving for the honour of being the destroyers of Rome. Several victories over the Germans were gained by the generals of Gallienus; but each army resolving to make its own general emperor, a period of hopeless and helpless anarchy ensued, which threatened the immediate disruption of the empire. The host of competitors which thus sprung up in all quarters, is known by the designation of "the thirty tyrants," though not actually amounting to so many. The very number of these contending rivals impeded the success of any, no one being possessed of sufficient power to strike a decisive blow. At length Gallienus was killed while besieging Aureolus, one of the usurpers, in Milan.

A.D. 268.

Marcus Aurelius Claudius.

He was succeeded by Marcus Aurelius Claudius, a man of great courage, skill, and virtue, capable of upholding the tottering state of the empire. He soon defeated Aureolus, then overcame the Germans, and next routed the Goths in a great battle at Nissa. His attention was next directed to the affairs of the East; but while making preparations for his march thither, he was seized by a pestilential disease, of which he died at Sirmium, after having reigned two years.

A.D. 270.

Aurelian.

A feeble attempt to obtain the imperial power was made by the brother of Claudius, which terminated after the lapse of seventeen days, by the unfortunate victim of ambition becoming his own executioner. The army now made choice of Aurelian, a native of Sirmium, the son of a peasant of that country, and raised to high military rank and fame by his own surpassing merits. It was reserved for this distinguished man to show what could be accomplished by an imperial hero. The hopes of the Goths had revived on the death of Claudius, and they had renewed their invasion. They were met by Aurelian, and a bloody battle was fought, to which night, not victory on either side, gave a temporary suspension. Wearied with mutual slaughter, both parties were averse from renewing the undecided combat, and a treaty was formed, by which Aurelian consented to relinquish that part of Dacia which lay beyond the Danube, and to make the river the boundary of his empire in that direction. The Goths furnished a body of cavalry as auxiliaries to the Romans, and engaged to abstain from future invasion. By this treaty, Aurelian strengthened the Roman empire in that quarter, obtaining a well-defined boundary, and leaving to the enemy a devastated region, no longer worth defending.

The Alemanni, in the mean time, had entered the Roman dominions, and laid waste the country along the Po. Aurelian marched rapidly against them, inflicted on them several sanguinary defeats, and freed Italy from the terrors of the barbarian invaders. The Vandals also sunk before his matchless valour and conduct; and having now secured the western part of the empire, he directed his arms against the east, to encounter a female antagonist.

Zenobia queen of Palmyra.

This was the justly celebrated Zenobia (Zeinab) queen of Palmyra, widow of Odenathus, who had been one of the numerous claimants of imperial honours during the reign of Gallienus, and to whom that easy monarch had been willing to grant the title of his colleague. Palmyra, or Tadmor, is stated in the Bible to have been built by Solomon. The situation of that beautiful spot, a green island in the midst of a sandy ocean, and almost equidistant between the Euphrates and the Phœnician coast, pointed it out to the wisest of kings as a suitable place for commercial enterprise, and admirably adapted to promote his great idea of changing the line of intercourse between the east and the west, from the Red Sea to the Euphrates, and rendering Palestine, not Egypt, the great emporium of nations. After the decline of the kingdom of Israel, this idea seems to have been relinquished; but still Palmyra continued to form an excellent intermediate station between the Euphrates and Asia Minor, for the caravans employed in the Indian and Arabian trade. It thus grew in wealth, if not in political power or importance, yielding ready obedience to the great dominant empires, each in its turn, and seeking nothing from them but protection. From the Parthians it seems to have suffered no injury; but the revolution which gave central Asia to the Sasanide dynasty, involved Palmyra in the general warfare. Odenathus, said by some to have been an Arab Emir, was one of the most considerable of the inhabitants of Palmyra. Irritated by the insults of the Persians, and instigated by his high-spirited wife, Zenobia, he headed his countrymen in their resistance to the plundering bands of the Persian king, successively defeated them, and acquired sufficient power not only to rescue Palmyra, but even to carry the war into the enemy's country, and to advance to the gates of Ctesiphon. In a short time all Mesopotamia and Syria owned his sway, and he was acknowledged as colleague by Gallienus. Odenathus having been cut off by private treachery, the falling sceptre of Palmyra was immediately seized by Zenobia, who wielded it with no timid or feeble hand. For the space of six years did she maintain her sway, and even added Egypt to her dominions, justifying the proud title she had assumed, Queen of the East. Such was the woman against whom Aurelian thought it no disgrace to lead in person his Roman legions.

The result was what might have been anticipated. Zenobia was defeated in two successive and bravely-contested battles; Palmyra was besieged, and after a gallant resistance, its own resources being exhausted, it was compelled to capitulate, and Zènobia was taken prisoner while attempting to make her escape into Persia. Scarcely had

Roman History.

Aurelian withdrawn his forces, when the Palmyrenians again revolted; and the angry conqueror having again made himself master of this city of romance, reduced it to ruins, of which the extent, beauty, and magnificence still amaze the traveller. Among the victims of the emperor's wrath was Longinus, the secretary of Zenobia, and the reputed author of an admirable treatise on the sublime. Having thus reduced and destroyed Palmyra, he suppressed an insurrection in Egypt, and returned to Rome, where he celebrated his victories and conquest by a triumph the most remarkable that the city had ever witnessed. Zenobia, who had been compelled to grace this triumph, by walking on foot in the train of her conqueror, received afterwards from him a small estate at Tibur, where she spent in tranquillity the remainder of her life as a Roman matron, leaving a family which was not extinct in the fifth century. A.D. 271.

A violent sedition soon afterwards arose at Rome, in consequence of an attempt by Aurelian to debase the coinage. It was followed by so much bloodshed, and gave so much offence to the emperor, that his native sternness, and the pitiless decision of a warrior, degenerated into harshness and cruelty. Being again obliged to lead his army against the Persians, he left the city, and sought the more congenial pursuits of war; but was afterwards assassinated at the instigation of his private secretary Mnestheus. The murderers were torn to pieces by the enraged soldiery, who almost adored their warlike emperor. A. D. 275.

Nothing can better prove the effect of the masculine government of Aurelian, and the regulated subordination which it had given to the troops, than the fact that the army actually allowed six months to pass in tranquillity, while they awaited the election of an emperor by the senate. That body at length elected Marcus Claudius Tacitus, an aged senator of high character, and a decendant of the celebrated historian of that name. He had scarcely begun to prove the wisdom of their choice, by the enactment of some salutary laws, when he was compelled to march against the Alani, a Scythian tribe, who were devastating Asia Minor. He was successful in the war; but the fatigues and anxieties of the campaign were too severe for a frame already enfeebled by age, and he died in Cappadocia.

acitus.

D. 276.

lorianus.

The imperial diadem was immediately assumed by Florianus, brother of the late emperor; but the Syrian army chose Marcus Aurelius Probus, a general of great and varied merit, to be the successor to the throne. Florian finding himself opposed by a man against whom he could not hope for success, put an end to his own life, and thus left the empire to his rival.

obus.

Closely resembling Aurelian in personal bravery, and, like him, also a native of Sirmium, Probus began a reign scarcely less warlike and glorious than that of his great countryman. He defeated the Germans in several battles, and drove them beyond the Rhine and Danube, which were now considered the natural limits of the empire. To complete the boundary-line in that quarter, he constructed a strong wall from the Danube to the Rhine. Passing along the northern frontier of the empire, he reduced the Goths to quiescence, entered Asia, and led his army against Varames (Bahram) king of Persia. That monarch not daring to encounter the hardy veterans of Probus, consented to a peace of which the terms were dictated by the emperor. Three competitors next fell before his power, and he now seemed at leisure to cultivate the arts of peace, for which he had a strong natural predilection. He accordingly employed his legions in draining pestilential fens, planting vineyards, and improving instead of devastating the face of the country. This restoration of the ancient and wise military discipline of earlier and more virtuous days, gave offence to the licentious soldiery; who mutinied and slew the brave and good emperor. D. 282.

Roman History.

Reverting to the custom formerly so prevalent, the army proclaimed as emperor Carus, prefect of the prætorian guards, and the senate reluctantly ratified their choice. In the hope of promoting tranquillity, and securing the inheritance of the imperial dignity in his own family, Carus gave the title of Cæsar to his two sons, Carinus and Numerianus, who were thus his appointed successors. He led his army against the Goths, who had renewed their predatory incursions, and defeated them; but was prevented from following up his victory in consequence of a new invasion of the Persians. Leaving Carinus to protect the western provinces, and taking Numerianus along with him, he marched into Asia, and gave the Persians a complete overthrow. Pursuing the defeated enemy, he entered their own country, advanced to Ctesiphon, and began the siege, when he was killed in his tent, some authors say by a flash of lightning, more probably by some secret conspiracy. A. D. 283.

Numerianus.

Numerianus was acknowledged by the army as his successor; but his gentle and pacific disposition exposed him to the ambition of Aper, præfect of the prætorian guards, by whom he was privately murdered, and his death was concealed till the traitor might have time to secure his own elevation. But the bloody deed being discovered, a tumult arose in the army, in the midst of which Diocletian slew Aper, and was proclaimed emperor in his stead. He did not, however, at once obtain undisputed possession; for Carinus, hearing of his brother's death, assembled a powerful army, and began his march against the usurpers. On his way he encountered and defeated another rival, Julianus, and advancing into Mœsia, was met and opposed by Diocletian. The troops of Diocletian, however, were unable to contend with the hardy veterans of Carinus, who gained the victory, but was slain in the moment of his success by a tribune, to avenge the violated honour of his wife; and thus, though defeated, Diocletian remained in possession of the diadem. A. D. 284.

Diocletian and Maximian.

The reign of Diocletian is one of much historical importance. It was rendered conspicuous by the introduction of a new system of imperial government, and by the last and greatest persecution of the Christians. Very soon after his accession to the throne, Diocletian, feeling the weight of the imperial government greater than he was disposed to bear alone, chose as his colleague Maximianus, who had been his companion in arms, and to whom he was willing to delegate the chief part of the military cares. Maximian had soon an opportunity of using his power and displaying his courage, in consequence of an insurrection in Gaul. This insurrection he speedily suppressed, and obtained some victories over the German invaders of the province. In the mean time, Diocletian had been equally successful against the Sarmatians and the Persians. But scarcely had they obtained these victories, when new disturbances and new invasions broke out in every part of the wide empire, the wandering nations pressing inwards from all quarters, and threatening to crush the entire Roman power. To make head against so many invading armies seemed impossible, without a further division of power. For Diocletian seems to have entertained the opinion, that to entrust large armies to experienced commanders was only to put it in their power to become aspirants for the throne; and that the only way to secure their fidelity was to give them such a share in the imperial government as should engage their own interest in its preservation. A. D. 286.

In pursuance of this scheme, he induced his colleague Maximian to name as his Cæsar and successor Constantius Chlorus; while he himself chose Maximinus Galerius. In this choice Diocletian was apparently guided by the same A. D. 292.

principle which had led to his selection of Maximian as his own colleague, the principle of dissimilitude. A man comparatively peaceful himself, he chose to be associated with Maximian, a rough warrior: to this rugged Augustus, or emperor, he assigned a peaceful and mild Cæsar, Constantius, again choosing for his own Cæsar the warlike and fierce Galerius. A new division of the empire followed. Diocletian took the eastern provinces; Galerius was appointed to Thrace and Illyricum; Maximian received Italy and Africa; and Gaul, Spain, and Britain, were entrusted to Constantius. Each of the Cæsars, although they differed in their dispositions, was a man of courage and military experience; and for a time the arrangement seemed productive of the very best consequences, but it ultimately tended to hasten the dismemberment of the empire and its consequent overthrow.

British war.

Constantius, to whom Britain had been assigned, had to begin his tenure of power by a war for its possession. The usurper Carausius had several years before raised himself to the chief command in Britain, which he retained in spite of the efforts of the imperial generals. He was slain by Allectus, a new usurper, just as Constantius was preparing to cross from Gaul against him. Constantius speedily defeated Allectus, and gained the complete possession of his province, which he maintained with equal valour and moderation, governing with such justice as to make himself equally beloved by his army and the native inhabitants. In the mean time, Galerius was equally successful on the Danube, where he defeated the invaders; Maximian in Africa, and Diocletian in Egypt; so that this division of power seemed to secure the defence of the empire, by enabling its rulers to oppose every new assailant. A war against the Persians threatened more disastrous consequences. Diocletian had sent for Galerius to conduct this war; but in the first battle the Persians gained the victory, and inflicted on the Romans a very severe defeat. Next year Galerius, at the head of a more powerful army again invaded Persia; but profiting by experience, he kept his forces on the hilly regions of Armenia, where the Persian cavalry could not act, and watching his time, rushed like a mountain torrent on the Persians, and gave them a terrible overthrow. The rout was complete and irrecoverable, and so greatly were the Persians dispirited, that they were glad to yield to the conditions of peace offered by the conqueror. The province of Mesopotamia was ceded to the Romans, and the Tigris again became the eastern boundary of the empire.

Persian war.

Great persecution of the Christians.

These successful wars might have been followed by a period of peace and prosperity; they ushered in scenes of unparalleled atrocity. Diocletian had made the city of Nicomedia the seat of his residence; and there he maintained a court of eastern splendour, to which he invited men of learning and philosophy. But the philosophers who frequented his court being all animated with extreme hatred against Christianity, exerted themselves in instigating the emperor to extirpate a religion too pure and lofty to suit their polluted minds. Galerius is said also to have stimulated Diocletian to undertake the destruction of a religion, the gentle and peaceful spirit of which he could neither understand nor appreciate. Three imperial edicts were successively published, requiring the books of the Christians to be everywhere sought for and burned, forbidding them to meet together for the purpose of religious worship on pain of death, inflicting punishments of every kind, imprisonment, slavery, infamy, and death upon all the dignitaries of the church, and sanctioning the employment of every possible method to produce, enforce, or compel apostacy, and a return to the established idolatry of the empire. The barbarities which followed upon the issuing of these edicts were utterly inconceivable. Malicious ingenuity was racked to the utmost to devise tortures for the persecuted followers of Jesus. For the space of ten years did this persecution rage with scarcely mitigated horrors; and such multitudes were massacred in all parts of the empire, that at last the imperial murderers ventured to erect a triumphal column, bearing the barbarously boastful, yet false inscription, that they had extinguished the Christian name and superstition, and restored the worship of the gods to its former purity and splendour.

A.D. 303.

The scheme of this great and bloody persecution was devised by the emperor Diocletian and his Cæsar Galerius, during a winter residence in the palace of Nicomedia. Soon after the issuing of the persecuting edicts, Diocletian repaired to Rome, and there, along with his colleague Maximian, enjoyed the honours of a triumph for the various victories which had been gained in their joint sovereignty. This was remarkable as the last triumph that ever entered the proud gates of Rome. Diocletian had already set the example of a residence in the provinces; and other causes soon conspired to render this example both common and expedient, so that Rome ceased to be the capital of even the Roman world. Wearied with the cares of government, offended with the rude freedoms of the citizens of Rome, and feeling the effects of advancing age, Diocletian began to entertain serious intentions of abdicating the imperial power. These intentions were confirmed by a severe illness under which he laboured, after his return to Nicomedia; and at length he prevailed on his reluctant colleague Maximian to accompany him in his abdication, as he had in his assumption of the toils and the honours of sovereign dominion. Accordingly, the two emperors formally relinquished the imperial station, power, and titles; and were succeeded by Galerius and Constantius, who now from being Cæsars, became each an Augustus. A new division of the empire necessarily followed, of which Galerius seized the lion's share, without however provoking any hostile opposition from Constantius. Galerius retained all the eastern provinces, together with Italy and Africa; Constantius was satisfied with the possession of Spain, Gaul, and Britain. Galerius appointed two Cæsars, Severus, to whom he consigned Italy and Africa, and Maximin, to whom he entrusted the Asiatic provinces. Diocletian survived his abdication about nine years, which he spent in tranquillity, ease, and luxurious retirement at Salona (Spalatro), amusing himself in the erection of a magnificent palace, and the calm pleasures of rural and horticultural pursuits, resisting every attempt to induce him to return to the paths of ambition, and declaring that he had never known the true enjoyment of life till after his resignation of power.

Last Roman triumph.

A. D. 30

Galerius and Constantius.

Constantine, son of Constantius, was detained for some time by Galerius, who was apprehensive of danger from the talents of that young prince; but he contrived to escape, and by a rapid flight secured his safety, and joined his father in Britain, who was preparing to march against the Scots and Picts, as the inhabitants of the northern regions of that island now began to be called. While Constantius was on his march northwards, he was seized with a mortal illness, and died at York, having nominated as successor, his son Constantine, who was accordingly saluted Augustus by his army. Galerius refused to ratify this elevation to the imperial dignity of a prince whom he at once hated and feared; but sanctioned his being termed a Cæsar, bestowing the now vacant rank of Augustus upon Severus, one of his own Cæsars. This dignity had been expected by Maxentius, son of the abdicated emperor Maximian. Indignant at his disappointment, Maxentius caused himself to be proclaimed emperor by his army; and to colour this usurpation, he induced his father to leave his retreat, and resume the imperial title. A scene of contention followed, scarcely paralleled in the annals of Rome. Severus march-

A. D. 30

ed against the two usurpers; but was abandoned by his own troops, yielded, and was slain. Galerius levied a great army, and marched into Italy against Maximian and Maxentius; who, dreading his power, retired to Gaul, and endeavoured to procure the support of Constantine. This politic prince did not consider it expedient to provoke a war at that time, and for no better cause; and Galerius having withdrawn from Italy, and returned to the east, Maximian and Maxentius returned to Rome. To aid him in the struggle, Galerius conferred the title of emperor on his friend Licinius; and thus there were at once six pretenders to the sovereignty of the empire, namely, Galerius and Licinius, Maximian and his son Maxentius, Maximin, who had been nominated Cæsar by Galerius, and Constantine, the son and successor of Constantius. Among these rivals, Constantine possessed a decided superiority in prudence and abilities, both military and political.

. D. 307.

The harsh temper of Maximian soon led to a quarrel between him and his son Maxentius; and finding himself unable to obtain an ascendancy over one who was no less intractable than himself, he quitted Rome, and went to Gaul to Constantine. There also he found himself disappointed of that power which he so greatly longed to possess, and began to plot against the life of Constantine, his son-in-law. But being detected, he was condemned to death, the only favour shewn to his age and former dignity being permission to choose in what manner he should die. Thus perished one competitor for the throne. Nor did Galerius long survive him. A loathsome disease, contracted by excessive indulgence in habits of sensuality, brought his turbulent life to its termination, leaving his power to be divided between his Cæsars, Maximin and Licinius. There were now four rivals contending for the empire, Constantine, Maxentius, Maximian, and Licinius. Maxentius speedily provoked open hostilities with Constantine, who marched at the head of a powerful army towards Rome.

D. 310.

D. 311.

stan- de- es him- a istian, D. 311.

It was while Constantine was proceeding on this momentous expedition, that he made an open and public declaration in favour of Christianity. Before that time, the persecuting edicts of Diocletian had been much mitigated by the forbearance and leniency of Constantius; and Constantine not only followed his father's example, in being merciful to the persecuted Christians, but even shewed them some marks of positive favour. Very considerable numbers of them, in consequence, flocked to his standards, and swelled the ranks of his army. Their peaceful, orderly, and faithful conduct, contrasting most favourably with the turbulent and dissolute behaviour of those who formed the mass of common armies, won his entire confidence. To what extent this led Constantine to form a favourable opinion of Christianity, or inclined him to view with esteem and respect tenets which had produced such results, cannot be ascertained. How far his avowed reception of Christianity was influenced by the prudence of the politician, how far by the convictions of the convert, it is impossible to determine. The accounts of his dream, and his vision, which united to enforce his trust in Christianity, bear too much the aspect of fiction, or of having been the illusive consequences of mental anxiety, brooding intensely on the possible results of a great religious revolution, to be woven into the narrative of sober history. This, at least, is certain, Constantine caused the *cross* to be employed as the imperial standard, and advanced with it to promised victory.[1]

After the armies of Maxentius, led by his generals, had sustained two successive defeats, he found it imperatively necessary to rouse himself from his sensual and inactive life at Rome, and to advance against his formidable assailant. He accordingly mustered a very numerous army, put himself at its head, marched out of Rome, and met the host of Constantine near the little river Cremera, about nine miles from the city. A dreadful encounter took place, both parties being stimulated by every motive that could animate men to erect the utmost energies of mind and body. It was not merely a battle of emperors; it seemed also a strife of religions. At length the troops of Maxentius gave way, wavered, broke, and fled in headlong and irretrievable confusion; Maxentius himself, endeavouring to enter the city by the Milvian bridge, amidst the crowd of fugitives, was precipitated into the Tiber, and perished, partly weighed down by his armour, and partly encumbered and overwhelmed among numbers of struggling wretches, whose dying gripes knew not to respect the purple.

A. D. 312.

Constantine and Licinius.

Constantine entered Rome victorious, restored to the senate their authority, disbanded the prætorian guards, and destroyed their fortified camp, from which they had so long awed the city and given rulers to the empire. After a brief stay in Rome, he proceeded towards Illyricum to meet Licinius, with whom he had formed a secret alliance before marching against Maxentius. The two emperors met at Milan, where their alliance was ratified by the marriage of Licinius to Constantine's daughter. During this calm interview, Constantine prevailed upon Licinius to consent to the repeal of the persecuting edicts of Diocletian, and to the issuing of a new edict, by which not only the sanguinary enactments of the former emperor were revoked, but Christianity was encouraged, its religious teachers were honoured, and its adherents advanced to places of trust and influence in the state.

A. D. 313.

This placid and beneficial intercourse between the emperors, was speedily interrupted by an irruption of the Franks into Gaul, to which they afterwards gave their name. Constantine hastened to oppose them. Anxious to take advantage of this opportunity to crush separately the two emperors, whom united he could not match, Maximin made a very rapid march against Licinius, and almost succeeded in overpowering him unawares. Licinius, however, kept his enemy at bay till he had mustered sufficient force, and then gave him a total overthrow near Adrianople. Maximin fled almost alone to Nicomedia, and there died, either of poison or of mortified rage and despair.

A. D. 313.

The peace, which had seemed to be established on so firm a foundation between Constantine and Licinius, was soon interrupted. A war, conducted with great skill and courage on both sides, arose for the sole supremacy of the empire. But the activity, talents, and enterprise of Constantine prevailed. Licinius was defeated in a bloody battle near Sirmium; but though defeated, he was not overpowered. He speedily rallied the remains of his beaten army, mustered fresh forces, and again met his rival in the field, again to sustain another and a more complete discomfiture. Through the intervention of Constantine's daughter, an agreement soon afterwards took place, by which the provinces south of the Danube were ceded to the conqueror, and the dominions of Licinius limited to the Asiatic regions. For about eight years a sort of uneasy peace continued between the two rival emperors, Licinius feeling, and hating to feel, the natural superiority of Constantine. Another open rupture was unavoidable; and both parties now made preparations for a contest, the issue of which should be final. The two hostile armies met on the banks of the Hebrus, near Adrianople. Licinius had taken up a strong and advantageous position, in which he waited the attack of his adversary. For some days the two armies lay and watched each other's evolutions. At last Constantine with great skill drew his enemy from his position, and forced him to an encounter on equal terms. The battle was fierce, obstinate, and sanguinary; but the commanding genius, and heroic courage of Constantine secured him a complete victory. The spirit of Licinius was still unbroken. The siege of

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[1] It is not necessary to attempt any explanation of the celebrated dream and vision of Constantine, which have so much engaged the attention of both ecclesiastical and infidel historians. The circumstances, according to the best authorities, were the following. While he was marching towards Rome against Maxentius, at the head of his army, on a sudden there appeared in the air, about noon-day, a luminous cross, bearing the following inscription: 'Εν τούτῳ νίκα, BY THIS CONQUER. During the ensuing night, he was directed in a dream, to frame a standard resembling the vision he had seen, and to inscribe on it, and on the shields of his soldiers, the *labarum*, or monogram of the sacred name of Christ. That such a standard was at that time used, and that Constantine conquered, are historical facts beyond dispute; for the reality of the dream and the vision, we must refer to the testimony of the emperor himself, and of contemporaneous historians.

A. D. 324.

Byzantium detained Constantine, and allowed his antagonist to muster all his remaining strength, in order to strike one more blow for life and empire. Chrysopolis was the scene of the decisive conflict. But the raw levies of Licinius could not withstand the conquering veterans of Constantine; the struggle produced rather a carnage than a battle, and the utter annihilation of his last army left to Licinius no resource but unconditional submission. He was deprived of his imperial honours, and permitted to retire to Thessalonica, there to pass the remainder of his days in obscurity and inglorious ease. But the life of a dethroned monarch is not usually long. He was accused of tampering with the barbarians, and conspiring with their aid to rekindle the flames of war. Such an accusation was of itself enough to cause sentence of death to be pronounced; it was immediately put in execution, and the empire was once more transmitted to the sway of a single emperor.

Constantine.

Constantine, thus possessed of supreme power, immediately put in force some of those important purposes which had long engaged his thoughts. He issued several edicts for the suppression of idolatry; and at the same time restored to the Christians both the churches and the property of which they had been deprived during the last persecution. We have not sufficient information to enable us to judge accurately respecting the intentions of Constantine, or respecting the power of circumstances in obliging him to modify his own schemes, so as to adapt them to certain events which he could not altogether mould. But it is scarcely possible to ascribe too much to the deep policy of this emperor. He was well aware of the characters of the two conflicting religions, Christianity and Paganism. He had also marked with discriminating eye the deep degeneracy of Rome and its inhabitants. Neither had the consequences of the partition of the empire by Diocletian escaped his politic observation; and if the hope of preventing its final dissolution was to be cherished, he saw it to be indispensably necessary to attempt a reconstruction of the empire, upon an arrangement entirely new. The whole fabric of the ancient constitution of republican Rome had been pervaded by its religious worship and institutions. It was natural for him to determine that the new constitution of the renovated empire, should be pervaded by the worship and the institutions of Christianity. And as these had already attained a considerable degree of maturity, he adopted them as they were, partly perhaps because he durst not venture to offend the Christians by any attempted reformation, or reconstruction; partly because the state of his own religious knowledge, so far as we have any means of judging, was very inadequate and imperfect.

Establishment of Christianity.

Being resolved to give a new constitution to the Roman empire, and to make Christianity its basis and ruling principle; being at the same time aware of the inveterate force of the associations connecting every thing in Rome with its ancient idolatrous worship, enhancing immensely the difficulty of making any immediate and thorough change there; and having before him the example of Diocletian, Constantine resolved to change the seat of empire, in order to facilitate his change of the imperial constitution. The most formidable enemies of the empire had for a considerable time been the Goths and the Persians; and the necessity of being nearer to the scene of danger, may have led to the idea of selecting an eastern situation for the new seat of government. The siege of Byzantium, which Constantine had formerly conducted in person, probably directed his attention to that city, as the most eligible situation; and it must be owned that it possesses advantages almost unequalled, as the seat of an empire both European and Asiatic. On it accordingly the emperor fixed his choice; and receiving from him immense additions and embellishments, together with a new name, it became *Constantinople*, the new imperial city.

Seat of empire transferred to Constantinople.

Previously, however, to this great change in the seat of government, there had been held a general council of the Christian teachers at Nice, for the purpose of determining the Arian controversy, which the emperor attended in person; and where he obtained the opportunity of making such enactments respecting the civil constitution of the church, as he either deemed it expedient, or found himself enabled to make. But the controversies which at that time, and for a long period afterwards, divided the church, furnished unhappily the means, and set the precedent, of persecutions conducted by one body of Christians against another; and in which both were too ready to sacrifice their spiritual independence, for the purpose of obtaining the aid of the civil power in crushing their antagonists.

A. D. 3

A. D. 3

In the arrangements of his new imperial constitution, Constantine adopted much of the pomp and ceremony of an Asiatic court. A complete disjunction between civil and military authorities took place; and all the great officers of state were modelled anew, with new titles suited to the new arrangements, as officers of the court, of the army, and of the civil department. The officers of the court and of state, were chiefly the lords or counts of the bed-chamber and the palace *(comites cubiculi, et palatii)*, and the ministers of the interior, of the finances, of justice, of the crown-treasury, and of the household troops, or body guards. The officers of the army were the general-in-chief, and the generals of cavalry and of infantry; the next class were the counts and dukes *(comites et duces)* of the army. The civil department was divided into four great *præfectures*, each had its *diocese*, and each diocese its *province*, administered by *præfecti prætorio*, *vicarii*, and *rectores provinciarum*, which officers had no military authority, as the military and state officers had no civil power. A new system of taxation was also established, consisting chiefly of a land-tax, a tax upon trade, and the obligatory enforcement of what had formerly been a free gift to the emperor upon extraordinary occasions. Such is a very brief outline of the new constitution given by Constantine to the empire, obviously more Oriental than European or Roman in its character.

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Notwithstanding the Asiatic aspect thus imparted to his government, Constantine retained his ability and readiness for war, when enemies dared to insult his dominions. Several defeats repressed the hostile invasions of the Sarmatians and Goths, who had renewed their attempts upon Thrace; and the Persian monarch did not venture to provoke the power of an emperor equally renowned for his military and for his civil virtues. Disease at length assailed a frame that had been long and severely tried by the toils, cares, and indulgences of imperial state; and after being openly admitted by baptism into that church of which he had been so long an avowed adherent, he expired in the thirtieth year of his reign.

A.D. 337. Constantine. Constantius. Constans.

The three sons of Constantine had been named Cæsars by their father, and on his death they divided the empire among them. Constantine obtained Gaul, Spain, and Britain; Constantius, the Asiatic provinces, with the capital, Constantinople; and Constans, Italy and Africa. The late emperor had assigned provinces to his two nephews, Dalmatius and Hannibilianus; but the three new emperors, on the ground of a false accusation, barbarously murdered their uncles, cousins, and every member of the imperial house, except two cousins, Gallus and Julian, one suffering under a hopeless malady, the other a mere child. This bloody deed did not long secure to the brothers the quiet possession of their dominions. A dangerous war arose in the East, where Constantius was unable to resist the growing power of the Persians, but suffered several heavy defeats, and was in danger of losing the whole of Mesopotamia, when the Persians were obliged to offer a peace, in consequence of their own dominions being assailed by the nomad tribes beyond the Oxus.

Death of Constantine. A.D. 340.

In the mean time, ambition had kindled a war between the other two imperial brothers, Constantine and Constans. Not satisfied with his portion of the empire, Constantine first seized upon Africa, and then attempted to wrest Italy from Constans. He crossed the Alps, and began to ravage the country round Aquileia; when falling into an ambuscade he was slain, together with the greater part of his troops. Constans immediately took possession of his fallen brother's dominions, and thus became the sovereign of two-thirds of the empire. Satisfied, apparently, with this great acquisition, he plunged into the most dissolute indulgences, refused to cede any portion to Constantius, and even allowed that prince to wage an unequal war against the Persians, refusing to lend him any assistance. At length his general, Magnentius, raised the standard of revolt. Constans fled towards Spain, but was overtaken and killed near the Pyrenees.

Death of Constans. A.D. 350

While Constantius was preparing to avenge the death of his brother, a new revolt broke out in Illyricum. The army of that province compelled their general, Vetranio, to assume the purple; and Constantina, sister of the emperor, encouraged him to the deed, and even urged him to form an alliance with the usurper Magnentius, who had so recently slain her brother Constans. Not deeming it prudent to engage in a war of such magnitude without providing for the administration of affairs during his absence, Constantius placed his cousin Gallus in the rank of Cæsar, and advanced to Constantinople, which Vetranio had seized while the emperor was engaged in the Persian war. Pretending to be willing to admit Vetranio to an equal share of power with himself, he obtained permission to enter the imperial city; and immediately roused the feeling of the army and the people so far, that they declared him sole emperor. Vetranio quietly submitted, his life was spared, and he retired to Prusa, where he spent the remainder of his life in calm seclusion. Maxentius, fully determined to maintain his usurped power, marched at the head of a strong army into Pannonia to meet Constantius. The hostile forces came to an encounter on the plains of Mursa, and a furious combat ensued. It terminated in favour of Constantius, but the victory was purchased by the loss of his bravest troops; a loss which the exhausted state of the population could not adequately supply. Next summer Constantius gained possession of Italy; and Maxentius having fled to Gaul, sustained there another defeat, and seeing further resistance in vain, put an end to his own life.

A.D. 353.

Constantius was not long permitted to enjoy his triumph in tranquillity. His cousin Gallus, whom he had created Cæsar, instigated by the ambitious Constantina, and being himself of a morose and haughty disposition, caused so much dissatisfaction in the provinces of the East, that Constantius was obliged first to recall him, and soon afterwards to put him to death. Of the race of Constantine the Great, there now remained only Julian, the cousin of the present emperor; and he escaped the fate of his brother Gallus, partly in consequence of the intercession of the empress Eusebia, partly because he had hitherto preferred a scholar's life to the dangerous eminence of military fame. He was permitted to prosecute his studies among the philosophers of Athens, from whom he imbibed that love of the mythology of ancient Greece, which led to his subsequent apostacy from Christianity.

Death of Constantius. A.D. 361.

Having thus once more arranged the affairs of the empire, Constantine paid a visit to Rome, where he was received with demonstrations of the most flattering character. But he was again called away, in consequence of the Germanic tribes assailing the western, and the Persians the eastern provinces of the empire. He sent Julian to command the armies in Gaul, and to oppose the Germans, while he himself endeavoured to maintain the eastern provinces. In his campaigns he obtained but little success; and was even compelled to abandon the siege of Bezade, which the Persians had taken. Mean while, Julian was distinguishing himself in a very remarkable manner in Gaul. Instead of a mere scholar, ignorant of every thing but the jargon of the sophists, as Constantius had thought him, he appeared at once, when in command of the army, an intrepid soldier, and a consummate general. The Franks he completely overthrew in several engagements, gained by his personal courage and his skilful conduct, even though the generals had secret orders rather to thwart than second his efforts. Having repelled the Germanic tribes, he crossed the Rhine, plunged through the morasses, penetrated the forests, and traversed the plains of Germany, spreading havoc and dismay among these ancient enemies of the empire. Constantius, envious of his renown, and jealous of his rising power, demanded from him the best legions of his army, on the pretext that their services were required in the Persian war. The legions refused to obey, and proclaimed Julian emperor. Both parties prepared for a war, to decide their pretensions to the imperial diadem; but while Constantius was exerting himself to the utmost, and while his mind was filled with rage and apprehension, he was seized with a fatal illness, and left the throne to his rival without bloodshed.

Julian the Apostate.

The high reputation of Julian, which had preceded him, procured for him a triumphant reception at Constantinople. Immediately on his arrival, he began a rigorous reform in the whole administration; banished the corrupt and servile ministers of his predecessor; dismissed those whose sole employment had been to gratify the sensual and luxurious habits of the court; appointed men of talent and activity to administer the affairs of the empire; and revived in Constantinople some of the forms of the ancient Roman constitution, particularly the senate and the consular title. But along with these reforms, he had planned a change of a much more extensive nature, nothing less than the subversion of Christianity, and the establishment of a somewhat reformed paganism in its stead. Trained as he was, in the philosophic lore of Greece, he imagined that he saw the deep mysteries of a true natural religion concealed beneath the fables of the heathen mythology; and though he did not imagine the popular mind capable of understanding the deeper meaning, he purposed to remove some of the grossest parts of the external mythic rites, give these, so reformed, to the people, and retain the secret mysteries for the learned. All this, he was well aware, could not be accomplished at once. But he adopted the most subtle methods to promote his ulterior designs. He revoked all the edicts against idolatry; discouraged Christianity, by removing Christians from all places of public honour and influence, and prohibiting them from teaching in the public schools, with the evident design of preventing them from being taught, that they might sink into insignificance.

Attempt to rebuild Jerusalem.

His attempt to rebuild the temple of Jerusalem was one of the most remarkable of his systematic endeavours to overthrow Christianity. He was sufficiently acquainted with the scriptures to know, that the final desolation of Jerusalem and dispersion of the Jews had been predicted, and was a standing miracle testifying to the truth of Christianity. This he endeavoured to refute, and turn against the cause, by rebuilding the temple in more than its original splendour, and restoring the Jews to their long-lost capital. But in this daring attempt he was signally defeated. If we may credit the testimony of contemporaneous historians, the workmen were driven from the attempt by thunders, whirlwinds, and flames bursting from the foundations which they were vainly endeavouring to lay, till terrified by these supernatural events, they were compelled to abandon the enterprize.

Persian war.

From these fruitless endeavours for the subversion of Christianity, Julian was called to take the field against the Persians, who had renewed their aggressions. Though peculiarly desirous of literary and philosophic fame, Julian was by no means destitute of military ambition. He returned a very haughty answer to the Persian ambassadors who had come to treat with him; and set out at the head of a powerful army of skilful veterans, determined to humble the pride and the power of the Persian monarch. For some time his expedition was one continued series of brilliant achievements, till bearing down all opposition, he reached the walls of Ctesiphon. But there he found himself too far from his resources to be able to continue his operations in the siege of a place which promised no speedy conquest. To advance was impossible, to retreat highly dangerous, to remain destruction. Reluctantly he commenced a disastrous retreat, through sandy deserts, oppressed with intolerable heat, deficient in provisions for his troops, and surrounded by clouds of swift Arabian cavalry. Several sharp encounters took place, in which the Roman forces gained the advantage whenever the enemy came to close combat, but suffered dreadfully from the light skirmishing warfare which they generally waged. At length a Persian arrow pierced the unguarded breast of Julian, inflicting a wound of which he died in a few hours, after an active reign of about twenty months. A. D. 363.

Jovian.

The distressed army could not be without a leader; and after a short consultation Jovian, the *first of the domestics*, a title which conferred senatorial dignity, and a rank equal to that of the military *duces*, was proclaimed emperor; and after some severe conflicts with the Persians, was obliged to conclude a treaty neither advantageous nor honourable to the empire, except that it was necessary for the preservation of the wreck of the army. Returning to his own dominions, he immediately revoked all the decrees issued by Julian against Christianity, and in favour of paganism, thus restoring the former to the supremacy which it had enjoyed since the time of Constantine. Before he reached Constantinople, to which he was directing his course, Jovian was found dead in his bed, having been suffocated, as was supposed, by charcoal. A. D. 364.

Valentinian.

After a period of ten days spent in consultation and debate, Valentinian was chosen by the imperial ministers and generals, and the army cordially ratified the choice. Soon after his elevation, Valentinian raised his brother Valens to the dignity of Augustus, and divided with him the empire, giving to Valens the eastern territories, and retaining to himself Illyricum, Italy, Gaul, Spain, Britain, and Africa. Thus were the Roman dominions once more divided into the eastern and western empires; and from the time of Valentinian, they were never again thoroughly united. Valentinian established his court, not at Rome, but at Milan, being nearer the centre of his dominions; and he was almost immediately engaged in hostilities with the restless and warlike tribes of the Germanic race. He made the most energetic efforts to drive back these invaders, and to maintain the extent of the empire undiminished; a task every year more and more difficult, from the increasing torrent of invaders, and the sinking strength of the exhausted empire. Not only were the German tribes in motion, pressing into Gaul, but the tribes bordering on the Baltic were beginning those piratical depredations which made them so long the terror of the adjacent maritime countries. In Britain the Scots and Picts were overpowering the Roman province, so that in every quarter of the western empire, nothing was to be seen but the march and countermarch of contending armies. Theodosius, the Roman general in Britain, succeeded in defending that province from its assailants, and thus gained the friendship of the emperor. To give the appearance of greater stability to his throne, Valentinian raised his son Gratian to the rank of Cæsar, and caused him to be received by the army as his successor.

In the mean time a dangerous war arose in Africa, where the avarice and cruelty of Count Romanus, the military governor, had excited general dissatisfaction. The complaints of the injured Africans having been guilefully misrepresented to Valentinian, he punished the complainers. Despairing of redress, the people revolted, and chose Firmus, the son of a man of great wealth and influence in the country, for their leader. Romanus was quite unable to suppress this rebellion; but Valentinian despatched the warlike Theodosius with a strong force, to reduce them to subjection. Immediately on his arrival, the aspect of affairs was changed. Firmus was defeated with great loss, and fled to a friendly tribe in the interior; but fearing to be betrayed, he committed suicide, to avoid falling into the hands of the conqueror. Valentinian himself had in the mean time been engaged in conducting an expedition against the Quadi, and other nations on the Danube, in which he was successful; but died suddenly of apoplexy, near the modern city of Guntz in Hungary. A.D. 37

Gratian.

Gratian, the eldest son of Valentinian, succeeded his father in the western empire, and immediately associated with himself his brother Valentinian II., at that time only a youth of five years old, assigning to him Italy and Illyricum. Among the first and the worst acts of his reign, was the sanctioning the execution of Theodosius, whose brave and skilful conduct had preserved Britain, and recovered Africa. To this he was instigated by the calumnious insinuations of envious courtiers, who both hated and feared the rising merit of that gallant warrior. The reign of Valentinian, though filled with wars, had been so prosperous that it had secured for his sons a period of comparative tranquillity, more suited to their youth and inexperience. But the eastern empire had neither enjoyed equal prosperity, nor was enjoying the prospect of equal tranquillity.

Almost at the very commencement of his reign, Valens, the eastern emperor, was compelled to make preparations for a new Persian war; and, in the midst of these preparations, was alarmed by a dangerous rebellion. This was raised by Procopius, a distant relation of Julian, whose pretensions to the throne were founded partly on his consanguinity to the former emperor, and partly on a rumour that Julian had himself secretly invested him with the purple. Procopius was at first successful; but his haughty and cruel temper disgusting his own supporters, he was deserted by them, taken by the emperor, and put to death. The Persian war proceeded favourably, Sapor receiving a severe defeat, which was soon followed by a peace. But a more important event occurred, formidable not only to Valens, but also to the whole of the western world. This was the appearance of a new moving nation of barbarians, called Huns. Respecting the origin of this people, there are va-

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rious opinions, of which the most commonly received is that which represents them as sprung from the great family of the Mongolian Tartars, and in some way connected with those tribes called by the Chinese, Hioung-Nou. But there was also among them a manifest mixture of various nomad tribes, of which the predominant were probably the Finnish. It would indeed be absurd to imagine that a mighty migration of nomad tribes, sweeping onwards from the wilds of Mongolia to the Tanais (Don) and the Palus Mæotis (Sea of Azov), could be other than a mingled mass of all the various tribes whom they had conquered and absorbed in their tide-like course. Crossing the Tanais, the Huns drove before them the nations north of the Danube; and these uprooted nations in their turn threw themselves headlong upon the Roman provinces, both impelled and supported by the countless hordes that continued to press resistlessly behind. The Goths, unable to repel these terrible barbarians, sought and obtained permission to settle in the waste lands of Thrace, which formed part of the Roman province of Mœsia. Unfortunately for both themselves and the empire, the Goths had been taught Arianism, and as a very violent hatred subsisted between the Arians and the orthodox Christians, the Goths neither were well received by the Romans, nor entertained sentiments of much friendship towards them. And not less unfortunately, the officers whom Valens appointed to superintend the new settlements of the Goths were men of the most depraved and abandoned characters, and treated them with the utmost perfidy and cruelty. At length Lupicinus, the chief of these officers, attempted at a feast to murder Fritigern and the other Gothic leaders; but the plot being prematurely discovered, the Gothic chiefs escaped, and arming their followers, massacred the greater part of the Roman troops in the province. In the mean time, the Huns advancing on their devastating career, drove the Ostrogoths before them into the territories possessed by the Visigoths; and thus mightily swelled the strength of the infuriated Goths. Uniting themselves under Fritigern, the Goths laid waste Thrace, Macedon, and Thessaly, and approached to the very walls of Constantinople.

In this state of affairs, Valens, assailed by a strong and vengeful foe, applied to Gratian, the young emperor of the west, for aid. He had been engaged in warring successfully against the Germans, and was at that time in the field; but seeing the urgent necessity of saving the eastern empire, he immediately marched to the assistance of his uncle. Before his arrival, the Gothic chief, Fritigern, thinking it lawful to use deceit against a deceitful foe, found means to draw Valens into a situation in which he was almost compelled to fight, without waiting for the arrival of succour. A decisive battle was fought near Adrianople; Valens himself was killed on the field, and nearly two-thirds of the Roman army were cut to pieces. Not even on the dreadful field of Cannae had the Romans sustained a more fatal overthrow; and the stern unconquerable spirit of the republic being no more, the fate of the eastern empire seemed to be inevitable. But what direct force might not have been able to accomplish, was effected by a rare combination of wisdom, valour, and probity. In consequence of his wars with the invaders of his own dominions, Gratian was unable to undertake the conduct of the war against the Goths; but he called to his aid Theodosius, son of that Theodosius whom he had unjustly put to death, and whose death he had bitterly repented. Him he now raised to the dignity of emperor, and gave him at once the eastern empire, with the addition of the province of Illyricum. Theodosius thus raised to the purple, speedily showed himself worthy of the high trust committed to him, that of restoring the fortunes of a falling empire. The courage of the Romans had been so much shaken by their late defeat, that Theodosius did not think it prudent to hazard a general engagement with the Goths; but, like another Fabius, he saved his own forces, harassed the enemy, taught his men that the Goths were not invincible, and gradually restored to them their courage, perfected by improved discipline and temperate caution. At length Fritigern died; and the Goths having no longer a leader capable of controlling the haughty chiefs of their ill-compacted confederacy, became disunited, and one by one submitted to the superior skill, policy, and authority of Theodosius. Great numbers of them received the pay, and were incorporated into the armies of that empire which they had so recently been on the brink of destroying, and the remainder voluntarily engaged to defend the Danube against the Huns. Thus, in about four years, the eastern empire was rescued from the most formidable danger by which it had ever been assailed, and seemed once more in a state of security.

D. 378.

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While Theodosius was thus employed, another calamity befel the western empire. The character and conduct of Gratian had defrauded the fair expectations formed of him on his accession, and exposed him to the contempt of the more warlike part of his subjects. Maximus, who held the chief command in Britain, revolted against him, passed into Gaul, and prepared to dethrone the feeble emperor. The army violated its allegiance, and Gratian having fled towards Italy, was overtaken and killed at Lyons. The death of this prince left his young brother Valentinian II. nominal emperor of the west, though the usurper Maximus assumed that title. Theodosius was obliged to conceal his resentment against the murderer of his benefactor, not being yet in a condition to quit his own dominions; and he even entered into a treaty with him, leaving him in the undisturbed possession of Gaul and Britian. But Maximus, encouraged by the success with which his rebellion had been followed, resolved to deprive Valentinian of even the nominal power which he enjoyed in Italy. Unable to defend his territories, he fled to Theodosius, and besought his aid. Theodosius having completed the pacification of his own dominions, immediately marched against the usurper, defeated him in two successive engagements, and his own troops having yielded him up, put him to death. Valentinian II. was thus restored to the throne of the western empire; a throne which his weak character did not enable him to fill and to defend.

A.D. 383.

Maximus.

A.D. 388.

Valentinian II.

Overthrow of paganism at Rome.

Theodosius, after his triumph over Maximus, resolved to visit Rome, and aid his imperial pupil in reforming the abuses prevalent in that city. This visit is memorable on account of the decrees published by Theodosius for the complete suppression of idolatrous worship in Rome. All sacrifices were prohibited under heavy penalties, the idols were defaced, and the temples of the gods abandoned to ruin and contempt. These decrees met but a feeble resistance, and from that time may be dated the complete and final overthrow of pagan idolatry in Rome. It would be an easy though an unpleasant task, to show how the ill-judging teachers of Christianity, in their zeal to make converts, in order to make the transition more easy to the pagan multitude, adopted many of the rites and festivals of the ancient idolatry, assigning merely to some saint what had been ascribed to some subordinate deity, and thus introduced much of the ill-disguised heathenism which forms so large a proportion of papal superstition: but this we leave to the pen of the ecclesiastical historian. Having thus completed the triumph of Christianity over paganism, Theodosius returned to the east, and employed himself in the kindred task of putting an end to the heresies of the church, establishing the predominancy of the orthodox over the Arian party.

A.D. 392.

Valentinian II. had but a short time recovered possession of the empire of the west, when he was murdered by Arbogastes, a Frank of a bold and warlike character, who had obtained a great ascendancy over him. Arbogastes did not himself assume the purple, but gave it to Eugenius, deeming it more safe to possess the power than the name of emperor. Theodosius once more prepared to avenge the murder of an emperor. He raised a powerful army, forced the passes of the Alps, encountered the army of the usurper, and inflicted on him a decisive overthrow. A.D. 394. Eugenius was killed by his own defeated troops, and Arbogastes, fearing the just resentment of the victor, died by his own hand.

The whole Roman empire might have been once more reunited under one imperial sovereign, had Theodosius been ambitious of that sole dominion. But being perfectly persuaded of the necessity of an emperor in each of the imperial cities, he assigned to his younger son Honorius the sceptre of the western empire, and associated Arcadius, the elder, with himself in that of the east. Scarcely had he completed this arrangement, when his constitution, which had always been feeble, overtasked with the exertions of this campaign and the cares of state, yielded to the shock, and he expired, to the universal regret of the empire, which beheld the splendour of the Roman name passing away with him its last great emperor. A.D. 395.

Stilicho, master-general of the army.

The Roman world now presented the miserable spectacle of two emperors of such imbecility as to be incapable of conducting the administration of public affairs, in a time of such peril and alarm as would have required the prudence of an Augustus joined to the martial skill and talents of a Cæsar. That Theodosius was not unaware of the feebleness of his two sons, may be conjectured from the fact of his assigning the care of at least the western empire to Stilicho, the master-general of the army. This able general seems to have been a Vandal by origin, but had by his courage and his great abilities raised himself to the highest military fame and station before the death of Theodosius; and to him that prudent emperor entrusted the guardianship of the empire. In the east, the crafty and avaricious Rufinus enjoyed similar influence over the feeble Arcadius, but without equal merit to sanction his possession of that power. Stilicho governed by the inherent right of commanding genius; Rufinus by the dark intrigues of a guileful and selfish nature. Stilicho seemed to regard himself as entitled to the supreme care of both empires; and Rufinus endeavoured to secure his authority in the east by persuading Arcadius to marry his daughter. He was however frustrated by the eunuch Eutropius, a person still more crafty than himself, who induced the young emperor to share his throne with the beautiful and accomplished Eudoxia. In a short time afterwards, Rufinus was killed by the leader of a body of Gothic troops in the confidence of Stilicho, who did not however obtain the ascendancy over Arcadius, being supplanted by the intrigues of Eutropius.

In the mean while, a dangerous war broke out in Africa, under the command of Gildo, brother of Firmus, who had been the leader of the last revolt. To suppress this insurrection, Stilicho sent Mascezel, the brother and deadly foe of Gildo. The Romans obtained the victory almost without bloodshed; and Gildo terminated his days by his own act, in a dungeon into which he had been cast. Mascezel did not long enjoy his victory, having been drowned either by accident, or, as some allege, by the contrivance of Stilicho.

War with the Goths.

But the fiercest storm that had ever assailed the empire was now ready to burst upon it in its hour of weakness. The Goths had yielded to the arms, and especially to the policy of Theodosius. After the death of Fritigern and of Athanric, they had been for some time without a leader able to combine them into one body. A leader of equal craft and courage now appeared in the famous Alaric, who having succeeded in establishing his authority over his countrymen, only waited for a fair pretext, and a favourable opportunity to put in practice a scheme of greater magnitude and daring than had entered into the mind of any of Rome's assailants since the time of Hannibal. The corrupt and avaricious ministers of Arcadius soon afforded him a pretext sufficiently plausible, by withholding the subsidy paid to the Goths since the agreement with Theodosius. Not deeming the lands of Thrace worth his while, Alaric led his forces into Greece, passed the straits of Thermopylæ without opposition, devastated its fairest lands, and plundered Athens, Corinth, Argos, and Sparta. A.D. 39 The unwarlike emperor of the east and his effeminate courtiers did not dare to meet the warlike barbarian; and Stilicho marched against them to rescue Greece from her rude plunderers. The great military genius of Stilicho was soon apparent in the advantage he obtained over the Goths, whom he at length succeeded in driving into a straitened position in Elis, whence it seemed impossible for them to escape. Taking advantage of the relaxation which security had produced in his antagonists, Alaric forced the lines of circumvallation, crossed the narrow strait at the mouth of the gulph of Lepanto, and resumed his ravages in Epirus. Before Stilicho could again reach his enemy, he received information that the emperor of the east had concluded a peace with Alaric, and had even made him master-general of Illyricum.

Alaric the Goth.

Stilicho yielded to the unwise policy of Arcadius, and returned to Italy; but was very speedily recalled to march against his baffled but unvanquished foe. Resolved if possible to make himself master of the western empire, Alaric crossed the Julian Alps, and marched rapidly towards Milan, where Honorius held his court. Stilicho hastened to recruit his army and to defend the empire; but before his preparations were complete, the swift march of Alaric compelled Honorius to fly from Milan. In his flight he was almost surrounded by the Goths, and took refuge in Asta, where he was immediately besieged. Stilicho hastened to the rescue of the emperor; and gained a great, but not decisive victory over Alaric at Pollentia. Rallying the remains of his shattered army, Alaric quitted the scene of his defeat, and marched furiously to Rome, determined to wreak his vengeance on that proud city, or to perish at its gates. But Stilicho at the head of a chosen body of his army hastened with scarcely less swiftness to the relief of the threatened capital, and arrived in time to protect it from the rage of Alaric. He did not however deem it safe to force his antagonist to a battle, dreading perhaps the almost invincible energies of a brave enemy's resolute despair; and thought it preferable to purchase his retreat, though at the expense of a very large sum of money.

Though frustrated in this attempt, Alaric did not relinquish his intention of making himself master of the western empire. He retreated towards Gaul, and attempted to seize Verona, intending to retain it as an open door by which to invade Italy when he should be supported by the strength of Gaul. Stilicho being apprised of his intention, followed, beset, and brought him to an engagement at Verona, and inflicted on him a second great overthrow, but could not prevent his escape, with a spirit undismayed, and a resolution only confirmed of implacable hostility to Rome. After this deliverance, Honorius went to Rome to enjoy the honours of a triumph; but this timid prince was not satisfied with a residence in any city which was exposed to the dangers of invasion. He therefore withdrew to Ravenna, a small fortified town on the banks of one of the mouths of the Po, deemed inpregnable from its situation; and here he determined to fix his imperial residence.

The Vandals.

Another enemy now appeared to summon forth afresh the energies of the brave and indefatigable Stilicho. This was another combined host of roving nations, chiefly Vandals, Alani, Suevi, and Burgundians, under the command of Radagaisus. On their march a large body of this moving mass separated, and entered Gaul; while the rest under their chief entered Italy and laid siege to Florence.

Again did Stilicho by his superior tactics save his own army, and overthrow that of the enemy, enclosing them within such entrenched lines as they could not force, and reducing them to such distress that they were compelled to surrender at discretion. Radagaisus was put to death; and the greater part of his army sold as slaves. Of this fresh tide of migrating barbarians, the portion which turned towards Gaul was more successful. They devastated the whole of that country, crossed the Pyrenees, and formed a settlement in Andalusia.

D. 408.

Stilicho was now suspected of a secret intercourse with Alaric, whom he had several times defeated, but always suffered to escape. A correspondence certainly existed between them; and Stilicho even attempted to persuade Honorius to frame a treaty with Alaric, and to give him the province of Illyricum. In the midst of these political intrigues, Olympius found means to gain the confidence of Honorius, and procured the murder of the brave and able Stilicho, the deliverer of Italy. As if to prove the infatuation of guilt, Olympius next procured the murder of the wives and children of the barbarians throughout Italy, which, instead of weakening their power, strengthened it by the just resentment which so atrocious a deed awoke in their fierce, yet human bosoms. They immediately invited Alaric to head them in avenging the slaughter of their families; and thus about thirty thousand brave and disciplined men were by one bloody and treacherous deed converted from auxiliaries into the most implacable foes, while the death of Stilicho encouraged Alaric to invade a country no longer defended by that renowned warrior, before whom his own martial genius had stood rebuked.

ome be-
ged.
D. 408.

itu-
s.
D. 409.

Delighted to see his great scheme so nearly within his reach, Alaric once more entered Italy and marched directly against Rome.[1] By a skilful arrangement of his forces, he cut off all supplies, and the devoted city was soon subjected to the aggravated horrors of war, famine, and pestilence. Safe in his retreat at Ravenna, the emperor made no effort to save his capital; and after suffering the most dreadful miseries, the senate purchased a cessation of hostilities and the retreat of the besieging army, by the payment of an enormous ransom. Alaric withdrew to Tuscany, and waited the ratification of this treaty by the emperor, being unwilling to come to extremities, under the hope of yet obtaining such an alliance with Honorius as should raise him to the command of the armies of the whole western empire, which he might govern in the name of the emperor, as Stilicho had done. Honorius refused to ratify the treaty; and Alaric once more invested Rome. In this second siege Alaric took measures to secure a more speedy triumph. He seized upon the harbour of Ostia, which contained the granaries for supplying the city; and the Romans were compelled at once to capitulate. Still the conqueror modified his triumph, contenting himself with raising Attalus, præfect of the city, to the empire. Notwithstanding this virtual dethronement of Honorius, Alaric continued to negotiate with that feeble monarch, whose name bore a higher dignity than that of Attalus. Having again failed to obtain his wishes, he deposed Attalus, and marched against Rome, resolved no longer to control the strong impulse which had long urged him to the sack of Rome. The barbarian army once more approached the walls. During the darkness of night the Gothic slaves within the city seized one of the gates, and threw it open to their countrymen, setting fire to some adjacent houses to light their entrance and to begin the work of devastation, spoil, and carnage. For six successive days of horror the Goths were allowed to glut their furious appetites in the sack of the prostrate queen of the world, restrained only by their own respect for the churches, where numbers of the trembling inhabitants found a sanctuary.

Taking of Rome by Alaric. A.D. 410.

It was not the intention of Alaric to destroy Rome, but rather to make himself its sovereign. After he had attempted this by policy and intrigue, he accomplished it by force. His ambition now expanded with his success; and he resolved to subjugate all Italy, pass into Sicily and add it to his conquest, thence into Africa, and annex it to his dominions, and thus to make himself the sovereign of the whole western empire. But while on his march through southern Italy for the accomplishment of these vast designs, he was suddenly smitten with a mortal malady, and died near Consentia. Before his death he gave orders that he should be interred in the channel of the small river Busentinus. The river was turned aside by the labour of captives, the royal sepulchre dug in the vacant bed, the body, richly adorned with the spoils and trophies of Rome, was deposited, the waters were restored to their channel, and the prisoners who had executed the work were murdered, that it might not be known where he lay, and that the hand of man might never insult the ashes, and the foot of man never tread upon the grave, of Alaric the Goth, the conqueror of Rome.

Death of Alaric. A.D. 410.

After the death of Alaric, the command of the Gothic army devolved upon his brother Adolph, who, though not destitute of talents, possessed neither the fierce passions nor the high ambition of Alaric. He concluded a peace with Honorius, consenting to quit Italy upon condition of the princess Placidia being given to him in marriage. This being done, he acted as a Roman general, led his forces into Gaul, and reconquered that country for the emperor. Thence he passed into Spain, and began a fierce war against the other barbarian nations by whom that country had been invaded; but was murdered in the midst of his victorious career. His successor Wallia continued the war with equal vigour and success, till he subdued nearly all Spain, and founded the Gothic monarchy. Placidia was sent back to her brother Honorius, on the remonstrances of the emperor's victorious general Constantius, at the head of a powerful army; and she was afterwards given in marriage to the brave leader by whom she was thus recovered.

A.D. 423.

Constantius did not long enjoy his dignity; and upon his death Placidia sought a retreat in the court of Theodosius, taking with her to Constantinople her two infant children Valentinian and Honoria. Within a few months after this event, which renewed the intercourse between the imperial families of the East and of the West, the emperor Honorius died of dropsy. The throne was immediately seized by John, the Primicerius, or principal secretary of the late emperor. Thedosius II. who had succeeded his father Arcadius in the empire of the East, prepared to place his cousin on the throne of Rome. The eastern army took Aquileia, and obtaining possession of Ravenna, where the usurper then was, put him to death, and secured the Italian crown. After some little delay, the son of Honorius, an infant only six years old, was raised to the throne, by the name and title of Valentinian III., emperor of the West; the administration of affairs being conducted by his mother Placidia. It is worthy of remark, that both divisions of the Roman empire

Valentinian III.

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[1] The state of Rome at that eventful period cannot be better described than in the language of Gibbon. "It had attracted the vices of the universe, and the manners of the most opposite nations. The intemperance of the Gauls, the cunning and levity of the Greeks, the savage obstinacy of the Egyptians and Jews, the servile temper of the Asiatics, and the dissolute, effeminate prostitution of the Syrians, were mingled in the various multitude; which, under the proud and false denomination of Romans, presumed to despise their fellow-subjects, and even their sovereigns, who dwelt beyond the precincts of the Eternal City."

were at this juncture governed by females; the East by Pulcheria, in the name of her brother Theodosius II., and the West by Placidia, in the name of her son Valentinian III.

The two rival generals, Bonifacius and Ætius.

While Rome was assailed on all sides by fierce barbarian nations, it was extremely necessary that either the sceptre should be swayed by a warlike monarch, or that men of military talents should occupy the chief places of trust and influence. The western empire was governed by a woman in the name of an infant; but there were two men at the head of its armies equal to the burden of its support and defence, had they not been rendered foes by jealousy and intrigue. These were Bonifacius in Africa, and Ætius in Italy, both men of great abilities, but the latter envious and designing. In order to ruin his less cunning rival, Ætius wrote to Bonifacius to inform him that the empress Placidia wished his death, and meant to recall him from Africa for that purpose; and at the same time he persuaded Placidia that Bonifacius meant to rebel, and advised her to recall him for the purpose of proving his obedience. When the order reached Bonifacius, it confirmed the fallacious statement of Ætius, and he refused to return; this refusal convinced Placidia of his traitorous design, and she caused him to be proclaimed a traitor, thus driving him into rebellion. Bonifacius was well aware that he could not hope to contend successfully against the veteran troops of Rome, led by Ætius; and he therefore had recourse to the aid of Genseric, king of the Vandals, at that time settled in Spain. This ambitious and daring barbarian immediately crossed the straits of Gibraltar, entered Africa, and commenced a course of dreadful devastation. Bonifacius learned, when too late, how he had been deceived; and he then attempted, but in vain, to check the progress of the savage invaders. He was defeated, the cities that opposed the Vandals were taken, and Africa was wrested from the power of Rome, and completely overrun by the barbarians.

Genseric the Vandal.

As the innocence of Bonifacius had been proved by the deceitful letters of Ætius, he was received on his return to Italy, with marks of favour by the empress. This roused the utmost wrath of Ætius, and a sort of civil war arose between the two rivals, in which Bonifacius was slain; but the empress, who was now thoroughly acquainted with the treachery of Ætius, proclaimed him a traitor, and he fled to the Huns, with whom he had maintained a secret alliance. In a short time afterwards he returned to Italy, requesting re-admission to the councils of the empire, and supported in his requests by an army of sixty thousand barbarians. Placidia was obliged to accept his proffered assistance, to raise him to the dignity of a patrician, and to the command of the imperial armies, and consequently to the government of the empire.

No sooner had Ætius secured this object of his ambition, than he resolved to recover the lost province of Africa; and for this purpose, availing himself of the indignation which the cruel and barbarous treatment of his sister by Genseric had excited in the mind of Theodoric, king of the Visigoths, he endeavoured to frame such a treaty with that monarch as should induce him to aid the Romans against the common foe. This politic design was however discovered by the crafty barbarian, Genseric, who defeated it by inducing the terrible Attila, king of the Huns, to invade the empire. For some time this powerful barbarian had ruled with despotic sway over the whole nation of the Huns, and kept both the courts of Rome and Constantinople in terror, levying a tribute from each, as the price of his temporary forbearance. The death of Theodosius II., and the accession of Marcian, the nominal husband of Pulcheria, infused a more determined spirit into the councils of the eastern empire; and the fury of Attila might have been directed against it, rather than the west, had it not been for the intrigues of Genseric, who induced the fierce king of the Huns to bend his course westward, and pour the torrent of his almost countless multitudes through Germany into Gaul. The haughty barbarian had also another pretext. The princess Honoria, daughter of Valentinian, is said to have offered him her hand; and Attila, availing himself of the proffer, demanded her in marriage, together with a portion of the empire as her dowry, and advanced at the head of an immense army to enforce his demands. All opposition was in vain, till he reached Orleans in Gaul, which sustained a siege for some time, in the hope of succour from the confiderate forces of Ætius and Theodoric. At length the allied army appeared, when the Huns were actually forcing their way into the town, and Attila called them back, and retired into the plains around Chalons, (*in campis Catalaunicis*,) to obtain space for the evolutions of his mighty army. After a battle, fierce, varied, obstinate, and bloody, in which the nations from the Wolga to the Atlantic were engaged, Attila was beaten back to his camp, and the field, covered with the dead bodies of 162,000 slain, remained in the possession of Ætius, Theodoric having fallen in the battle. Attila retreated into Germany, still too formidable to be more than harassed on his march.

Attila the Hun.

Battle of Chalons A.D. 45

During the following spring, he renewed his attempt, but now directed his course into Italy itself, and laid siege to Aquileia, which he took after a protracted and desperate resistance. Ætius could not induce the Visigoths to render him any assistance, and his own forces were unable to meet the vast armies of the Huns; yet he continued to keep the field, and to impede the progress of the dreadful invader. His march was now to be directed against Rome, when he was prevented, partly by the offers of an embassy sent to him from the timid Valentinian, and partly in consequence of a superstitious feeling of apprehension for his own life, both friends and foes reminding him that Alaric had not long survived the taking of Rome. He consented to accept a large ransom and the princess Honoria, threatening to return filled with implacable vengeance, should the stipulations of the treaty not be fulfilled. Soon after his return to his almost imperial village, he fell a victim to intemperance, and died by the bursting of a blood-vessel, on the night after a feast held in honour of his own nuptial engagement with the fair Ildico. Thus perished the terrible Attila, a man of matchless energy of character, a barbarian surpassing all in the barbaric pride and cruelty in which he delighted; who directed his ambassadors to say to the two emperors of Constantinople and Rome, "Attila, *my* lord, and *thy* lord, commands thee to provide a palace for his immediate reception;" who delighted in uttering the ferocious boast, that the grass never more grew on the spot once trodden by his horse; and who actually adopted the appellation given to him by a trembling enemy, *Attila, the scourge of God.*

Death of Attila. A.D. 45

Upon the death of Attila, the kingdom of the Huns was torn to pieces among his followers; and Rome might have enjoyed safety, had not the jealousy and ingratitude of Valentinian led him to murder with his own hand the brave Ætius, the only person capable of protecting the empire. Not long afterwards, Valentinian himself was killed by the patrician Maximus, whose wife the weak and dissolute tyrant had violated, and who ascended the throne thus rendered vacant.

A.D. 45

Maximus

Soon after his assumption of the imperial dignity, the wife of Maximus died; and wishing to obtain a sanction for his elevation, he married Eudoxia, the widow of Valentinian, and sister of the eastern emperor. In some moment of strange imprudence, he told the empress that he had caused the murder of her first husband Valentinian; and to revenge the deed, she privately invited Genseric, the Vandal conqueror of Africa, to invade Italy, and dethrone the usurper. Genseric had built and equipped a powerful fleet, which rendered him master of the sea, and put it in his

ome
ken by
enseric.
.D. 455.

power to devastate the maritime countries around the Mediterranean. His answer to Eudoxia was the speedy appearance of a Vandal fleet in the Tiber. The terror of the Roman citizens vented itself on Maximus, who was put to death in a tumult of popular indignation; but Genseric landed and took possession of the city, which immediately became a scene of horrors, surpassing those caused by the storm and pillage of Alaric and his Goths. For the space of fourteen days and nights did the savage Vandals indulge their rapacious appetite for plunder, by seizing upon all the public and private wealth which had escaped the Goths, or been accumulated since their departure. Eudoxia herself was despoiled of her jewels, and compelled, along with her two daughters, to embark on board the vessels of the barbarous plunderer. Great numbers of the Roman citizens were carried away to Africa as slaves, the only mitigation of their sufferings being what was purchased from the Vandals by Deogratias, bishop of Carthage.

vitus.

Before the death of Maximus, he had appointed a noble Gaul, named Avitus, to the command of the troops in that country. When the death of Maximus left the empire without a sovereign, the army proclaimed Avitus; and the friendship of Theodoric, the king of the Visigoths, induced him the more readily to accept the dangerous honour. But he enjoyed his elevation a short time. Ricimer, commander of the barbarian mercenaries in the armies of the empire, descended of the royal race of the Visigoths by the mother's side, and of the nation of the Suevi by the father's, having defeated the Vandals in a naval action, and been hailed "deliverer of Italy," found himself strong enough on his return, to depose Avitus, who was allowed to become bishop of Placentia, but he did not live to enjoy his ecclesiastical preferment.

D. 456.

ajorianus

For a short time Ricimer continued to govern the empire without the appointment of an imperial ruler; but at length he raised to that position Majorianus, a man of courage and merit, who had been trained under the care of Ætius, and was equally skilled in the arts of the field and the cabinet. His first attempt was to check the growing degeneracy of Rome, by amending the laws, making a new distribution and arrangement of the taxes, restoring and reforming the magistracies, preventing the destruction of public edifices, and especially by such a vigorous resumption of the ancient discipline of the armies, as should render them able to meet their enemies with their former certainty of victory. He levied troops, repelled an invasion of the Vandals, constructed a fleet, and prepared to carry the war into Africa, for the recovery of that province, which had long been the very granary of Rome. But it was not the policy of Ricimer to allow a truly able and heroic monarch to occupy the imperial throne, lest he might rouse the Romans from their deep degeneracy. He fomented a sedition in the army, in consequence of which Majorianus was compelled to abdicate; and five days after his abdication he died, as was reported, of a dysentery, more probably of treachery. In him perished the hopes and the prospects of Rome, of ever again obtaining deliverance from the degradation of barbarian sway.

D. 461.

ius
erus.

, At the command of Ricimer, the senate named as emperor Libius Severus, an obsequious dependant of the imperious barbarian, who continued to hold the nominal dignity of emperor for a period of six years, during which the whole power was so completely retained by Ricimer, that the name of Severus is scarcely ever mentioned by the historians of the time. At length the growing power of the Vandals in Africa, and their incessant depredations on the coast of Italy, compelled Ricimer, who had no naval force to oppose them, to apply for aid to the emperor of the east, and to offer him the appointment of a western emperor as an inducement. The opportune death of Severus enabled Ricimer to make this offer freely, if indeed he had not caused that death; and Leo, the eastern sovereign, nominated Anthemius to that ill-omened station. A combined armament was prepared by the Constantinopolitan and Roman emperors, and sent against the Vandals; but the superior conduct of Genseric prevailed, and the confederate force was almost totally destroyed. Bereft of his eastern support, Anthemius was unable to maintain himself against the powerful and ambitious Ricimer, who first withdrew from Rome to Milan, and there held a separate and independent court, and then marched toward Rome in open rebellion against the emperor. For some months Anthemius defended the city; but at length it was carried by storm, and the unhappy emperor being dragged from concealment, was murdered by the command of Ricimer.

Anthemius
A.D. 467.

A.D. 472.

Anycius
Olybrius.
A.D. 472.

Anycius Olybrius, the son-in-law of Valentinian III. was next placed on the throne, by this daring and successful setter-up and puller-down of emperors. Within about a month after this exploit, Ricimer himself followed his imperial victims to the grave, being cut off by a painful disease; and before other two months had elapsed, Olybrius died a natural though an early death.

Julius
Nepos.

Even ambition could not rouse the sluggish court of the east to activity, although the death of Ricimer rendered it probable that the nomination of a new emperor would meet with little opposition. At length Leo named to that dignity Julius Nepos, who had married a relation of the empress, and had previously held the government of Dalmatia. In the meantime, Gundobald, the Burgundian prince, and nephew of Ricimer, had raised to the throne an obscure soldier named Glycerius; but upon the approach of Nepos, supported by the troops of Leo, Glycerius fled, the Burgundians not thinking proper to engage in a war for his defence, and he is said to have consulted his safety in the new character of bishop of Salona.

Glycerius.
A.D. 474.

Nepos enjoyed the sovereignty but a very short time. The barbarian confederates, or auxiliary troops, broke out into a violent sedition, and marched, under the command of their general, Orestes, a native of Pannonia, of high descent, against Ravenna, where Nepos had his court. Instead of confiding in the strength of the fortress, and hazarding the contest, Nepos fled across the Adriatic to his former Dalmatian province, and lived in obscurity till he was murdered by the instigation of his former rival Glycerius.

A.D. 475.

Romulus
Augustulus

Orestes did not himself think proper to assume the purple, but gave it to his son Romulus, or, as corrupted by the half-barbarian half-Greek pronunciation of Pannonia, Momyllus, to whom, as raised to the imperial dignity, was also given the name of Augustus, afterwards changed into Augustulus; in whom thus met, by a strange combination, the names of the founders of the city, and of the empire. But Orestes soon found that it was easier to usurp than to retain supreme power. The barbarian mercenaries, headed by Odoacer, a bold and enterprizing chief of the Heruli, demanded a partition of the lands of Italy among them, to at least a third; and upon the refusal of Orestes, they flew to arms, mustering from all quarters, besieged and took Pavia into which Orestes had thrown himself, and put him to death. Odoacer next directed his march to Rome, and was met by Augustulus, who voluntarily abandoned the insignia of imperial sway, and appealed to the clemency of the conqueror. His life was spared, and he was allowed to retire to the villa which had belonged to Lucullus, where he was allowed a sum of money for his support. Odoacer retaining the entire sovereignty, contented himself with the title of king, and thus put an end to the Roman Empire of the West, in the 1229th year from the foundation of Rome.

Odoacer,
king of the
Heruli.

A.D. 476.

Statistics of Rome.

Though this was the actual termination of the Roman Empire, yet it ought to be added, that Odoacer never assumed the purple and diadem, or the title of king of Italy, being satisfied with the regal title alone, without any local application; and that after a comparatively peaceful, prosperous, and prudent reign of fourteen years, his fortunes sunk before the superior genius of Theodoric, the king of the Ostrogoths, a prince alike capable of founding or reconstructing a monarchy, under whose sway all vestiges of the imperial government were swept away, or remodelled, and Italy was formed into a kingdom.

Theodoric the Ostrogoth.

There is no portion of profane history more pregnant with important instruction, than that which relates to the rise, the growth, the fluctuations, and the fall of Rome. It equally demands the studious attention of the scholar, the statesman, the philosopher, and the Christian. In its literature, the scholar will find treasures second only to those of Greece; in its political struggles and changes, the statesman will find much to guide him in his endeavours to mould the constitution of his own country; in its peculiar mental aspect and character, the philosopher will find a full development of one of the most vigorous and striking phases of mind that have ever been displayed in the history of humanity; and in its resistance to the pure and simple truths of the gospel, the Christian will be led humbly to ponder on the deep depravity of man, and the danger of rejecting that system of religion which can alone elevate the character of individuals, and promote the security and happiness of communities. To point out the full application of these views would require a dissertation far beyond our limits; and we must therefore leave the intelligent and inquisitive reader to trace them for himself, well assured that the labour will amply prove its own reward.

(B. O.)

STATISTICS OF ROME.

Having thus related at length the rise and progress, decline and fall, of the empire of Rome, we now proceed to give a topographical and statistical description of that famous city.

Rome, by the shortest route, Brighton, Dieppe, Paris, Geneva, Simplon, Milan, Bologna, Florence, and Sienna, s about 1169 English miles distant from London.

Hills of Rome

The hills of Rome are chiefly composed of volcanic granular tufa, but the greater part of the Capitoline is lithoid tufa, which resembles the peperine stone of Albano, and the same material is found in some parts of the Cælian and Aventine hills. The valleys among the hills are chiefly of siliceous-calcareous sand, but argillaceous substances are very prevalent in the soil of Rome.[1] The height, in English feet, of the principal hills above the sea, is as follows: Capitol, at west angle of Tarpeian rock, 151; at north end, 160; Palatine, 170; Aventine, 148; Cælian, 146; Esquiline, 180; Quirinal, at Pope's palace, 150; Pincian, 206.

Modern Rome occupies a triangular space, each side of which is nearly two miles long. The ground upon which it is built covers about 1000 acres, or one mile and a half square; its walls form a circuit of fifteen miles, and embrace an area of 3000 acres. The greatest part of the population of Rome is now comprised within the limits of the Campus Martius. Three of the seven hills are covered with buildings, but are only thinly inhabited; the Transtiberine district, including the Borgo, contains the rest of the inhabitants. The ancient city, however, was more than treble the size of the modern, for it had very extensive suburbs beyond the walls. The greater portion of the city stands extremely low, being only from forty to fifty feet above the sea, though sixteen miles distant from it. The Tiber, where it enters the city, is only about twenty feet above the level of the sea.

According to the unanimous opinion of all ancient writers, Rome was originally confined to the Palatine hill,[2] and after the union of the Romans with the Sabines, the latter, with their king Tatius, had their abode on the Capitoline. After the death of Romulus, a temple to his honour, under the name of Quirinus, was erected by Numa on the Quirinal hill, to which it gave the name.[3]

The Cælian hill was added by Tullus Hostilius, who had his own dwelling there, and appropriated part of the mount for the residence of the conquered Albans.[4] The Aventine mount was annexed to Rome by Ancus Martius, the fourth king, who gave it for the accommodation of the Latins after his conquest of their country.[5] He also surrounded mount Janiculum with a wall, and erected upon it a fort, lest this advantageous post should fall into the possession of an enemy. He likewise connected it with the city, by throwing across the Tiber the famous bridge called the *Pons Sublicius.* When the waters of the river are not above their usual level, the traveller may still see the foundations of this bridge, the scene of the heroic exploit of Horatius Cocles.[6] The city, which now contained four hills, the Palatine, the Capitol, the Cælian, and the Aventine, was enclosed with a stone wall by Tarquinius Priscus; and his successor Servius Tullius having added the Quirinal, Viminal, and Esquiline hills, surrounded the whole city with a wall, built of large squares of peperine stone, and fortified it on the eastern side behind the Viminal hill, by his celebrated "Agger,"[7] which was finally completed by Tarquin the Proud. All around the wall, on both sides, was a circle of ground, called the Pomœrium, consecrated by the augurs, and held sacred; and it was unlawful to build within its limits, or even to pass the plough over it.[1] This consecrated circle, however, was not necessarily preserved close to the walls, and it was frequently extended without any change being made in the walls themselves. But the boundaries of the city could only be enlarged by those who had made any acquisition of territory to the Roman state.[2] The first who took advantage of this privilege was Sylla, and his example was followed by Augustus, Claudius, Nero, and Trajan.[3] All their improvements, however, consisted in restoring or enlarging the Pomœrium; and no change was made in the walls of Rome till the time of Aurelian, who built a wall round the city, and enlarged it so as to comprehend the Janiculum and the Pincian hill, with great part of the Campus Martius.[4] Various exaggerated accounts have been given of the walls of Aurelian, and antiquaries are much divided respecting them, but their probable compass appears to have been about twenty-one miles. The walls of Rome were repaired during the reign of the emperors Arcadius and Honorius. One-third of them was destroyed by Totila about the middle of the sixth century. His ravages were hastily restored with rude and dissimilar materials, by Belisarius, to stand the second siege. Since that period they have been so often shattered, repaired, and remodelled, that but little of their original structure can now remain.

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[1] Brocchi's Description of the Soil of Rome; Burgess's Antiquities of Rome, vol. i.

[2] It is impossible to ascertain the precise limits of the city of Romulus, but an outline of it has been traced by Tacitus: "Igitur a Foro Boario, ubi æreum Tauri simulacrum adspicimus, quia id genus animalium aratro subditur, sulcus designandi oppidi cœptus, ut magnam Herculis aram amplecteretur. Inde certis spatiis interjecti lapides, per ima montis Palatini ad Aram Consi, mox ad Curias veteres, tum ad sacellum Larium: Forumque Romanum et Capitolium non a Romulo, sed a Tito Tatio additum urbi credidêre." Tacit. Ann. lib. xii. cap. 24. Compare also Dionysius, lib. ii. cap. 50; and Sextus Aurelius Victor in Romulo.

The Palatine was nearly a square, and hence Rome was sometimes called "Roma Quadrata."

"Et quis extiterit Romae regnare quadratæ?"

Ennius, quoted by Festus.

[3] "Tura ferant, placentque novum pia turba Quirinum.
Templa Deo fiunt, collis quoque dictus ab illo;
Et referunt certi sacra paterna dies."

Ovid. Fast. lib. ii. 507, &c.

Ἱερὸν μὲν οἶν αὐτῷ ἔστι κατεσκευασμένον εν τῷ λόφῳ τῷ Κυρίνῳ προσαγορευομένῳ δι' ἐκεῖνον.

Plutarch. "in Romulo."

[4] Tit. Liv. lib. i. cap. 30. Eutropius in Tull. Host. &c. "Cælium montem intra mœnia clausit, numero et potentia crescente Roma" Vide Messala Corvino, lib. de August. Progen. p. 696. Aug. Histor. &c.

[5] "Aventinum novæ multitudini datum, &c. . . . . Janiculum quoque adjectum, non inopia loci, sed ne quando ea arx hostium esset; id non muro solum, sed etiam ob commoditatem itineris, ponte Sublicio tum primum in Tiberi facto, conjungi urbi placuit." Liv. lib. i. cap. 33.

[6] Liv. lib. ii. cap. 13, &c.

[7] "Aggere et fossis et muro circumdat urbem; ita Pomœrium profert." Tit. Liv. lib. i. cap. 44. See also Plin. Hist. lib. iii. cap. 5.

The number and situation of the ancient gates of the city are involved in hopeless obscurity. Rome at present has sixteen gates, including the four of the *Citta Leonina*, but several of them have been walled up.

Palatine mount.

The Palatine mount is about a mile and a half in circuit, and is nearly square. The ruins of the successive edifices which have stood upon it have raised the soil around its base considerably above the ancient level. About one-half of the surface of it is called the Villa Farnese, which occupies all the north-west side, and about one-half of the two sides contiguous, and is let and cultivated as a kitchen-garden. Adjoining, on the south, is the Villa Spada, which lies along a part of the west side overlooking the site of the Circus. Another part of the hill is covered by the upper and lower gardens. Roncioni, and the side opposite to the Cælian mount, is partly occupied by the convent and gardens of Saint Bonaventura. This celebrated spot, which contained the whole Roman people, till the destruction of the republic, was the site of the dwellings of her senators, and the temples of her gods. But the mansions of the Gracchi, of Hortensius, Crassus, Clodius, Catiline, Cicero, and many others, were all swept away, to make room for the palace of Augustus,[5] which is supposed to have stood on the north-west part of the Palatine, looking down on the *pulchrum littus*, "the beautiful shore" near the Tiber. His successor, Tiberius, erected a dwelling for himself on the north side of the Palatine, looking into the Velabrum.[6] Another was built on the north-east corner fronting the Capitol by Caligula, who joined the Palatium and the Capitol by a bridge thrown across the Forum.[7] But by far the most magnificent was the "Domus Aurea," erected by Nero. The only description on record of this gorgeous palace is that of Suetonius, which we shall give in his own words: "In nothing was he so ruinous as in building. He erected a house extending from the Palatine as far as the Esquiliæ. At first he called it his House of Passage; afterwards, when it had been destroyed by fire and restored again, he gave it the name of the Golden House. To form an idea of its extent and magnificence, it may suffice to state the following particulars. The vestibule admitted his colossal statue, which was 120 feet high. The building was on so large a scale that it had a triple portico a mile long, also an immense pool like a sea, enclosed by buildings, presenting the appearance of towns. There were moreover grounds laid out for tillage, and for vineyards, and for pasturage and woods, and stocked with a vast number of every description of cattle and wild animals. In other respects, every thing was overlaid with gold, embellished with gems, and with mother-of-pearl. The ceilings of the banqueting-rooms were fretted into ivory coffers, made to turn, that flowers might be showered down upon the guests, and were furnished with pipes for discharging perfumes. The principal banqueting-room was round, and by a perpetual motion, day and night, was made to revolve after the fashion of the universe. There were baths streaming with salt and sulphurous waters."[8] "On the ruins of his native country," says Tacitus,[9] "Nero erected a palace, in which the profusion of gold and precious stones did not raise the chief admiration, for these were ornaments that widely-diffused luxury had rendered common; but universal astonishment was excited by its spacious glades, and large artificial lakes, by its thick woods and shades, like vast wildernesses, by its ample lawns and avenues, and far extended prospects." The successors of Nero made various alterations on the imperial palace. It suffered by fire for the third time under Commodus.[10] The Goths and Vandals, in the fifth century, pillaged it of most of its treasures, but they do not appear to have rendered it uninhabitable; for even so late as the beginning of the seventh century Heraclius held a state ceremony in the palace of the Cæsars. Its final destruction seems to have been in a great measure the work of the Farnese popes and princes, who carried off its materials to build their palaces and villas, and buried its magnificent halls beneath their wretched gardens. Many extensive chambers and halls have at different times been discovered, but after being rifled of their statues and ornaments, they have all been filled up again. The whole mount is now one mass of confused and undistinguishable ruins. The very soil is formed of crumbled brick-work. Nothing has been told, nothing can be told, to satisfy the belief of any but a Roman antiquary.

Palace of the Cæsars.

Capitoline hill.

The celebrated Capitoline hill, the least of all in extent, but greatest in fame and importance, is 470 yards long and 185 broad, and contains about sixteen acres. It exhibits two summits separated by a valley, which is called by antiquaries the *Intermontium*. The height of this hill has been materially diminished, both by the ruins around its base, and by the repeated earthquakes that have shattered the friable tufa of which it is composed, and have thus both lowered the actual height and filled up the base. On the summit of this famous mount

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[1] Vide Tit. Liv. lib. i. cap. 44.

[2] "Pomœrio autem nemini principum licet addere, nisi ei qui agri Barbarici aliqua parte Romanam rempublicam locupletaverit; addidit autem Augustus, addidit Trajanus, addidit Nero," &c. Vopiscus in Aurelian, cap. 21.

[3] "Et Pomœrium auxit Cæsar, more prisco; quo iis, qui protulêre imperium etiam terminos urbis propagare datur. Nec tamen duces Romani, quanquam magnis nationibus subactis, usurpaverant nisi L. Sulla et Divus Augustus." Tacit. Annal. lib. xii. cap. 23. See also Dion. Cassius—De August. lib. iv. cap. 6, tom. ii. p 776.

[4] Vopiscus in Aurelian, cap. 21; Ovid, cap. 39; Aurelius, Victor. De Cæsar, cap. 35; Roma Antica Nardini, lib. i. cap. 8.

[5] Vide Middleton's Life of Cicero; Suetonius' Life of Augustus.

[6] It should be stated, however, that when mention is made of the houses of the emperors, it does not mean that these were all separate buildings, but such parts of the imperial palace as the emperors added, and which bore their respective names. Vide Josep. Antiq. lib. xix. cap. i. sect. 15.

[7] Suet. in vit. Caligul. cap. xxii.

[8] Suet in vit. Neron. cap. xxxi. Vide Alexan. Ponct. de Urb. Vetera, lib. iii. apud Grævium, tom. iii. p. 68. Dr. Adam's Roman Antiq. p. 491.

[9] Tacit. Annal. lib. xv. cap. 42.

[10] Dion. Cassius—In Commod. lib lxxii. p. 1224. Euseb. Chronicon. A.D. 186.

Capitol.

> ——— the Capitol,
> Above the rest, lifted his stately head;
> On the Tarpeian rock her citadel,
> Impregnable.

Here also stood the temple of Jupiter Feretrius, the temple of Jupiter Capitolinus, and many other interesting objects. The temple of Jupiter Optimus Maximus was one of the largest and most splendid of the ancient world. Its roof was of burnished gold, the pavement of the finest materials, the columns were of precious marbles, the doors of bronze overlaid with gold, the statues of ivory; and many other objects of surpassing costliness and art embellished the whole interior.[1] In the centre of the temple was the statue of Jupiter Capitolinus seated on a throne of gold, with Juno on his left, and Minerva on his right side. This splendid edifice was destroyed during the civil wars between Marius and Sylla, but was shortly after rebuilt by the latter, who enriched it with the spoils of Greece. It was a second time destroyed by fire during the bloody conflict that took place in the Capitol between the partisans of Vitellius and Vespasian.[2] The Capitol rose again from its ashes, with renewed splendour, and through the liberality of Vespasian, and especially of his son Domitian, it greatly surpassed its former magnificence. Its immense wealth appears to have remained untouched till the time of Honorius, when the necessities of that emperor forced him to lay hands upon the gold which ornamented it; and about seven years after his death, it was completely despoiled of its treasures by Genseric king of the Vandals. Of all the ancient splendours of the Capitoline hill, scarcely a vestige now remains. Its invulnerable citadel, its temples and golden statues, its triumphal arches and splendid porticoes, all have been swept away, and its very name is now almost lost in the semi-barbarous appellation, Campidoglio. At present the Capitoline mount is covered with buildings, which, although not devoid of elegance, are unworthy of a spot which was once so august.

At the base of the northern and principal ascent to the Capitol, are two colossal lionesses of Egyptian porphyry, pouring a stream of water into spacious basins of marble; and at the top of the ascent are two ancient colossal statues of Grecian marble, representing Castor and Pollux standing by the side of their horses. Here we enter the square, supposed with great probability to be the *Intermontium*, in the centre of which stands the equestrian statue of Marcus Aurelius. In front, and on each side, are three palaces, erected by Michael Angelo; that of the senators, the conservatori, and the statue gallery. The Museum Capitolinum contains a splendid collection of busts, statues, sarcophagi, &c., and the staircase is lined with an old plan of Rome, which formed originally the pavement of a temple in the forum, but unfortunately it is not entire. Beneath the senators' palace are the remains of an ancient edifice, supposed to have been the *Tabularium*, where the laws and public records were suspended on tables of bronze; and in its stables, cellars, and gardens, are considerable remains of the ancient fortifications of the citadel. Near the base of the Capitoline hill are the remains of the Mamertine prisons, built (according to Livy) by Ancus Martius. A lower cell, called the Tullianum, was added by Servius Tullius.[3] There are still two dungeons remaining, an upper and a lower; and in ancient times, prisoners who were condemned to be strangled, or to die of hunger, were thrust down into the lower cell by a circular aperture called Robus. It was in these dungeons that Jugurtha was suffered to die of hunger.[4] Here the accomplices of Cataline, when, through the influence of Cicero's eloquence, they were condemned to immediate death, were conducted from the senate house and strangled.[5] Here too Sejanus, the minister of Tiberius, met the just punishment of his crimes;[6] here Perseus, the captive king of Macedonia, lingered in hopeless confinement; and here Simon, the bravest of the Jewish leaders, was put to death, while Titus ascended in triumph to the temple of Jupiter Capitolinus.[7] The northern and highest summit of the Capitoline mount is occupied by the church and monastery of Ara Cæli; and on that part of the hill which lies towards the river, is the

> steep Tarpeian,
> The promontory whence the traitor's leap
> Cured all ambition.

Aventine hill.

The Aventine, well known for the unpropitious augury of Remus, is the most western of the seven hills. It is separated from the Palatine by the valley of the Circus Maximus, and the Tiber flows round its northern base. It has two distinct summits, which are divided by a valley. On this mount stood the famous temple of Diana, erected in the joint names of all the Latin tribes. Here also stood the temple of Juno Regina; the temple of the Bona Dea; the temple, portico, and library of Liberty, the first public library in Rome.[8] But of these, and many other magnificent and celebrated edifices, no traces now remain, nor is their place supplied by any buildings, even of modern times, except some decaying churches and half deserted convents.

Cælian hill.

The Cælian, which is the most southern of the seven hills, is of a triangular form, and is crossed by the lofty and ruinous arches of Nero's aqueduct It is stated by Tacitus, that this mount was originally called *Querquetulanus*, from the quantity of oak trees that grew upon it; and that it received its name from Cælius Vibenna, an Etruscan chief, who inhabited some part of it when he came to the succour of Tarquinius Priscus.[9] Tiberius commanded that it should be called Mons Augustus, but the intention was never carried into effect.[10] The name of Lateran has prevailed in modern times, derived from a senator named Lateranus, who had a splendid edifice upon it in the time of Nero.[11] Deserted as it now is, the Cælian mount was once covered with temples and monuments of magnificence; but of these splendid buildings every trace has long since vanished, and the surface of the hill is strewed over with shapeless ruins, of which the date, the author, and the object, are alike unknown. The only buildings worthy of particular attention are the curious and interesting church of San Stephano Rotondo, which is universally admitted to be an ancient temple, though antiquaries are by no means agreed respecting the name of its tutelar god; and the sumptuous basilica of St. John Lateran, which stands on the eastern summit of the hill.

Esquiline hill.

The Esquiline is more extensive than any of the rest, and more irregular in its form. It is partly covered with the buildings of modern Rome, and partly abandoned to desolation. The Esquiline hill was added to Rome by Servius Tullius, and it was in his flight from the senate-house, to his palace on the Esquiline, that he was murdered by the emissaries of Tarquin his son-in law. A street called *Vicus*

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[1] *Vide* description of it by Dion. Halicarnassus and Pliny; Liv. lib. vi. cap. 29; Id. lib. iii. cap. 17; Liv. lib xxxv. cap. 41.

[2] Tacit. Hist. lib. iii. cap. 71.

[3] Liv. lib. i. cap. 33; Varro de Ling. Lat. lib. iv. cap. 32.

[4] Sallust de Bello. Jugurt.

[5] Sallust de Bello Catilin. cap. 55.

[6] Dion. Cassius. lib. lviii. p. 885; Tacit. Annal. lib v. cap. 9.

[7] Plutarch's Life of Æmilius Paulus; Josephus de Bello, Jud. lib. vii. cap. 5.

[8] Pliny vii. 30. xxxv. 2.; Mart. xii. 3. 5.

[9] Varro de Ling. Lat. lib. iv.; Tacit. Ann. lib. iv. cap. 65.

[10] Sueton. in vita. Tiberii, cap. 48.

[11] Tacit. Annal. lib. xv. sect. 49, 60; Juv. Sat. x. 15.

Sceleratus, between the forum and the Esquiline, was the scene of his daughter's horrible impiety, when she caused her chariot wheel to pass over the body of her father.[1]

Before the Augustan age, the Esquiline mount was inhabited by the meanest of the Roman people; and in that part of it which was without the wall their unburied bodies were promiscuously deposited.[2] Mæcenas having received a present of the ground from Augustus, covered it with gardens and groves, and erected on its summit a palace.[3] On this mount Julius Cæsar was born. Here also was the house of the younger Pliny, part of Nero's golden house, and the palace and baths of the emperor Titus. Here Virgil also is said to have had a house, near the palace of his patron Mæcenas. It is stated by Suetonius, that Horace was buried near the tomb of Mæcenas, at the extremity of the hill.[4] The Esquiline mount has two summits, the Cispius, on which stands the basilica of Santa Mari Maggiore, and which was supposed to have been anciently occupied with the temple of Juno Lucina; and the Oppius, crowned with the church of St. Pietro in Vincula, built upon a part of the extensive baths of Titus. Toward the extremity of the Esquiline, and not far from the Porta Maggiore, in a vineyard, stands a ruined edifice called the temple of Minerva Medica. Nothing now remains but the walls and part of the vaulted roof. Many beautiful statues have been found in the grounds that border it.

iminal ll.

The Viminal hill, which probably derived its name from the osiers *(vimines)* that grew upon it,[5] lies between the Esquiline and the Quirinal, but the fall of the ruins from these hills has rendered it almost impossible to recognize it. The only conspicuous object upon it is the church of S. Lorenzo in Pane Perna, with its adjoining buildings and vineyards. Near the Viminal hill stood the celebrated prætorian camp, which forms such a distinguished object in the decline of the Roman empire.

uirinal l.

The Quirinal hill was adorned in ancient times with the famous temple of Romulus Quirinus. On the opposite side, the magnificent temple of the Sun, built by Aurelian, is supposed to have stood. The Quirinal is the only one of the seven hills that is populous. It is covered with palaces, churches, streets, and fountains. But the only remains of antiquity that it can now boast, are the vestiges of the baths of Constantine, in that part of the Colonna gardens which overlooks the Piazza Pilotta, and a considerable part of the baths of Diocletian, one of the grandest remains of ancient splendour.

rum.

The site of the Roman Forum is between the Palatine and Capitoline hills. Its present surface is from fifteen to twenty feet above its ancient level, and various excavations are now making in it in the hope of discovering some relics of antiquity. "Here were held the comitia, or assemblies of the people; here stood the rostra from which the orators harangued them; the curia, or senate-house; the basilica, or courts of justice; the public tribunals, the statues and memorials of great men, and some of the most sacred temples of religion." After the destruction of the republic, another forum was built by Julius Cæsar; and his example was followed by Augustus, Nerva, Domitian, Trajan, Vespasian, and Antoninus Pius. The only remains of antiquity that now stand within the limits of the Roman forum are those commonly designated as the triumphal arch of Septimius Severus, the temple of Jupiter Tonans, the temple of Fortune, and the temple of Concord, and the solitary column dedicated by the Greek Exarch, Smaragdus, to the emperor Phocas, the ruined wall of the curia, and the three beautiful columns near the base of the Palatine hill, generally called "the disputed columns." Of the immense number of other buildings of all kinds, temples, basilicas, columns, statues, which once stood here, not a vestige now remains, and their very situations are a matter of bitter dispute. At the north-east corner of the Forum is the church of Santa Martina and St. Luke, which is supposed, with some probability, to occupy the site of the beautiful temple of Mars the Avenger, erected by Augustus. Near it is the church of St. Adrian, called *in tribus foris*, from the Roman forum, and the forums of Julius Cæsar and Augustus, of which it forms the connecting point. Behind these are three fluted Corinthian columns, and one pilaster of Parian marble, of the grandest and most perfect style of architecture, supposed to be the remains of the forum of Nerva. To the eastward, and at the base of the Quirinal hill, is the forum of Trajan, the centre of which has been excavated, down to the level of the ancient pavement, by the French. Here stood the famous equestrian statue of Trajan, which excited the admiration and envy of Constantine,[6] and many other honorary statues of distinguished individuals; and here still stands the triumphal column of Trajan, the finest in the world. This superb pillar is of the finest white marble, about 128 feet in height, and is covered with sculptured figures representing the wars and triumphs of the emperor Trajan. The ascent to the summit is by a winding staircase of 185 steps of solid Parian marble. A little to the north is the triumphal column of Marcus Aurelius, formed of the same materials and workmanship, though inferior in the beauty and perfection of its sculpture to that of Trajan. These columns formerly supported each a colossal statue of Trajan and Marcus Aurelius, but they have long since disappeared, while bronze statues of the apostles Peter and Paul have been substituted in their stead. In a deserted spot, which was once the forum boarium, or cattle-market of Rome, there is a magnificent four-fronted arch, commonly called Janus quadrifrons, which is the only one now remaining of the many ancient Jani of ancient Rome. It is built of immense blocks of Grecian marble, now so darkened and discoloured by time, and covered with bushes and ivy, that it has a peculiarly picturesque and venerable appearance. Near this arch, by passing under some low brick vaults opposite the church of S. Giorgio in Velabro, the best view is obtained of the celebrated "Cloaca Maxima," unquestionably the most ancient of all the ruins of Rome, and the only remains of the work of her kings. This stupendous and useful work was executed by Tarquinius Superbus.[7] In ancient times the arches were so large, that it is stated by Strabo and Pliny, that a waggon load of hay might pass through them.[8] Though greatly choked up by the elevation of the soil of modern Rome, it still, after a lapse of 3000 years, serves as the common sewer of the city. Almost close to the cloaca maxima is the far-famed fountain of Juturna.[9]

Trajan's pillar.

Cloaca Maxima

Proceeding along the Via Sacra, we come to some ruins which are supposed to be the remains of Vespasian's temple of Peace, built at the close of the Jewish war. It was one of the most magnificent temples of antiquity, and within it were deposited the spoils taken from the temple of Jerusalem. Others maintain, however, that these ruins belonged to the basilica of Constantine. Crossing to the opposite side, and passing under the broken and defaced triumphal arch of Titus, we behold the majestic ruins of the mighty Coliseum. This stupendous building was erected by Vespasian and Titus, on the spot which had previously

Coliseum.

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[1] Liv. lib. i. cap. 48. [2] *Vide* Horace, Sat. lib. i. viii. 7, 17; Juvenal, &c. [3] Hor. Carm. iii. 29. [4] Suet. in vita Horat.

[5] "Viminalis a Jove Viminis quod ibi aræ sunt ejus, aut quod ibi vimineta fuerunt." Varro de Ling. Lat. lib. iv.; Juvenal, Sat. lib. iii. 71.

[6] Ammian Marcel. Hist. lib. xvi.

[7] Livy, lib. i. cap 56.

[8] Strabo, Geograph. lib. v.; Plin. Hist. Nat. lib. xxxv. cap. 15.

[9] *Vide* Æn. lib. xii. 878.

Statistics of Rome.

been covered with the pools belonging to the "golden house of Nero." Owing to the stability of its construction, it survived the era of barbarism, and was so perfect in the thirteenth century, that games were celebrated in it for the amusement of all the nobility of Italy. Its destruction was, in a great measure, the work of the Romans themselves, who carried off the materials to build their own dwellings.

> ——From its mass
> Walls, palaces, half cities have been rear'd ;

till at length Benedict XIV. secured it from further dilapidation, by erecting a cross in the middle of the arena, and proclaiming it to be consecrated ground, hallowed by the blood of the martyrs. The form of the Coliseum is elliptical ; the length measures $591\frac{1}{4}$ feet, and the breadth $508\frac{3}{4}$; it is $1683\frac{3}{4}$ feet in circumference, and 147 in height. The exterior elevation presents four divisions or storeys, of which the three lower are supported by half columns, and the uppermost by pilasters. The interior elevation, beginning from the arena, presented first the podium, a kind of covered gallery, destined for the use of the emperor and persons of the first description ; then three successive orders of seats for the spectators, called collectively the cavea; and at the top the attic, with the velarium or awning. It has been calculated that the cavea, with the podium, could contain 80,000 persons seated ; but taking into account the upper gallery, and the number of persons necessarily engaged about the arena, that not less than 100,000 souls have sometimes been contained within these walls. At the dedication, which lasted one hundred days, 5000 wild beasts were exhibited and slain.[1] The arena also was overflowed with water, and made the scene of a mock naval fight. The northern side is pretty entire ; but on the south, the stupendous arches have been stripped of their external decorations. In the interior the destruction is more complete ; the marble steps are all torn away, the steps and vomitories overthrown, and the sloping walls and broken arches are covered with weeds and shrubs. Around the arena the pictured representations of the fourteen stages of our Lord's passion are placed at regular intervals. In the centre of it stands a huge black cross, which offers the liberal recompense of one hundred days' indulgence to every person who devoutly kisses it. A broad pathway runs through the middle ; the rest is covered with a smooth green sod. "Here," says Mr. Forsyth, "sat the conquerors of the world, coolly to enjoy the tortures and death of men who had never offended them. Two aqueducts were scarcely sufficient to wash off the human blood which a few hours' sport shed in this imperial shambles. Twice in one day came the senators and matrons of Rome to the butchery. A virgin always gave the signal for slaughter; and when glutted with bloodshed, those ladies sat down in the wet and steaming arena to a luxurious supper. Such reflections check our regret for its ruin. As it now stands, the Coliseum is a striking image of Rome itself, decayed, vacant, serious, yet grand, half grey and half green, erect on one side and fallen on the other, with consecrated ground in its bosom ; inhabited by a beadsman, visited by every cast; for moralists, antiquaries, painters, architects, devotees, all meet here to meditate, to examine, to draw, to measure, and to pray."[2]

Circus Maximus.

Between the Aventine and Palatine hills stood the Circus Maximus, which occupied the whole valley; and though all traces of the building have disappeared, its form is still very apparent. This circus was first laid out by Tarquinius Priscus ;[3] but it does not appear to have attained any great degree of splendour till the time of Julius Cæsar, who enlarged the whole space, and rendered it capable of containing 150,000 spectators. Pliny states that in the time of Trajan it held 250,000.[4] It was the last place where games were celebrated in Rome. So late as the close of the fifth century, it was filled for the last time with spectators of the gladiatorial combats, when Telemachus, an Asiatic monk, having ineffectually tried remonstrance, descended into the arena to separate the combatants, and was stoned to death by the enraged people. But the sacrifice was not made in vain, for from that day Honorius abolished the combats of gladiators. The last remains of the Circus Maximus were removed by Paul III., "that universal destroyer of antiquities." Attached to this circus were the shops or *tabernæ*, in which, during the reign of Nero, began the conflagration that consumed ten out of fourteen quarters of the city. Of all the circuses of ancient Rome, one only is sufficiently entire to shew what a circus was. It stands on the Via Appia, beside the tomb of Cecilia Metella, and is called the circus of Caracalla, though there is no reason for believing it to have been built by that emperor. It is still in excellent preservation.

On the outside of the Coliseum are the mouldering ruins of a building, supposed to have been that famous fountain the Meta Sudans, which existed even in the time of the republic.[5]

Pantheo

One of the most attractive of the ancient edifices of Rome, is the Pantheon or Rotondo, "the pride of Rome." That glorious combination of beauty and magnificence, which was erected by Agrippa, is 132 feet in height, the same in diameter, and 396 feet in circumference. It is generally believed that the body of the building is of earlier erection than the portico ; that it was built for a thermal hall, or something belonging to the baths of Agrippa, and that the portico was afterwards added in order to convert it into a temple. It has long been a matter of dispute to whom the Pantheon was dedicated. The popular belief is, that it was dedicated to Jupiter and all the gods of antiquity ; but Pliny expressly says that it was dedicated to Jupiter the Avenger.[6] In the year 608, Pope Boniface IV. obtained permission of the emperor Phocas to consecrate it for a Christian church. It then received the title of St. Maria Rotondo, which it still preserves. About fifty years after its consecration, Constans II. stripped off the bronze covering of the roof, the bronze bassi relievi of the pediment, and the silver which adorned the interior of the dome, and carried away the spoil to send it to Constantinople ; but being murdered at Syracuse on his return, these ornaments were afterwards conveyed by the Saracens to Alexandria. In 1632, Pope Urban VIII., one of the Barberini family, carried off all the bronze that was left, and moulded it into ornaments for St. Peter's tomb in the Vatican, and cannon for the castle of St. Angelo. It has been calculated that upwards of forty-five millions of pounds weight of metal was taken away on that occasion. This gave rise to the pasquinade, "Quod non fecerunt Barbari Romæ, fecerunt Barberini." The same pope disfigured the building by placing before the dome two hideous belfries, as a perpetual monument of his wretched taste. As a sort of compensation, however, he replaced one of the three deficient columns of the portico. The other two were restored by Pope Alexander VII. The portal has been pronounced to be "positively the most sublime result that was ever produced by so little architecture." The original folding doors are said to have been carried off by Genseric; but the present gates are obviously ancient also, and are supposed to have been taken from some other Roman building. The four grand recesses in the interior, each supported by two magnificent columns, and two pilasters of giallo antico, are truly beautiful; but the niches in the intermediate spaces are wretchedly mean, and in bad taste. Behind the altars which crowd the principal recesses, are placed on shelves the busts of the most distinguished men of modern Italy. The pavement, which is supposed to be the work of Septimius Severus, is composed of porphyry and yellow marble, and of pavonazzetto, laid down in large slabs, alternately round and square. The splendid dome which rises over the whole is still uninjured. A large circular aperture at the top, surrounded with a girth of metal, admits a flood of light sufficient to illuminate the whole building. The remains of Raphael are interred in the Pantheon, together with many of those whose names reflected lustre on modern Italy in her proudest days. The situation of the Pantheon is extremely unfavourable. It is sunk in the dirtiest part of modern Rome. The congregated filth of the pavement, the incessant uproar, and the crowds of clamorous beggars, tend materially to lessen the enthusiasm with which the spectator gazes upon this monument of the taste and magnificence of antiquity. Yet in spite of all this, and of the dilapidations which it has suffered from the lapse of eighteen centuries, and the rapacity of barbarians, still, under every disadvantage, it is pre-eminently beautiful. "The pure and perfect architecture, the greatness of design, the harmony, the simplicity, and the imposing majesty of the whole, command our never satiated admiration, our approbation, and our praise." "Though plundered of all its brass, except the ring which preserves the aperture above; though it has been twice the prey of fire; though it is always open to the rain, and is sometimes flooded by the river, yet no monument of equal antiquity is so well preserved as this rotondo."[1]

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[1] Suet. in vita, Titi, cap. 7. Dion. lib. lxvi. tom. ii.

[2] Forsyth's Italy, p. 159.

[3] Livy, lib. i. cap. 35. Dion. Antiq. Rom. lib. iii. cap. 68.

[4] Plin. Hist. Nat. lib. xxxvi. cap. 15.

[5] Seneca, Op. 57.

[6] Pliny, Hist. Nat. lib. xxxv. cap 5. Dion. Cassius, lib. liv. tom. i.

Temple of Vesta.

Near the Tiber there is a beautiful little temple, popularly called the temple of Vesta, though no satisfactory reason can be given for the designation. Its form and elegance have been much admired; and bronze models of the "little temple of Vesta" are dispersed over most of Europe. It is entirely built of Parian marble, and its portico is composed of a circular colonnade of twenty fluted Corinthian columns. Of these only one is wanting; but all the architrave is lost. The small circular cell within the colonnade is now converted into a chapel, dedicated to "La Madonna dell' Sole," (the virgin of the sun.)

Churches.

Opposite to this beautiful building, stands the church of St. Maria in Cosmedin, built by Adrian I. on the ruins of an ancient temple, the name of which is unknown. It appears, like the Pantheon, to have eight columns, and fifteen at the sides. Six of the front columns of the most beautiful Parian marble may still be traced, built up into this hideous compound of deformity and bad taste. The church of S. Maria Egizziaca has been formed out of another ancient temple, which is usually called by the name of Fortuna Virilis. On that ruin-covered spot, which now bears the name of the Roman Forum, but without its ancient limits, stands the temple of Antoninus and Faustina. It is a fine specimen of ancient architecture. Its noble portico, which, though entire, has evidently suffered from fire, is composed of six Corinthian columns of Cippollino marble in front, and two on each side. The exquisite chiseling of the friese and cornice, the sculptured griffins, candelabras, vases, &c. which form the ornaments, are scarcely equalled in any Roman monument of the kind in existence. A little farther on is the church of the saints Cosmo and Damiano, supposed to be the double temple of Romulus and Remus. Near the Coliseum are the remains of Hadrian's magnificent temple of Venus and Rome.[2] Some striking ruins of the interior of the fabric still exist in the middle of the site. Pope Honorius I. covered the whole of St. Peter's basilica with bronze tablets which he took from the roof of this temple.

Many other ruins of the magnificent temples of ancient Rome are scattered throughout the city, but their remains are so scanty that it is impossible to obtain any information respecting their origin or extent.

Theatres.

Various temporary theatres seem to have been erected at different times in Rome, but the first that was built of stable materials in this city was the theatre of Pompey. It was rebuilt by Tiberius, and again by Claudius, but there is not a single vestige of it now remaining. The theatre of Marcellus was built by Augustus, who named it after his nephew, whose death has been commemorated by Virgil in such pathetic strains.[5] Of this once magnificent edifice nothing now remains except a very small portion of the two lower arcades, which are considered models of architecture.

Porticos.

Ancient Rome possessed a number of noble porticos, but all that now remains of these is a fragment of the portico of Octavio. It originally consisted of a double line of marble columns covered with a roof, so as to afford shelter to those who walked within it. In the open square stood the temples of Jupiter and Juno, the first in Rome that were built of marble. Here were exhibited many splendid paintings and statues; and this portico contained one of the three public libraries which Rome possessed in the Augustan age. The only remains of this magnificent building are four Corinthian columns, and three pilasters of beautiful marble, with a part of the ancient pediment. They stand in what a modern traveller has pronounced the "filthiest spot upon the whole face of the globe—the pescheria or fishmarket, the crowded quarter where the Jews are condemned to reside."

Thermæ, or baths.

It has been justly said that no monument of ancient architecture is calculated to inspire such an exalted idea of Roman magnificence, as the ruins of their thermæ, or baths. These magnificent structures were not, however, erected for bathing alone; but in them there were rooms for almost every kind of athletic exercises; walks shaded by rows of trees; fountains adorned with statues and precious marbles; libraries; spacious halls and vestibules decorated with the finest objects of art, where poets recited, orators declaimed, and philosophers lectured. A splendid description has been given by Pliny of the sculptures and paintings, the magnificent seats of solid silver, the silver pipes and baths, the polished vases, the pavements of precious stones, and all the sumptuous decorations of these magnificent buildings dedicated to the luxury and idleness of the Romans.[4] The thermae of ancient Rome are known to have stood in all their original magnificence so late as the fourth century, and their destruction seems to have been almost entirely owing to the rapacity of the modern Romans. Of all the thermae that adorned imperial Rome, the ruins of those of Titus, Diocletian, and Caracalla, are all that now remain in any considerable degree of preservation. The thermae of Caracalla are situated at the base of Mount Aventine, on the Via Appia. They were left incomplete by Caracalla, and were finished by Heliogabalus, and by Alexander Severus.[5] These baths, together with the outworks, were one mile in circumference, and their ruins still cover a vast extent of ground; but it is impossible to form from them any idea of the peculiar destination of the particular parts. They form a succession of immense halls, in the midst of which some aged trees have taken root in the soft green turf which now supplies the place of the pavement of costly marble and rich mosaic. One of these halls, the famous Cella Soleares, held 1600 seats of polished marble,[1] and was entirely covered with a flat roof of stone, supported by cancellated work of brass or copper, which, from the resemblance to the lacing of a sandal, is supposed to have given the hall its designation. On the western side of the ruins there are the remains of a rotondo, and a great number of smaller divisions of all sizes and forms. This enormous fabric was adorned with an immense number of statues and paintings. The celebrated Farnese Hercules, the Glycon, the bull, now in the museum at Naples, the Torso Belvidere, the Flora, the Callypigean Venus, together with many other statues, columns, bas reliefs, &c., were all found in these ruins. The thermae and palace of Titus were built with the materials, and on the site of the buildings and pleasure grounds, of Nero's golden house. They were finished or enlarged by Trajan, and afterwards repaired and embellished by Hadrian. They appear to have been of remarkable extent and magnificence. Part of the theatre of one of the temples, and of one of the great halls, still remains above, and many vaults and long galleries under ground. Some of these subterraneous apartments are curiously painted, and the ceiling of one of them contains some most exquisite specimens of paintings in arabesque, which afforded a model to the genius of Raphael, and enabled him to restore an art which had been lost for so many centuries.[2] In the time of Leo X. some excavations were made, and the famous group of the Laocoon was discovered in one of the halls, and several pillars of granite, alabaster, and porphyry, have since been found in various partial researches. In another part of the Esquiline Hill stand the Sette Salle, nine halls of one hundred feet in length, by fifteen in breadth, and twenty in depth, which have evidently been immense reservoirs of water, to supply the baths of Titus, and occasionally the enormous arena of the Coliseum, when naval engagements were represented.

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[1] Rome in the 19th Century. Forsyth's Italy, p. 147.

[2] Vide Dion. Cassius, Hist. Rom., lib. lxix. p. 1153.

[3] Æn. lib. vi. 861.

[4] Pliny, lib. xxxiii. cap. 12. Rome in the 19th Century, vol. ii. p. 83. Seneca. Epist. 86. Statius.

[5] Vide Spartian. in M. Aurel. Caracall. cap. 9. Ælius Lampridius in Art. Heliogab. cap. 17. Ibid. in Alex. Sever. cap. 25. Eutrop. in Caracall. de Rom. Rev. lib. viii.

The thermae of Diocletian, which are scattered over the summit of the Quirinal and Viminal hills, are said to have surpassed all the thermae of ancient Rome in extent and splendour. One of the circular halls has been converted into a granary, another into the church of St. Bernard. The *xystum penacotheca*, or great covered hall of the thermae, has been transformed into the church of St. Maria degli angeli, and still retains much of its original grandeur. It is 350 feet in length, 80 in breadth, and 90 in height. It was paved and incrusted with the finest marble by Benedict XIV. The vaulted roof is supported by sixteen Corinthian columns, eight of which are ancient, and are formed of one vast piece of Egyptian granite. This noble edifice is adorned with a variety of paintings; among others, with the martyrdom of St. Sebastian, by Domenichino; and the circular vestibule contains the monuments of Salvator Rosa and Carlo Maratti.

Bridges.

Seven bridges formerly conducted over the Tiber to the Janiculum and the Vatican Mount. Three of these, the Pons Sublicius, the Pons Palatinus, and the Pons Triumphalis, were long ago destroyed. Those which now remain are the Bridges of the Island, the Ponte Sisto, and the Ponte San Angelo. Out of Rome there is only one bridge over the Tiber, the famous Milvian or Æmilian bridge, now corrupted into Ponte Molle. Here the ambassadors of the Allobroges were seized by the vigilance of Cicero;[3] and here was fought the eventful battle in which Constantine defeated Maxentius. About three miles from Rome, the Anio, now the Teverone, is crossed by the Ponte Lamentano, formerly the *Pons Nomentanus*, beyond which rises the broad green height of Monte Sagro, the famous *Mons Sacer*, to which the Roman army and people twice retired from the tyranny of the Patricians.[4] The Ponte Salario, a very singular and picturesque structure, which also crosses the Anio, about three miles beyond the gate of the same name, was the scene of the celebrated combat between Manlius Torquatus and the gigantic Gaul.[5] The ground on the other side of it is supposed to be that on which Hannibal encamped during the few days he remained before Rome.

Triumph arches.

Rome contains the ruins of a number of triumphal arches. The most important of these are the arches of Titus, of Septimius Severus, and of Constantine. The arch of Titus is the oldest triumphal arch now existing in Rome. It is peculiarly rich in sculpture. The interior is decorated with two fine bas reliefs, representing on one side Titus in his car of triumph, and, on the other, the spoils of the temple of Jerusalem and the captive Jews. It was greatly mutilated, but has been recently restored. The arch of Severus, though more entire, is much less beautiful. The arch of Constantine is thought by far the most noble of the triumphal arches of Rome, but its columns, its beautiful sculptured medallions and bas reliefs, have evidently been pilfered from one of the triumphal arches of Trajan.

Aqueduc

Of all the stupendous aqueducts of ancient Rome, two alone remain even in ruins, the Martian and the Claudian. The former, which was built by Quintus Martius Rex the prætor, 125 years B. C., conveyed to Rome three different waters in three distinct channels; the latter was built by the emperor Claudius, and conveyed two waters to Rome, the aqua Claudia, and the Anio vetus. The first was conveyed a distance of thirty-five, the last of sixty-two miles. There is reason to believe that the aqueducts were destroyed by Totila, but notwithstanding their destruction, Rome is still the city in the world the best supplied with water, three popes having conducted to it three noble streams.[6]

Rome alone, of all the cities of the world, boasts those sublime monuments of antiquity, the obelisks of Egypt.[7] The most important of these are the obelisk that stands in the Piazza del Popolo; it was the first ever seen in Rome, and was brought from Egypt by Augustus, and placed in the Circus Maximus, where it served as the gnomon of a dial; the obelisk in the grand piazza of St. Peter's, brought from Egypt by Caligula; the obelisk in front of the Lateran church, the largest of them all, transported from Egypt by Constantius; the obelisk mentioned by Pliny, which was brought to Rome by Augustus, and erected in the Campus Martius; it now stands on Monte Citorio; and the obelisk which stood in the circus of Sallust, and now crowns the lofty summit of the Pincian hill.

Tombs.

The Roman tombs were distinguished by their impressive grandeur and magnificence. All along the long line of the Appian way are the mouldering remains of the ruined and blackening sepulchres,

> "Where Cæsars, heroes, peasants, hermits lie,
> Blended in dust together."

But among the immense number of proud sepulchres of the most distinguished Romans which crowded that "Queen of ways," all, with a very few exceptions, are unknown. About sixty years ago the tomb of the Scipios was brought to light, but "the Scipios tomb contains no ashes now." Exactly on the opposite side of the road to it is the sepulchre of the Maniglia family. The tomb of Cecilia Metella, the daughter of Metellus, and "the wealthiest Roman's tatistics Rome.

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[1] Olympiodorus in Bibliothec. Photii, p. 114.

[2] Eustace's Classical Tour, p. 388. Rome in the 19th Century, vol. ii. p. 99.

[3] Sallust, Bell. Catil.

[4] Livy, lib. ii. cap. 32.

[5] Ibid. lib. vii. cap. 10.

[6] Rome in 19th century, vol. ii. p. 150.

[7] Ibid. p. 158—165.

wife," is generally acknowledged to be a most beautiful sepulchral monument.[1] It consists of a round tower formed of immense blocks of Tiburtine stone fixed together without cement, and adorned with a Doric marble frieze finely sculptured. This beautiful tower was at one time turned into a fortress by the family of the Gætani. In the sepulchral vault was found the beautiful marble sarcophagus of Cecilia Metella, now in the Palazzo Farnese. Near the Porta San Paolo, in the "Prati del Popolo Romano," ("the meadows of the Roman people,") stands the grey pyramid of Caius Cestius. It rises about a hundred and twenty feet in height, and is entirely built of marble. Its form is graceful, and its appearance very picturesque. The "Prati del Romano" are planted round with mulberry trees, and now form the burial place of foreigners, excluded by their religion from the other cemeteries. By far the greater part of the strangers interred here are English.

tacombs

The extensive catacombs found about Rome owe their origin to the large excavations which were made by the Romans for obtaining pozzolano, an immense quantity of which they used, and exported for sand and mortar, and other purposes. These subterraneous labyrinths branch out many miles in various directions. Those under the church of St. Sebastian alone are said to have been explored to the extent of above fifteen miles. Those dreary regions afforded shelter to the first Christians during the dreadful persecutions which they suffered under the emperors. They were also used as sepulchres, but all the bones which they once contained have been carried off as precious relics. The chambers are all square, with arched recesses, and rectangular gaps, both in the walls and flooring, to receive coffins.

ilica.

Peter's.

It has been said that perhaps no city in the world abounds with such numbers of churches as Rome, or with fewer handsome ones as respects their architecture. Many of the old churches of Rome are still called basilica,[2] but that title properly belongs to the following seven, St. Peter's, St. John Lateran's, Santa Maria Maggiore's, S. Paolo *fuori le muro*, Sante Croce in Gierusalemme, S. Sebastiano, and S. Lorenzo *fuori le muro*. St. Peter's is the finest church in the world, excelling all others, not only in magnitude but in beauty. It was projected by Pope Nicholas V. in the middle of the fifteenth century; it was not, however, till the pontificate of Julius II. in 1506, that the first stone of the edifice was laid, and the whole building was not finished till the year 1621, during the pontificate of Paul V. No fewer than twenty-four popes, counting from Nicholas V., assisted in the erection of this magnificent structure. It is said to cover twenty acres, and to have cost many millions sterling. It is entirely built of Travertine stone, which looks as bright and fresh as if newly finished. The length of the building is 609 feet, and of the transept 500 feet, the height of the dome is 440 feet, the height of the nave 154, and its breadth 90 feet. The plan of the building was frequently changed. The original architect was Bræmante, but the greater part was from the design of Michael Angelo, which, however, has unfortunately been marred by Paul V. and Carlo Moderni, justly stigmatized as "a wretched plasterer from Como, who broke the sacred unity of the master-idea, and whom we must execrate for the Latin cross, the aisles, the attic, and the front."[3] From the front of the church on either side, a grand semicircular colonnade, composed of four rows of columns, sweeps round and encloses the immense circular area, in the centre of which stands a noble Egyptian obelisk of red granite, between two most beautiful fountains. The general effect is greatly injured by the Vatican Palace, which is built on one side of St. Peter's, overlooking the top of the colonnade, and destroying its uniformity. A covered portico extends along the whole breadth of the building, vaulted with gilt stuccos, and paved with various marbles. It lengthens on the eye by a grand succession of doors, niches, statues, and fountains, till the perspective terminates with the equestrian statue of Charlemagne. The nave is infinitely grand and sublime, and is impannelled with the rarest and richest marbles, and adorned with every art of sculpture and of taste.

Statistics of Rome.

The splendid canopy of the great altar, and the wreathed columns which support it, were formed out of the bronze taken from the Pantheon by Urban VIII. A double marble staircase leads down to the confessional or tomb of St. Peter, illuminated by more than a hundred never-dying lamps. His sepulchre is surrounded by a circular vault, which is lined with the tombs of popes, saints, emperors, and deposed or abdicated princes, among whom are the last of the Stuart family, the emperor Otho, &c.

The stupendous dome, viewed in its design, its altitude, or even its decoration, is altogether unrivalled, and has justly been pronounced the triumph of modern architecture. A broad paved road leads up to the top of the church, and from thence the dome may be ascended by a succession of ingeniously contrived staircases. From the top an extensive prospect may be obtained of the beautiful amphitheatre of hills which encloses the Campagna. The summits of the loftier Apennines behind, wreathed with snow; the Tiber in its sinuous windings through the waste; in the distance the blue waters of the Mediterranean gleaming in the sunbeams; and, far beneath, Rome, with her churches, her palaces, her dark and distant ruins, the rich verdure, and golden fruit of the orange gardens of her convents, contrasting with the deep shade of their mournful cypresses.[4]

St. John Lateran.

The church or basilica of St. John Lateran was built by Constantine, and during many ages before the erection of St. Peter's church, was regarded as the mother of churches, and head of the Christian world. It derived its name from Plautius Lateranus, the leader of the first and unsuccessful conspiracy against Nero.[5] This church has been frequently rebuilt, enlarged, and improved, and the old architecture now lies completely concealed in the modern. It is a very large but by no means handsome building, and its architecture is deformed by many glaring defects.

St. Paul's.

The old basilica of St. Paul, founded by Constantine, and rebuilt by Honorius, contained a hundred and twenty pillars

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[1] There is a stern round tower of other days,
Firm as a fortress with its fence of stone,
Such as an enemy's baffled strength delays,
Standing with half its battlements alone,
And with two thousand years of ivy grown,—
The garland of eternity, where waves
The green leaves over all by time o'erthrown.
What was this tower of strength? Within its cave
What treasure lay so lock'd, so hid? A woman's grave.
Childe Harold, c. iv. st. 100.

[2] "A *basilica* seems at first to have been part of a palace. It is sometimes represented as a simple portico. It then included the buildings which were afterwards annexed. Some of these buildings which had served as *basilica* for law and trade, became places of worship to the primitive Christians, and the first churches that were erected expressly for that worship, erected perhaps on the site of some ancient basilicæ, retained the same name."—*Forsyth's Italy*, p. 87.

[3] Ibid. p. 195.

[4] Rome in 19th Century, vol. ii. p. 277.

[5] Tacit. Ann. 15. Juvenal. Sat. x. 17.

Statistics of Rome.

of the rarest marble and granite, the spoils of some of the noblest edifices of antiquity. A few years ago this church was destroyed by fire, but it is now rebuilding in a style of great magnificence.

St. Clement's.

The church of St. Clements on the slope of the Esquiline has the reputation of being the oldest existing church in the world. The churches of the Jesuits and of St. Ignatius are distinguished for their riches, and the immense number of ornaments which they contain. The church of Santa Maria sopra Minerva, built on the site of Pompey's temple of Minerva, contains the celebrated Christ of Michael Angelo, and in the church of St. Pietro *in Vincoli*, is the famous statue of Moses by the same artist. Many of the churches of Rome are adorned with fine paintings by the greatest masters, but their beauty and colouring has generally suffered much from time, neglect, dirt, and damp. In the church of Santa Maria della Pace are the four Sibyls of Raphael, and the church of the Augustines contains his inimitable fresco of Isaiah. A number of admirable paintings in fresco by Domenichino adorn a chapel in the church of San Liugi de Francesi. The church of the Capuchins possesses Guido's celebrated painting of the archangel Michael trampling upon Satan. Domenichino's ecstacy of St. Francis and a fresco of Giotto representing St. Peter walking upon the waves, also adorn this church. Daniel da Volterra's deposition from the cross, which Nicholas Poussin pronounced to be the third picture in the world, once enriched the church of the S. S. Trinità de Monti, but it was totally destroyed by the French in their clumsy attempt to remove it. Here is the tomb of Claud Lorraine, and his house stands beside the church; on the opposite side of the way is the house of Nicholas Poussin, and close by it a house once inhabited by Salvator Rosa. The church of San Andrea della Valle is built upon the spot where the curia of Pompey once stood, in which Cæsar fell. It contains some fine paintings in fresco by Domenichino. In the church of Sant' Onofrio the remains of Tasso repose. A number of the churches have been formed out of heathen temples, and it is curious to observe the striking resemblance which the modern Catholic churches bear to the ancient pagan temples in their plan and decoration, pictures, statues, worship of images, holy places, altars, and votive offerings, multiplied ceremonies, and pompous processions.[1]

There are in Rome

54 parishes, and 300 churches,
154 churches served by secular clergy,
130 ———— by regular clergy (monks,)
64 monasteries and convents for men,
50 ———————— for women.[2]

Nothing strikes a stranger with more admiration on his arrival in Rome than the immense number of fountains which pour forth on every side an inexhaustible supply of the finest water. They shew a great variety in their composition. Some of them are beautiful, one or two grand, but they are all, generally speaking, deficient in simplicity, and several of them, such as the renowned fountain of Trevi, are completely overloaded with mythological sculpture. The water of this fountain, which is the chief supply of modern Rome, is the delicious Aqua Vergine, the same that flowed into Rome in the age of Augustus.

Streets.

The streets of Rome are narrow, crooked, badly lighted, and dirty. The best street is the Corso, so named from being used for the course or promenade of carriages at the Carnival. Part of it is the ancient via lata, the rest follows the line of the Via Triumphalis. It is almost the only street that has the merit of being straight, and that can boast of *trottoirs* for foot passengers. It extends a mile in length, but is scarcely fifty feet in breadth. This, and all the other parts of the city, consist of buildings from three to five stories in height, built of stone, and plastered over. Every considerable tenement has a bust or portrait of the Virgin stuck upon one corner of it, at the second story, with a lamp in front at night, and an ornamental plaster moulding round it, into which are generally wrought some figures of angels or saints. Rome has no squares, and of the piazzas, the Piazzo del Popolo, and that in front of St. Peter's, are the only two that deserve notice. Both are adorned with obelisks, statues, and fountains. Gas light is unknown in Rome, and the lamps attached to the shrines of the Virgin were the only street lights until the French came and introduced the "reverberés" used in Paris. Rome contains 500 streets, 275 lanes, 148 places, and 5500 shops.

Rome has about 335 palaces, or noblemen's houses. Of these, about fifty or sixty are of a superior kind, uniting in their external appearance something of the fortress, the prison, and the palace. Many of the families to which these buildings once belonged have sunk into poverty, and their residences are now turned into ecclesiastical colleges or hotels, or let to foreign ambassadors or consuls. In the others which have escaped this fate, the lower storey is sometimes let for shops, sometimes retained for stables, coach-houses, and servant's rooms. The second storey is generally a picture gallery, consisting of a suite of rooms all opening into one another, and richly adorned with marble columns and painted ceilings. The owner of the building and of these precious works of art, lives in the third or highest story, and generously throws open the gallery to artists and to all who choose to give two or three paoli to the servants. The exterior of these palaces is lamentably destitute of architectural beauty, and in the interior, notwithstanding the magnitude of the apartments, and the magnificence of the decorations, they are, generally speaking, exceedingly incommodious and uncomfortable dwellings, and all of them are deficient in cleanliness and order. It is no uncommon thing for an Italian nobleman to reside in the attics of his own palace, and to let the principal apartments to lodgers. Over the gates of the palace are the escutcheons of the family, and as if in mockery, the initials S. P. Q. R. (Senatus Populusque Romanus.) The immense palaces of the Doria, the Colonna, and the Borghese, are still occupied only by their own families and dependants. The Doria palace contains the largest collection of paintings in Rome, among which are found some of the finest specimens of the ancient masters. The princely house of Colonna has produced more illustrious men, and can boast a nobler descent, than any in Rome. The gallery of their palace, which is by far the grandest in the city, once contained a number of celebrated paintings, but the finest have been sold. The palace garden, which hangs on the steep side of the Quirinal hill, contains the picturesque remains of a magnificent ancient edifice, the name of which is unknown. The palace of the Barberini family formerly contained that celebrated museum of ancient sculpture, vases, gems, medals, &c., which was so long the wonder and admiration of Europe, but it is now sold and dispersed. The famous Portland vase was brought from this museum. The palace of the Borghese once contained a fine museum of sculpture, and it still possesses the best collection of paintings in Rome. In the Palazzo Massimi is the famous Discobalus, the finest in the world, found in the grounds of the Villa Palombari on the Esquiline hill. The Palazzo Spada contains the celebrated statue of Pompey, at the foot of which Cæsar fell. In the palace of the Braschi stands the beautiful colossal statue of Antinous, which was dug up on the site of the ancient Gabii.

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[1] Rome in 19th Century, vol. ii. p. 370. Middleton's Letter from Rome. Blunt's Vestiges of Ancient Manners in Italy and Sicily

[2] Melchiori's Guide Methodique de Rome.

Statistics of Rome.

The palace of Lucien Bonaparte possesses a small collection, but entirely composed of masterpieces, and kept in beautiful preservation. The Palazzo Nuovo di Torlonia, the residence of Torlonia the Roman banker, who has purchased the title and estate of the Duca di Bracciano, is fitted up with all the magnificence that wealth can command. The gallery is adorned with Canova's colossal group of Hercules and Lychas. The Farnese palace contains the far-famed gallery painted in fresco by Annibal Caracci.

The Vati- an.

The Vatican has long been celebrated for its unrivalled splendour and magnificence. Its ceilings richly painted in fresco; its pictured pavements of ancient mosaic; its magnificent gates of bronze; its polished columns of ancient porphyry, the splendid spoils of the ruins of imperial Rome; its endless accumulation of Grecian marble, Egyptian granites, and Oriental alabasters; its bewildering extent and prodigality of magnificence; but, above all, its amazing treasures of sculpture, far surpass even the gorgeous dreams of Eastern magnificence.[1] In common with all the other collections of the fine arts in Rome, the Vatican suffered materially from the rapacity of the French, but on the downfall of Bonaparte the stolen treasures were restored to their rightful owners. The Vatican contains a museum filled with the most splendid specimens of ancient sculpture;—the tapestry chambers hung with tapestry woven in the looms of Flanders, and copied from the cartoons of Raphael;—a picture gallery, filled with the masterpieces of painting;—the *Camere* and *Loggie* of Raphael, painted in fresco by himself and his pupils;—the Sistina and Paolina chapels, painted in fresco by Michael Angelo;—and the library, the halls and galleries of which alone are more than thirteen hundred feet in length. The view from the balcony in front of the windows gave the name of *Belvidere* to the museum, and in consequence to the matchless statue of Apollo Belvidere, pronounced by universal consent to be the finest statue in the world. It was found near Antium, in the ruins of a Roman villa, supposed to have originally belonged to Nero. The name of its artist is unknown. Here, also, is the celebrated group of the Laocoon, which Pliny states to have been executed by Agesander the Rhodian, and Athenodorus and Polidorus, who are believed to have been his sons.[2] This wonderful masterpiece was found in the palace of Titus, on the very spot where it is described by Pliny to have stood, and every successive generation that has passed since it was formed, has gazed with admiration on its matchless sublimity. The Vatican also contains the two finest paintings in the world, the Transfiguration by Raphael, and Domenichino's Communion of St. Jerome. The library contains a splendid collection of books, and is peculiarly rich in rare and valuable manuscripts. But a minute account of the immense treasures of art accumulated in this magnificent building would occupy too much of our space.

Another of the Pope's palaces, the Lateran, has been converted into an hospital.

Iuseum of e Capitol.

The museum of the Capitol contains a very extensive collection of specimens of ancient sculpture. The finest works in it are the famous statue called the Dying Gladiator, found at Antium in the same spot with the Apollo Belvidere and the Fighting Gladiator; the two Furietti Centaurs; the old shrivelled crone, which some have called the Præfica, others a Sybil, others Hecuba; the group of Cupid and Psyche; Cupid bending his bow; the Osiris and Isis; the professor of the gymnastic art; the noble seated statue of Agrippina, the wife of Germanicus; the Camillus; the child playing with a swan; the bronze urn which bears the name of Mithridates; the four doves, a mosaic, which must be either the original or a copy of the famous mosaic of Sosus, in the temple of Pergamus, described by Pliny; and the bas-reliefs of the dispute between Agamemnon and Achilles; the Nine Muses; and the battle of the Amazons.[3] The Capitol contains also a museum of painting, but it is of very inferior interest.

The academy of St. Luke, in the Forum, contains Raphael's famous picture of St. Luke painting the Virgin's portrait. Here is preserved the skull of Raphael under a glass case.

Rome contains eleven public libraries, some of which are excellent. In the Augustine convent there is one containing upwards of one hundred thousand volumes, which is open to the public.

Villas.

There are a great many villas in the immediate vicinity of Rome, and even within its walls. Every villa has at least one building, called a casino, containing a suite of entertaining rooms, fitted up with all the luxury of painting and sculpture. The villa and garden of the Borghese, which are by far the most beautiful pleasure grounds at Rome, are open as a common drive to the whole metropolis. The villa Ludovisi, within the walls of the city, is nearly two miles in circuit. It contains an invaluable collection of celebrated pieces of ancient statuary, of which no copies are known to exist. The magnificent villa Medici, on the Pincian hill, is now converted into the French academy, where a number of young artists of promise are supported at the charge of the French government, with the view of enabling them to enjoy the advantages of a few years study at Rome. The villa Albani is enriched with the most precious collection of ancient sculpture that any private cabinet ever contained. The finest specimens of this collection are the famous Apollo *Sauroctonos*, the most beautiful bronze statue now left in the world, and which, in the judgment of Winkelman, is the original of Praxiteles, described by Pliny; the statue of Minerva, which is pronounced by Winkelman to be the only monument now existing at Rome of the sublime age of art that lasted from the age of Phidias to that of Praxiteles; and the far-famed relievo of Antinous, which, says Winkelman, "after the Apollo and the Laocoon, is perhaps the most beautiful monument of antiquity which time has transmitted to us."[4]

Castle of St. Angelo

The castle of St. Angelo, "the mole which Hadrian rear'd on high," was originally called "Moles Adriani," from the name of its founder, who destined it to hold his remains for ever. It is a circular building, and was formerly reckoned very strong; it has stood many sieges, but as a fortress it is wholly untenable against modern tactics. It has been so often taken and retaken, repaired and altered, that but little of the original structure now remains, except the walls. It communicates with the Vatican by a long covered gallery, made by Pope Alexander VI., to afford him a way of escape from the just fury of his subjects. The castle of St. Angelo is now used as a place of confinement for prisoners sentenced to the galleys. The upper part of it also serves as a state prison for criminals of rank, and those who fall under the suspicion and displeasure of the Pope.

Population

The population of Rome, which in 1800 amounted to 153,004, gradually diminished till it was only 117,882 in 1813. Since that period, however, it has progressively increased, and in 1836 consisted of 153,678, exclusive of Jews, who amount to 3700. On the dismemberment of the Pontifical territory in 1800, the population of those parts which now form the government was 2,400,000, in 1829 that population had increased to 2,679,524, being an augmentation of about one-eighth.

The population returns for the city of Rome in 1836, are thus given by the authorities:—

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[1] Rome in 19th Century, vol. i. p. 144—178.

[2] Pliny, lib. xxxiv. cap. 8.

[3] Rome in 19th Century, vol. ii. p. 428—450. Forsyth's Italy, p. 229.

[4] Winkelman, Hist de l'Art. liv. vi. chap. 7. sect. 28. Rome in 19th Century, vol. iii. p. 109—116.

Statistics of Rome.

Parochial churches,...	54	Communicants,......	112,940
Families,................	34,895	Non-communicants,	40,738
Bishops,..................	37	Marriages,............	1119
Priests,.............	1468	Boys baptised,.......	2258
Monks,..................	2023	Girls baptised,.......	2115
Nuns,....................	1476	Males dead,..........	1683
Seminarists and collegiates,..................	541	Females dead,.......	1592
Heretics and Turks, (Jews excluded,)...	201	Male population,.....	81,488
		Female population,..	72,190

The increase of population from 1835 is 1221; the births are as 1 to 35; the deaths as 1 to 47.

The following is a correct statement of the extent of the surface of the different districts in the Roman States. A third part of the surface is cultivated:

Surface.	Superficies in Tavole Quadrate Censuarie.[1]	Value in Scudi and Bajocchi.
Rome and Agro Romano,	2,101,947	13,043,679.39
Comarca di Roma,.........	2,095,242	10,122,937.35
Bologna,......................	3,358,305	19,046,841.03
Ferrara, ...	2,736,093	14,293,823.59
Forli,..........................	1,774,163	12,489,821.66
Ravenna,......................	1,751,908	10,270,541.91
Urbino and Pesaro,........	3,559,086	10,060,247.50
Velletri,......................	1,593,420	4,589,789.56
Ancona,........................	1,155,738	7,231,281.25
Macerato,.....................	2,135,278	9,869,941.98
Camerino,.....................	811,847	1,187,047.89
Fermo,.........................	890,294	3,606,128.89
Ascoli,.........................	1,145,084	2,426,337.87
Perugia,.......................	3,973,376	13,383,842.71
Spoleto,.......................	2,820,683	6,920,604.81
Rieti,...........................	1,438,655	4,492,890.31
Viterbo,.......................	2,900,985	9,243,772.59
Orvieto,.......................	762,159	1,717,985.49
Civitá Vecchia,.............	968,509	3,553,944.87
Frosinone e Ponte Corvo,	1,873,281	5,052,802.95
Benevento,..................	139,191	1,546,535.
Totals,............	39,985,236	164,150,798.54

Productions.

The principal productions of the country are corn, such as wheat and maize, vegetables, rice, hemp, wines, vinegar, brandy, tartar, wine lees, oil, timber, charcoal, tobacco. The produce of secondary importance is fruit, potatoes, flax, seeds, and oleaginous vegetables, dye-woods, and barks of the cork and other trees, potash, soda, hay, mulberry-trees, aniseed, &c. The main agricultural products are cattle, both large and small, with their secondary productions, such as wool, cheese, butter, hides, bacon, &c.; silks, wax, honey, tallow, horns and bones, parchment, &c. Buffalos, goats, mules, and other animals for carriage, are found, but not in large numbers. Domestic fowls, and game of all sorts, are in abundance.

The cultivation of rice, vegetables, potatoes, hemp, olives, mulberry-trees, silk worms, horned cattle and sheep, with cheese and wool, is on the increase, while, on the contrary, corn, firewood, charcoal, wood, pine-kernels, horses, and the salted sardinias of the Adriatic are diminishing. The fishing-trade generally is declining or almost extinct. Other produce is nearly stationary.

Statis of Ron

With respect to the mineral productions of the Pontifical States, but little information can be given. They possess excellent earths, argillaceous and others, fit for various manufactures, and especially for earthenware. Pozzolano is found at Rome and elsewhere; travertine, peperine, and other building stones, at Tivoli, Albano, &c. Millstones, siliceous and fire-stones, fuller's earth, alabaster, are also found. In some parts are marbles, variegated and sculptuary. Rock crystals are found at Tolfa, and elsewhere. They produce also salts and bitumens, alum, vitriol, fossil coal, pitch and naphtha. They have no fossil, but abundance of marine salt, the annual produce of which is 76,000,000 lbs. There are many salt-springs in Romagna and the frontiers, and abundance of salubrious mineral springs, both hot and cold. Of metals there are indices of gold and silver in various places, but the quantities are small. Iron ore is believed to exist in the territory of Terni, Viterbo, Bologna, and elsewhere, but no sufficient trial has been made to enable a correct estimate to be formed of the probable produce. Copper ores, quicksilver, marcasite and lead, have also been found. Pozzolana is employed for subaquatic works, and is exported to some extent. The Viterbo vitriol mines produce more than 100,000 lbs., one-half of which is exported. There are many mines of fossil coal, which were worked with great success, and the coal was found most abundant and excellent, but they have of late been utterly neglected. About four million lbs. of sulphur are dug in Romagna, Pesaro, and Tormignano. The government works only the alum mines, all the rest are private undertakings.

Agricult

Roman agriculture is by no means in a flourishing state. Most of the lands in the Agro Romano, and generally in the Maremme, extending from the confines of Tuscany to those of Naples, are divided into large properties. The extent varies much, some containing no less than 8000 hectares, and others not exceeding a few hundred hectares; but, generally speaking, the landed properties vary from 500 to 1000 hectares. All the tract of country from the Apennines to the Mediterranean, with the exception of the suburban districts near the towns and villages, is divided into possessions of considerable size. But the number of wealthy proprietors is very small, perhaps there are not twenty landholders of ample fortune. The great majority of them are poor, a few of them are tolerably well off, but the opulent are rare indeed. The value of land is almost infinitely various; the rent in the Maremme varies from a half to four crowns per hectare. Beyond the Maremme it is sometimes let at twenty crowns per hectare (L.4) per annum, and in some cases the rental exceeds that sum. Lands do not ordinarily render more than two and a-half or three per cent. In the neighbourhood of the large towns of the State, land readily sells for forty years' purchase. The agricultural labourers are grossly ignorant, and they have no means of acquiring education, though they are neither indolent nor unwilling to better their condition. They in general live badly, using, for the most part, maize bread and *polenta*, beans and pulse, and other vegetables, but they seldom are able to obtain animal food. In winter their beverage is *picchetta*, a mixture of wine and water, and in summer wine alone. In the populous districts, wages vary from one to two pauls (5d. to 10d.) and in the Maremme from two to four pauls per day, according to the employment, the season, and the locality.

In the most populous and best cultivated districts, there is usually an annual change from spring grasses to corn produce, but in the Maremme the soil is often left to repose for from three to seven years. No operations on a large scale can be carried on there in summer, owing to the state of the climate. In the summer season, the animals are driven from the plains to the mountains, and after the gathering of the harvest, the Maremme are abandoned, on account of the malaria. The leases in these districts are sometimes subset to smaller cultivators, and even subdivided into small fractions. But in other parts of the country leases are rarely granted; land is almost all colonized, that is, farmed on the mezzeria principle, a system which is productive of the worst results. The general arrangement is, that the landowner shall receive from the coloni half the produce of the soil; but there are many cases in which the amount received is not one-sixth of the produce. The coloni are generally in debt to their landlords, and are often in a state of insolvency.

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[1] The Tavola censuale = 1,000 square metres; so that 39,985,235 T. ◻ C. = 11,632,745 miles ◻ Italian, of 60 to the degree.

The Roman states produce a supply of cattle sufficient for the ordinary consumption. Horses are exported, and there is a small importation of oxen and swine. The breed of sheep is improving, and the export of wool is considerable, and is rapidly increasing. Olive plantations were long one of the most productive investments; but they are now less so than the cultivation of the white mulberry, which would spread widely were capital abundant. Vineyards have been too extensively planted, and now yield no return equivalent to the outlay. The culture of the wheat has diminished solely from the absence of external demand, and the consequent decline of prices. The instruments of husbandry employed are of the rudest kind. The heavy customs have prevented the introduction of improved implements, and the arts are too little advanced to allow their production at home. The principal impediments in the Roman states to agricultural improvements are, the political situation of the country; the protecting system, which keeps all the producing powers in backwardness; the want of capital; the want of population in the Maremme, and the mezzeria system elsewhere; the want of knowledge, and more especially of agricultural knowledge; the extreme difficulty proprietors have in finding managers for their estates who are able and willing to introduce the improvements that have been adopted elsewhere; mortmain, the heavy burden of taxation falling particularly on proprietors, agriculturists, and their productions, and the difficulty of sales from restricted relations.[1]

The population of the Roman states in general is rather agricultural than manufacturing, and their manufactures serve only for the home consumption. There is little demand for them abroad. The papal government has made enormous sacrifices, by protections, prohibitions, and premiums, for the encouragement of what is called native industry; but these measures, so far from increasing and improving manufacturing produce, have been the main causes of decline and decay. Their only effect has been to reward and to render permanent the most rude and ignorant processes of manufacture. Scarcely a valuable discovery has been introduced into their manufactories, and the looms are still such as were generally employed in the fourteenth century. Many a town in Great Britain, consisting only of 30,000 souls, produces a greater quantity of manufactured articles than the three million inhabitants of the pontifical states. The principal manufacture is that of woollens of ordinary quality. Rome is the chief seat of this manufacture, and the value of the fabrics produced annually, is calculated at 300,000 crowns, (L.60,000.) Next to woollens stands the manufacture of hats. They are well made every where, but especially at Rome, and to the amount of 200,000 crowns, (L.40,000.) There are silk manufactories in Rome, Bologna, Camerino, and Brugia; but the trade is declining. Next in importance to woollen and silk manufactories, are those of tanned and dressed leather. Gloves are made in Rome and Bologna, to the extent of from 90,000 to 100,000 pairs annually. Roman musical strings enjoy a very ancient and deserved reputation. The annual quantity made amounts in value to 10,000 crowns. There are scarcely any manufactories of cotton goods. The government has made great sacrifices to maintain an establishment at the Diocletian baths, but without success. The fabrics of hemp and flax are more numerous than those of cotton, but there are no factories; all the goods produced are manufactured either in public schools, orphan asylums, or private houses. The other articles of manufacture are ropes and cordage, wax and tallow candles, paper, cream of tartar, liquorice juice, pig iron, copper manufactures, earthenware, and glass. An extensive trade was formerly carried on in alum, which was dug in large quantities in the mountains of Tolfa, but the introduction of artificial alum, by lowering the prices, has greatly diminished this trade. Raw sulphur is found in large quantities and of excellent quality. After supplying the home consumption, both raw and refined sulphur are exported to the amount of four million lbs. giving an annual proceed of 120,000 crowns. The sulphuric manufactures of Bologna produce annually 50,000 lbs. of sulphuric, and 10,000 lbs. of nitric acid.

Trade.

The trade of the Roman states is far from extensive or flourishing. The principal exports are corn from Romagna and the frontier districts; but this trade is diminishing. Sheep 50,000 yearly, swine 40,000, oxen 10,000. The export to England of Roman wool is become very considerable, and is increasing rapidly. The provinces on the west of the Apennines export from 800,000 to 900,000 lbs. of wool for Piedmont and France. A million lbs. of cheese go to Tuscany and Sardinia; of lambs skins, about 400,000 lbs. are shipped to England, Piedmont, and Naples. Of horns and bones, there is an export of 15,000 lbs.; of honey, 10,000 lbs.; of skins, 100,000 lbs.; of tallow, 200,000 lbs.; of lard and fat, 150,000 lbs.; of hemp, 30 millions of lbs.; of white and brown rags, 3 millions lbs.; of oil, 1 million lbs.; of tobacco, 300,000 lbs., but the government monopoly is a great impediment to the extended cultivation of a plant to which the soil is well adapted. There is a large export of planks to Spain, America, and France, besides other articles.

Imports.

The imports are to some extent affected by the circumstance, that a chain of mountains traverses the country, making the north-west almost inaccessible to the south, so that while one part of the state is exporting, another is importing the same article. Colonial produce is received principally from England and France; and the consumption is, of raw sugar, 10,000,000 lbs.; coffee, 1,600,000 lbs.; pepper, 1,000,000 lbs.; cocoa, 50,000 lbs.; cinnamon, 40,000 lbs.; cloves, 35,000 lbs.; and raw cotton, 150,000 lbs. Of other principal articles, the yearly imports are, from 40,000 to 50,000 sheep; from 12,000 to 13,000 calves or oxen; 8000 to 9000 swine; 16,000 to 18,000 cows; some costly horses, principally for the capital; hides, about 1,200,000 lbs.; raw skins, 50,000 lbs.; coarse wool for mattresses, 1,000,000 lbs.; cheese, 1,300,000 lbs.; butter, 70,000 lbs.; wax, 700,000 lbs.; cochineal and kernes, salt fish from England, 8,700,000 lbs.; about 3,000,000 lbs. more of pilchards, Sardinian salmon, &c. are brought from Spain, France, Sicily, and Russia.

The tariff which regulates the import and export duties of the Pontifical states, is dated 28th April 1830.[2]

The prohibitions in the Roman states are not numerous. On imports they include the articles farmed, as salt, tobacco, alum, vitriol, playing cards, pictures, engravings, &c.

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[1] See the communication of one of the largest landed proprietors in the Roman States, in Dr. Bowring's Report, &c. p. 78, 79.

[2] Report on the Statistics of the Roman States, by Dr. Bowring. 1837.

The Corn-Laws in the Roman States are as follows.

Mediterranean.	Adriatic.	Duties.	
		Import.	Export.
Wheat, when the price is Under 14 crowns	Under 12 crowns, per 640 lbs.	Prohibited.	Free.
up to 14 ...	Up to 12	Crowns 2	1
up to 15 ...	Up to 13	... 1	2
up to 16 ...	Up to 14	No duty.	Prohibited.
Flour, under 16 ...	Under 14	Prohibited.	Free.
up to 16 ...	Up to 14	Crowns 1 50	75
up to 17 ...	Up to 15	... 75	1 50
up to 18 ...	Up to 16	Free.	Prohibited.

A similar legislation is applied to bread, maize, beans, peas, potatoes, and chesnuts; but rice is subject to an export duty of one bajocco per 100 lbs.

The exports to England are few, and consist mainly of grain, raw hemp, rags, raw and refined sulphur, silk, cream of tartar, wood, lamb and kid skins, cork, &c. English vessels load goods at Civita Vecchia, but the major part of the above articles are shipped for England from Leghorn, Genoa, and Marseilles.

Rome receives from England colonial produce, fish, medicines, drugs, and dye-stuffs, metals, cotton-twist, piece goods of all sorts, hardware, and iron and steel goods, jewellery, glass, earthenware, porcelain, &c.

Roads. The roads of the Pontifical states are, generally speaking, well kept. They are best at a distance from the capital, and worst in its immediate neighbourhood, from the want of siliceous material for repairs. Ever from the time of the ancient Romans, the roads have been divided into the three classes of consular, provincial, and communal. By a decree of the 23d October 1817, this arrangement was regulated, and a board nominated to the charge of the roads; and it was determined to levy a tenth part of the praedial impost for the consular roads, a variable quota from the provinces for the provincial roads, and another at the charge of the municipalities for the communal roads.

The bankers Torlonia recently proposed a scheme of great utility, that of introducing steam navigation on the Tiber, establishing a port on its mouth, extending steam communication from it to Naples, Leghorn, and all the adjoining coast. But after the steam vessels and omnibuses were contracted for, and nearly ready, the government took alarm, and put an interdict on the scheme. In the stage coaches travellers pay 35 bajocchi per post, (somewhat less than 2d. per mile, English). Money, jewels, and effects of small bulk and large value, are conveyed from one end to the other of the Roman states, if under 100 crowns, at 2 per cent; from 100 to 500 at 1 per cent, &c. The government messengers have the privilege of conveying travellers for their own account, and their general charge is 60 bajocchi per post, (somewhat more than 3d. per mile), half of which they are required to pay to government. The price of travelling in ordinary vehicles averages at from 3 to 3½ crowns per 100 miles per individual, comprising one meal to be furnished by the *vetturino*. By carriage or carts the general charge for the carriage of goods is 1 crown per 100 miles.

Wages. Wages in the Roman states are low; and in general it may be stated, that the services which in England cost a shilling, in France a franc, in the Papal states cost a paul, (54 centimes, or about 5½d. sterling). A day's labour in summer costs 30 bajocchi, (14d. sterling), but in winter only 15 to 20 bajocchi, (7d. to 10d. sterling); and the prices of the ordinary articles of consumption vary much in the different parts of the Roman states. There is a very great difference between those in the capital and those on the two sides of the Apennines. The rate of wages paid in town and country are as follows:—

In town, a	valet	10	crowns per month, lodging and food.
	waiting-maid	6	ditto, ditto.
	footman	8	ditto, and clothing.
	maid-servant	2	ditto, lodging and clothing.
	wardrobe-keeper	4	ditto, ditto.
	coachman	10	ditto, and clothing.
	rider	7. 50	ditto, ditto.
	groom	6	ditto, ditto.
	cook	10	ditto, lodging and food.
	boy	3	ditto, and food.
In country,	labourer	6	ditto, lodgings and food.
	shepherd	4	ditto, ditto.
	boy	3	ditto, ditto.

The monthly expenses of maintaining a family in the country, composed of six individuals, are, (including rent,) 17 crowns, 10 bajs., making 2·85 crowns per person, without calculating medical charges, so that, according to the above estimate, a family of six person living in the country can subsist on 17s. a-week, or about L.41 per annum. But in Rome, the monthly expenses of a family of the middling classes, composed of six individuals, would be 52 crowns, 33; that is to say, 8·72 per individual, about L.2, 12s. 6d. per week, or about L.125 a-year, for the expenditure of a family of the trading classes.

Prices of ordinary articles of consumption in the markets of Rome.

Bread	Bajocchi 2½	per lb. of 12 oz.	
Flesh-meat	6½	”	
Fish	6	”	
Flour	3	”	
Salt	3	”	
Hogs' lard	9	”	
Salt meat	12	”	
Vegetables	2½	”	
Wine	10	per bocale.	2½ bocali equal to 1 gallon.
Oil	40	”	

Wages paid for different classes of labour:—

Masons	Pauls per diem 4½
Carpenters	6
Blacksmiths	6
House Painters	6
Stonemasons	6
Workers in stucco	6
Upholsterers	4
Coachmakers	6
Sawyers	5
Potters	4
Dyers	5
Spinners	6
Weavers	5½
Printers	Pauls per diem 5
Millers	3
Bakers	8
Waiter at public-houses	3½
Goldsmiths	5
Watchmakers	4
Tailors	5
Milliners	2
Shoemakers	5
Hatters	6
Agriculturists of various classes	3½

Statistics of Rome.

Civil government.

The civil government is in the hands of the College of Cardinals, and the executive is administered by the Cardinal Vicarius, who is a kind of prime minister. It has been defined to be "a government administered by monks, who conduct the affairs of a nation by the rules of a convent, and apply the maxims of the twelfth century to the business of the nineteenth;" and the apathy and timidity, the dread of independent thinking and of free inquiry which it manifests, fully justify the statement. Such is the dread of innovation, that even vaccination is not permitted in Rome. The press is held in rigid durance, and all the best works on mental philosophy are prohibited. As might have been expected, these restrictions have proved in the highest degree injurious to the prosperity of literature. The state of science in Rome is still less flourishing, for it has been the constant policy of the papal government from the days of Galileo to the present time, to discourage as much as possible the research after truth. Rome, therefore, has not one eminent man of science; there are very few who take even any interest in the matter; nor is there a single museum of natural history, public or private, worth notice. The constitution of society, too, is so framed as to hold every man in the situation in which he is born. However meritorious or enterprising he may be, he can scarcely ever expect by his own personal exertion to raise himself to a higher station, for there are barriers he can never pass.

The clergy constitute the nobility of Rome; they form the court of the sovereign, and fill all civil offices as well as ecclesiastical. The persons styled Roman princes are few in number, and, with two or three exceptions, very poor, and totally destitute of power or authority.

Religion.

The inhabitants of the papal states, with very few exceptions, profess the Romish faith. According to the official returns the number of Jews in Rome is 3700; of heretics and Turks, 201. The Jews are compelled to reside in one particular quarter of the city. There is now a Protestant place of worship in Rome, in which an English clergyman regularly officiates, but this is rather connived at than openly tolerated. Of late years there has been a considerable increase in the number of the clergy. In 1825 they amounted to 4938; in 1835, to 5273. According to the official statement, there were, in 1836, 37 bishops, 1468 priests, 2023 monks, 1384 nuns, and in houses of education, 698. There is thus in Rome one clergyman for every ten families; but it is supposed that the real number considerably exceeds the official return. The state of morals, both among clergy and laity, is far from satisfactory.

Statistics of Rome.

Education.

The absence of statistical accounts makes it impossible to state what is the number of children in the schools of the Roman territory. According to the calculation of the government, it is about 1 in 50 of the population. A bull was issued on this subject by Pope Leo XII., which was followed by a "Reglamento degli Studj," erecting a board intended to have the general direction of the business of education, the control of all universities and schools, and consists of certain cardinals in official stations, and others, to be nominated by the pope. It established two primary universities, Rome and Bologna, and six secondary universities. The universities have four faculties, theology, law, medico-surgery, and philosophy. But of this Reglamento only a very small portion refers to public schools. They are placed almost entirely under the control of the bishop. The teachers are elected by the communal council, but the bishop must confirm the nomination, and he possesses a perpetual power of dismissal without reference to the local authorities. But the business of education is almost universally neglected. The elementary schools in Rome are 872; the number of masters, 482, and of scholars, 14,099; that is to say, in the infant schools, 4800; in the gratuitous elementary schools for boys, 2694; for girls, 287; in the schools where a small sum is paid for instruction, 2115 boys, and 1600 girls. Many parts of Rome, however, as Trastavere and the Borgo, are very ill supplied. Rome contains four ecclesiastical boarding-schools, two seminaries, seven ecclesiastical colleges, five secular colleges, two universities, nine gratuitous parish schools, and sixty regionary; seven schools kept by monks, one for the deaf and dumb, five pious places of education for males, and fourteen for females.

Two banks for savings have lately been established, one in Rome, the other in Spoleto; that of Rome has been very successful, and in six months has received 50,000 crowns in deposits. The Monte di Pietà of Rome has existed for nearly three centuries. It has passed through many vicissitudes, and has now a circulating capital of about 230,000 crowns advanced on about 200,000 pledges. It is proposed to associate this establishment with the savings bank, which is now attached to the lottery office.

The following Table shews the Receipts and Expenditure of the Roman States.

General Heads of Receipt.			Expenses of Administration.			State Expenses.		
No.	Particular Heads.	Crowns.	No.	Particular Heads.	Crowns.	No.	Heads.	Crowns.
1	Predial imposts, landed property, &c.	3,280,000 00	1	Predial imposts, landed property, &c.	760,000 00	1	Sacred palaces, sacred college, ecclesiastical congregations, and diplomatic body abroad	500,000 00
2	Monopolies, customs, and taxes on consumption	4,120,000 00	2	Monopolies, customs, and taxes on consumption	460,000 00	2	Public debt	2,680,000 00
3	Stamps and registries	550,000 00	3	Stamps and registries	90,000 00	3	Expenses of state government	530,000 00
4	Post-office	250,000 00	4	Post-office	150,000 00	4	Justice and police	920,000,00
5	Lotteries	1,100,000 00	5	Lotteries	760,000 00	5	Public instruction, fine arts, and commerce	110,000 00
	Total of receipts	9,300,000 00		Total administration and charges	2,220,000 00	6	Charities and acts of public beneficence	280,000 00
	Deduct	2,220,000 00				7	Public works, cleaning and illuminating Rome	580,000 00
		7,080,000 00				8	Troops of the line and carabineers	1,900,000 00
						9	Other military charges, health, and marine	290,000 00
						10	Public festivals, aud extra expenses	44,000 00
						11	Reserve fund	100,000 00
							Total of expenses of the state	7,934,000 00

evenue.

Thus the net receipts exhibit 7,080,000 crowns, and the net expenditure 7,934,000 crowns, showing a deficit of 854,000 crowns.

The average cost of collection appears to be nearly one-fourth of the gross revenue. That of the predial imposts, 23 per cent.; of the customs. &c., 11 per cent.; stamps,

Statistics of Rome.

&c., 16 per cent.; post-office, 60 per cent.; lotteries, 69 per cent. The interest on the national debt absorbs about 38 per cent. of the net revenue.

Taxation.

If the population of the Roman states be estimated at 2,800,000, and the average expenditure at 9,000,000 crowns, the amount of taxation per individual would be about 12s. 10d. per annum.

The principal taxes levied are,—

1. Tax on consumption (exclusive of that on flour) which, if estimated on the whole of the male population above the the age of 16, would give 60 bajocchi per head, (2s. 6d. sterling.)

2. The personal tax which is levied according to the classification of the payers, with a reference to their wealth. If averaged upon the males above 16 years, its amount would be 40 bajocchi each, (1s. 7d. sterling.)

3. Additional impost on the value of the cadastral survey.

4. Various taxes of localities, markets, offices, &c., as on weights and measures; on fishing and hunting, &c.

Army.

The papal troops consist of

Polizia	4000
Custom-house officers	1500
Armed functionaries	5500
Artillery	1000
Cavalry	1000
Infantry	12000
Regulars	14000

And about 15,000 militia, who are not in active service.

Charitable institutions

It is a boast of the Romans that in no city is so large a sum devoted to public charity in proportion to the population. The proportional payments of Rome for charitable purposes are about double those of Paris. Rome has a yearly revenue from charitable funds of 1,900,000 francs; and the state grants annually 2,200,000, making a yearly revenue of 4,100,000 francs. But of the immense number of benevolent establishments in Rome, a great proportion are of doubtful, ill-directed, and even pernicious charity; and in spite of the liberality with which money is scattered, nowhere is more mendicity, wretchedness, idleness, and want.

Hospitals

Besides the foundling hospitals, which are very numerous, there are thirteen societies for giving dowries to girls on their marrying, and pecuniary gifts on their taking the veil. Of 1400 women who are married at Rome annually, no less than 1000 receive dowries from the public purse, the annual payment for this object being 32,000 crowns, or L.8000 sterling. Independently of public institutions, there is much private almsgiving. There are in Rome twenty-two establishments for the diseased, the insane, and the convalescent, of which eight are public, eleven are private hospitals, two are institutions for visiting the sick in their houses, and one is for the burial of the dead. These hospitals can accommodate about 4000 persons. The maximum of deaths is 11.60 per cent. the minimum 5.43. The average cost of ordinary patients is two pauls per day, (10d.)

Rome is one of the great recipients for abandoned children, which are brought thither from remote provinces, and even from the kingdom of Naples. In St. Spirito 800 boys are annually received; the Conservatory receives ordinarily 800 girls; five other hospitals have 544 boys and 670 girls. At the end of 1838, there were 1672 children in the St. Spirito asylum; 804 were deposited in that year, 684 had departed, and 1552 remained from the former year. No less than 580 children died in the year, being a mortality of 72 per cent.

Justice.

The latest official document respecting the administration of justice is that of 1832 The number of condemned persons in that year was 2708, but about 8000 more must be added to these for criminals already in prison, so that the number of prisoners is generally about 6000. Criminal proceedings in the Papal States are very dilatory. The prisons receive all offenders, whether of correctional or criminal police; and as there is no liberation of the accused on bail, there is necessarily a considerable aggregation of offenders. (B. Q.)

Statement of the Criminals in the different places of Detention, with the Classification of their Crimes and Punishment in December 1832.

No.	Places of Punishment.	Will hold.	Number of Criminals actually detained.	Length of Punishment.					NATURE OF OFFENCES.															Total.
				Life.	20 Years.	10 Years.	5 Years.	Under 5 Years.	Homicide.	Wounds.	Burglary.	Robbery.	Larceny.	Theft.	Coining.	Breach of Police Surveillance.	Escapes from Prison.	Resisting Police.	Rape.	Sodomy.	State Offences.	Other Crimes.	
1	Civitá Vecchia,	1200	1146	220	556	210	117	43	357	43	212	35	119	213	5	...	1	12	40	14	2	93	1146
2	Ancona,	450	408	3	25	80	72	228	48	58	40	2	44	161	1	5	4	2	10	6	6	21	408
3	Porto d'Anzio,	200	191	...	...	100	43	48	63	18	3	...	9	79	...	1	...	1	8	2	...	7	191
4	Spoleto,	500	436	...	14	30	158	234	59	66	24	6	32	181	...	8	1	6	10	2	...	41	436
5	Narni,	200	80	...	...	25	35	20	5	11	4	1	4	42	...	...	1	...	5	1	...	6	80
6	St. Leo,	30	21	2	11	4	4	...	2	...	3	1	1	8	...	...	1	...	...	...	5	...	21
7	Roma, Fort St. Angelo,	150	36	...	...	...	9	27	7	17	...	...	...	7	...	...	...	2	...	...	...	3	36
8	Fermo,	250	309	...	...	5	57	247	38	60	9	1	5	112	1	17	...	2	16	1	5	42	309
9	Civitá Castellana,																						
	Political,	130	58	...	...	1	2	55	...	...	...	...	...	...	...	...	...	...	...	...	58	...	58
	Criminal,	15	23	...	...	...	13	10	1	4	...	...	1	8	...	1	...	1	2	...	...	5	23
	Total,	3125	2708	225	606	455	510	912	580	277	295	46	215	811	7	32	8	26	91	26	76	218	2708

Burgess's *Antiquities of Rome; Rome in the Nineteenth Century;* Eustace's *Classical Tour;* Forsyth's *Italy;* Melchiorri, *Guide Methodique de Rome;* Dr. Bowring's *Report of the Statistics of the Pontifical States.*

ROMILLY, Samuel, one of the most enlightened and virtuous public men whom England has ever possessed, was, as his family-name indicates, the descendant of a French family. He was the son of a jeweller in London, and was born there on the 1st of March 1757.

The education of this child, destined in time to occupy so distinguished a place, was conducted for some time with even less care than might have been expected from the station held by his family. But, heartily disliking his father's business, he was at length allowed to change it for professional employments, though as yet in an inferior department. At the age of sixteen he was articled to one of the six clerks in chancery; and in the easy mechanical duties of his master's chambers, relieved by the zealous prosecution of his studies both in English and Latin, passed several years of his life. He then resolved on coming to the bar, a step which, he informs us, all his friends, with one exception, considered as highly imprudent. One circumstance which helped to determine Romilly was very interesting; the purchase of a seat in the office in which he had been articled would have cost a sum which he knew it would be inconvenient for his father to advance.

He had completed his twenty-first year when he entered himself at Gray's Inn, becoming, at the same time, a pupil of an able equity-draftsman. General reading both in English and Latin, translation habitually practised from the latter language into the former, the composition of a few political essays for the newspapers, and occasional attendance on the houses of parliament, now alternated with a closeness of application to legal study, which, after a time, injured his health, and compelled him to retire, first to Bath, and afterwards to the continent. At Geneva he became acquainted with some of the men who were then beginning to attract notice in that city; and, among acquaintances thus made, the most valuable was that of Dumont. After visiting some of the nearest scenery of the Leman Lake, and of Savoy, Romilly proceeded to Paris, where he met D'Alembert, Diderot, and other eminent men.

On the last day of Easter term 1783, he was called to the bar. For some years afterwards, he obtained an increasing employment in the drawing of chancery pleadings; but during this time, as he says himself, he had hardly once occasion to open his lips in court. In the spring of 1784, he went upon the midland circuit, which he continued to frequent until, even as admitted in his own modest Memoir, he was decidedly its leader. His chancery business, however, to which at length he entirely devoted himself, had become very great before he confined himself entirely to town; and his principal reason for remaining so long on the circuit, is assigned by himself in one of his calmly characteristic expressions of honourable ambition: he desired to qualify himself for being a *judge*.

Long before he left the circuit, he had attained a distinguished position in the eyes of those who were qualified to appreciate him, not merely as a lawyer, but as a statesman. In 1784, he became acquainted with Mirabeau, who was then in London, and of whose character he appears to have formed an exceedingly just estimate. Mirabeau was the medium through which Romilly became known to Lord Lansdowne, and thus to the leaders of that political party of which he had throughout been an honest and warm adherent. To that nobleman he was recommended, both by the hearty praises of Mirabeau, and by a pamphlet he had written, called "A Fragment on the Constitutional Power and Duties of Juries." Lord Lansdowne, directing Romilly's attention to a recent sanguinary tract on Criminal Punishments, induced him to write an answer, which was published anonymously, under the title of "Observations on a late Publication, entitled 'Thoughts on Executive Justice.'" In the mean time he continued vigorously to prosecute in private the inquiries into the Reform of the Laws, especially the Criminal Laws, of which he had thus begun to announce publicly the parts.

In the vacation of 1788, he paid a third visit to Paris. Introductions from England, and other circumstances, brought Romilly and his fellow-traveller Dumont into intercourse, upon this occasion, with many men distinguished then, and with others still more celebrated in the bloody struggle that was about to ensue. Mirabeau at this time translated into French, and published, observations made by Romilly on the Hospital and Prison of Bicêtre. This pamphlet had the honour to be suppressed by the police of Paris, but in the original English was afterwards printed by the author himself in an obscure London periodical. In July 1789, Romilly wrote a pamphlet which was afterwards published; "Thoughts on the Probable Influence of the French Revolution on Great Britain." But the lively interest he took in the events which emerged in Paris, while he was engaged in composing these remarks, led him back to that city in August of the same year; and he now saw, both in public and private, many of the persons who had become most distinguished in the National Assembly. Dumont's observations upon the eventful summer of 1789 in France, were translated into English by Romilly, and, with the addition of some observations by himself on England, were published in 1792, receiving the title of "Groenvelt's Letters." Many of Romilly's opinions on the progress of the French Revolution are contained in his published correspondence with Dumont, Madame Gautier, Dugald Stewart, and others, and in a diary which he kept during a journey to Paris in the autumn of 1802.

While Romilly was thus advancing to the highest rank in his profession, and had gained the confidence and admiration of some of the best statesmen in England, his domestic position underwent a most beneficial change, the immediate cause of which was a visit paid to Lord Lansdowne. In his private Memoirs he thus speaks of a person whom he accidentally met on this occasion. "I saw in her the most beautiful and accomplished creature that ever blessed the sight and understanding of man. A most intelligent mind, an uncommonly correct judgment, a lively imagination, a cheerful disposition, a noble and generous way of thinking, an elevation and heroism of character, and a warmth and tenderness of affection, such as is rarely found even in her sex, were among her extraordinary endowments. I was captivated alike by the beauties of her person and the charms of her mind. A mutual attachment was formed between us, which at the end of little more than a year was consecrated by marriage. All the happiness I have known in her beloved society, all the many and exquisite enjoyments which my dear children have afforded me, even my extraordinary success in my profession, the labours of which, if my life had not been so cheered and exhilarated, I never could have undergone,—all are to be traced to this trivial cause." The object of this beautiful eulogium was the eldest daughter of Mr Garbett of Knill Court in Herefordshire. His marriage with this lady took place in January 1798, when he had nearly completed his forty-first year.

He continued to be chiefly occupied in the discharge of his duties as a leader of the Chancery bar for several years, after which he united with these the other avocations that have given to his name so distinguished a place in the list of British statesmen. In the autumn of 1805 he had received from the Prince of Wales the offer of a seat in parliament, which he declined upon grounds strongly marking his sturdy independence of character. These reasons were the same which, many years before, had made him interfere to prevent a similar offer from being addressed to him by Lord Lansdowne. He said that, notwithstanding the declaration made, in both cases, of his being totally unfettered, yet he never could feel real independence while he thus held his place in the Commons by favour; and, he adds, "I formed to myself an unalterable resolution, *never*, unless I held a public office, to come into parliament but by a popular election, or by paying the common price for my seat. As to the first of these, I knew, of course, that I must never look for it; and as for the latter, I determined to wait till the labours of my profession should have enabled me to accomplish it without being guilty of any great extravagance." He was soon rewarded for the scrupulous feeling of honour which had thus forced him to decline a place, that held out to him, as he confesses, very strong temptations.

In February 1806, he was appointed Solicitor General under the government of Mr Fox and Lord Grenville, with neither of whom had he previously any connexion. He was obliged, much against his will, to accept the honour of knighthood, and was elected to represent the borough of Queenborough, accepting this seat, without scruple, from the government. "If I had come in," says he, "as a private individual, I would not have accepted a seat from any body; but as long as I hold the office to which I have been appointed, I must support the administration. As soon as they appear to me unworthy to be supported, it will be my duty to resign." Of the public life which commenced under these auspices, and was prematurely brought to a close in thirteen years, Sir Samuel Romilly kept a minute and faithful diary, the contents of which have lately been made known to the world. No existing record of a political career presents a purer picture than does this;—the history of a course of public conduct directed invariably by those qualities of mind and heart which we have, even in this hasty sketch, seen to have guided the earlier years spent in his family and in his profession. It is impossible to embrace, within these limits, so much as a catalogue of the parliamentary measures in which he took a share, in the way of inciting others to action, in the way of himself acting and speaking and writing in favour of reforms in the laws and constitution, in the way of resisting encroachments on public rights or on just economical principles. And if a selection were to be attempted of a few of his principal public acts, that selection could not be made without omitting many which, in particular views, might be considered more important than those that would be specified.

But the design which lay closest to Romilly's heart, and occupied most of the energies of his capacious intellect, was the amelioration of the law of England, especially in its criminal sections. For such plans his official duties, added to those of his profession and of his place in parliament, allowed him at first no leisure; but from some of these trammels he was speedily released, by the fall of the Whig ministry in March 1807. In the new parliament he was returned for Horsham, on the Duke of Norfolk's interest, engaging to pay L.2000 for his seat if he should be able to keep it in spite of a petition, which was expected to be presented in consequence of doubts entertained as to the qualification of many of the voters. The petition proved successful, and his next election was made on terms equally characteristic. A seat was offered him for Wareham, for which, although L.3000 were demanded, he was asked to pay but L.2000, the remaining L.1000 being promised from a fund subscribed for extraordinary purposes by the leaders of the opposition. Romilly peremptorily refused to be indebted even to the public men with whom he systematically acted. He accepted the seat, but paid the whole price himself.

He now occupied a very prominent position in parliament. The eyes of the most liberally organized constituencies in the country were directed towards him; and in 1811, when a dissolution was impending, it was proposed in several such places to put him up as a candidate. For Liverpool, which was one of these, he at once refused to stand, on account of the disturbances which the contest was sure to occasion. In regard to the county of Middlesex, a negotiation was attempted by Major Cartwright, which was frustrated by Sir Samuel's flatly refusing to give, before his nomination, a pledge in favour of annual parliaments, and of such reform as should make the suffrage co-extensive with the taxation. He however accepted a requisition from Bristol, but was defeated by a coalition between the Tories and a section of the Whigs. He then obtained a seat for Arundel, on the interest of the Duke of Norfolk, an assurance of perfect independence being given him by the patron, but no price being paid on this occasion. Romilly's justification of his change of views is very briefly stated in his diary. His known course in parliament protected him, as he thought, from being either required by his patron to be subservient, or suspected by the public of really being so; and therefore he could safely do that which, by a change of the law, it had now become necessary for him to do if he wished for a seat at all. "Since Curwen's bill," says he, "has declared illegal the purchase of seats in the manner which was formerly practised, there is no choice for a person like myself, but to come into parliament upon such an offer as is now made me, or to decline parliament altogether. And I cannot think that it is my duty to decline it." This seat Romilly held till the dissolution in 1818, when he accepted a requisition from electors in Westminster, upon which a severe contest ensued. One of the two vacant seats was considered as sure for Sir Francis Burdett; the return of Romilly for the other was opposed not only by a ministerial candidate, but by Hunt, Cartwright, and Douglas Kinnaird. Romilly and Burdett were returned, the former standing at the head of the poll from its opening till its close.

The results to which this great victory was expected to have led, were unfortunately never realized. Romilly had a constitutional tendency to hypochondria, or at least to lowness of spirits, which his continual labour both of body and mind prevented for years from reaching a dangerous height, although perhaps this very labour it was, that at length caused the overwrought organism to fall suddenly to pieces. The health of his wife, whom he idolized rather than loved, had for some time caused him serious uneasiness: she became alarmingly unwell. Soon after his election for Westminster, on the 10th of October, he closed abruptly those brief notices of her illness which had lately been the only entries in his diary; and on the 29th of that month she died at Cowes. Her husband travelled to town, labouring, during his journey, or at any rate after it, under an inflammatory fever; and in one of its paroxysms he put an end to his existence, three days after the death of his wife. He died on the 2d of November 1818, when he had nearly completed the sixty-second year of his age.

The public character of Sir Samuel Romilly would be best drawn by a few warm and vigorous strokes, all of which, with no exception worth noticing, would convey images of distinguished excellence. These traits would exhibit his manly and ratiocinative oratory, lighted up into eloquence by the fervour of his moral sense,—the consummate capacity, integrity, and knowledge of the law, and the comprehensive and philanthropic views of legislation, which made it a national misfortune for England that he never became one of her chancellors,—that antique spirit of mental independence, which bowed to the demands of no man, and of no party, not even his own, unless his conscience told him that those demands were just. And these virtues of the statesman and the jurisconsult, which, by their stern majesty, commanded from those that viewed them at a distance an awe not altogether unmingled with fear, were tempered in private life by the warmest and kindest feeling, by the most felicitous union of public labours with personal accomplishments.

His private Memoirs and Diaries, with a selection from his correspondence and other papers, were published by his sons in 1840, in two volumes octavo.

Romford || Ronda.

ROMFORD, a market-town of the county of Essex, in the parish of Hornchurch, and hundred of Havering, eleven miles from London. The population was in 1801, 3179; in 1811, 3244; in 1821, 3777; and in 1831, 4294.

ROMNEY, NEW, a town in the county of Kent, in the Lathe of Sheepway, seventy-two miles from London. It was once a place of much more importance than it is at present. It is surrounded with rich but unhealthy marshes, and is defended against the sea by a strong dyke, called Dunchurch Wall, on which is a good carriage road over the marshes. The population was in 1801, 755; in 1811, 841; in 1821, 962, and in 1831, 983.

ROMORANTIN, an arrondisement of the department of the Loire and Cher in France, seven hundred and thirty square miles in extent. It comprehends six cantons, divided into forty-eight communes, containing, in 1836, 47,722 inhabitants. The capital is the city of the same name at the junction of the Romorantin and the Saudre, and has some beautiful promenades on the bank of the former river. It contains 1200 houses, with 7181 inhabitants, who manufacture to a considerable extent woollen cloth and tanned leather.

ROMSEY, or RUMSEY, a large market and borough town of the county of Hants, seventy-three miles from London. It is in the division of Andover, of the hundred of King's Somborne, and stands on the river Test, on the road between Southampton and Salisbury, and is surrounded by pleasant meadows, which, by irrigation, are rendered highly fertile. It is divided into two parishes; with one church in common, a spacious building in the form of a cross, which, in ancient times, was the chapel of a richly endowed abbey. All the early abbesses were of royal blood, and so distinguished by their piety as to be deemed saints. The trade, which formerly consisted in making woollen stuffs, has nearly been annihilated; by the late law it elected annually four aldermen and twelve counsellors, who chuse the mayor. The population was in 1801, 4274; in 1811, 4297; in 1821, 5128; and in 1831, 5432.

ROMPEE, or ROMPU, in *Heraldry*, is applied to ordinaries that are represented as broken; and to chevrons, bends, or the like, whose upper points are cut off.

RONA, one of the Hebrides, is reckoned about twenty leagues distant from the north-east point of Ness in Lewis, and is about a mile long, and half a mile broad.

RONCESVALLES, a valley in Spain, in the province of Navarne, and district of Sanguessa. It stands at the foot of the Pyrenees, and is the largest valley in the province, but covered with wood. The town of the name is small, but on the great road from France to Madrid, having a church, an Augustin monastery, and an hospital. It has become a place of celebrity from the warlike deeds which the spot has witnessed, both by the defeat of Roland and the twelve peers of France at a remote period, and by the operations under the Duke of Wellington and Marshal Soult.

RONDA, a city of Spain, in the kingdom of Granada, and province of Andalusia. Ronda is about four thousand five hundred feet above the level of the sea, but being surrounded with mountains of vast elevation, it is, in fact, with regard to them, a largely extended valley. The mountains that surround it are more or less covered with snow throughout the whole year; and it is conveyed to the cities of Seville, Cadiz, Gibraltar, and other places, for the daily consumption of their luxurious inhabitants. The plain on which the city stands is one of the most verdant and fertile spots in this the best part of Spain. This city, long a Roman station, under the name of Arunda, abounds with inscriptions, monuments, and ruins of that people, which has been diligently explored by sundry antiquarians. The inhabitants amount to about twenty thousand. Longevity is so very general, that it is a proverb in Andalusia, that in Ronda a man at eighty is still a boy. The public buildings are numerous, but not striking, though some of the churches and convents have the ornaments and riches so commonly belonging to spiritual edifices in this country.

Roorterpoor || Rood.

ROORTERPOOR, a considerable town of Hindustan, province of Delhi, district of Morabad, forty-two miles north by east from Bareilly. Long. 79. 20. E. Lat. 29. 1.

RONSARD, PETER DE, a French poet, was born at the castle of Poissoniere in Vendomois in 1524. He was descended of a noble family, and was educated at Paris in the college of Navarre. Academical pursuits not suiting his genuis, he left college, and became page to the duke of Orleans, who resigned him to James Stuart, king of Scots, married to Magdalene of France. Ronsard continued in Scotland with King James upwards of two years, and afterwards went to France, where he was employed by the duke of Orleans in several negotiations. He accompanied Lazarus de Baif to the diet of Spires. Having from the conversation of this learned man imbibed a passion for the belles-lettres, he studied the Greek language with Baif's son under Dorat. It is reported of Ronsard, that his practice was to study till two o'clock in the morning; and when he went to bed, to awaken Baif, who resumed his place. The muses possessed in his eyes an infinity of charms; and he cultivated them with such success, that he acquired the appellation of the *Prince of Poets* of his time. Henry II. Francis II. Charles IX. and Henry III. loaded him with favours. Having gained the first prize of the *Jeux Floraux*, they thought the reward promised below the merit of the work, and the reputation of the poet. The city of Toulouse caused a Minerva of massy silver of considerable value to be made and sent to him. This present was accompanied with a decree, declaring him *The French Poet*, by way of distinction. Ronsard afterwards made a present of his Minerva to Henry II., and this monarch appeared as much elated with this mark of the poet's esteem for him, as the poet himself could have been had he received the present from his sovereign. Mary, the beautiful and unfortunate queen of Scots, who was equally sensible of his merit with the Toulonese, gave him a rich set of table-plate.

He wrote hymns, odes, a poem called the *Franciad*, eclogues, epigrams, sonnets, &c. In his odes he takes bombast for poetic raptures. He wishes to imitate Pindar; and by labouring too much for lofty expressions, he loses himself in a cloud of words. He is obscure and harsh to the last degree; faults which he might easily have avoided by studying the works of Marot, who had, before he wrote, brought French poetry very near to perfection. But what could be expected from a man who had so little taste, that he called Marot's works, 'a dunghill, from which rich grains of gold, by industrious working, might be drawn?' He has, however, some pieces not destitute of real merit; and there are perhaps few effusions of the French muse more truly poetical than his Four Seasons of the Year, where a most fertile imagination displays all its riches. Ronsard, though it is doubtful whether he ever was in orders, held several benefices in commendam; and he died at Saint-Cosme-les-Tours, one of these, December 27, 1585, being then 61 years of age. He appeared more ridiculous as a man than as a poet; he was particularly vain, and his immoderate indulgence in pleasure, joined to his literary labours, served to hasten his old age. In his 50th year he was weak and valetudinary, and subject to attacks of the gout. He retained his wit, his vivacity, and his readiness at poetic composition, to his last moments. Ronsard's poems have been published in folio, in quarto, and in 10 volumes duodecimo, in 1567.

ROOD, a quantity of land equal to forty square perches, the fourth part of an acre.

ROOF.

Roof.

Definition.

Roof expresses the covering of a house or building, by which its inhabitants or contents are protected from the injuries of the weather. It is perhaps the essential part of a house, and is frequently used to express the whole. To *come under a person's roof*, is to enjoy his protection and society, to dwell with him. *Tectum* was used in the same sense by the Romans. To be within our walls, rather expresses the being in our possession. A roof, therefore, is not only an essential part of a house, but it even seems to be its characteristic feature.

Strictures on various kinds of roofs.

The Greeks, who have perhaps excelled all nations in taste, and who have given the most perfect model of architectonic ordonnance within a certain limit, never erected a building which did not exhibit this part in the most distinct manner; and though they borrowed much of their model from the orientals, as will be evident to any one who compares their architecture with the ruins of Persepolis, and of the tombs in the mountains of Shiraz, they added that form of roof which their own climate taught them was necessary for sheltering them from the rains. The roofs in Persia and Arabia are flat, but those of Greece are without exception sloping. It seems therefore a gross violation of the true principles of taste in architecture, at least in the regions of Europe, to take away or to hide the roof of a house; and it must be ascribed to that rage for novelty which is so powerful in the minds of the rich. Our ancestors seemed to be of a very different opinion, and turned their attention to the ornamenting of their roofs as much as any other part of a building. They showed them in the most conspicuous manner, running them up to a great height; broke them into a thousand fanciful shapes, and stuck them full of highly-dressed windows. We laugh at this, and call it Gothic and clumsy; and our great architects, not to offend any more in this way, conceal the roof altogether by parapets, balustrades, and other contrivances. Our forefathers certainly did offend against the maxims of true taste, when they enriched a part of a house with marks of elegant habitation, which every spectator must know to be a cumbersome garret. But their successors no less offend, who take off the cover of the house altogether, and make it impossible to know whether it is not a mere screen or colonnade we are looking at.

Error of Sir Christopher Wren in the roof of St Paul's.

We cannot help thinking that Sir Christopher Wren erred when he so industriously concealed the roof of St Paul's Church in London. The whole of the upper order is a mere screen. Such a quantity of wall would have been intolerably offensive, had he not given it some appearance of habitation by the mock windows or niches. Even in this state it is gloomy, and it is odd, and a puzzle to every spectator. There should be no puzzle in the design of a building, any more than in that of a discourse. It has been said that the double roof of our great churches which have aisles is an incongruity, looking like a house standing on the top of another house. But there is not the least occasion for such a thought. We know that the aisle is a shed, a cloister. Suppose only that the lower roof or shed is hidden by a balustrade, it then becomes a portico, against which the connoisseur has no objection. Yet there is no difference; for the portico must have a cover, otherwise it is neither a shed, cloister, nor portico, any more than a building without a roof is a house. A house without a visible roof is like a man abroad without his hat; and we may add, that the whim of concealing the chimneys, now so fashionable, changes a house to a barn or storehouse. A house should not be a copy of any thing. It has a title to be an original; and a screen-like house and a pillar-like candlestick are similar solecisms in taste.

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The architect is anxious to present a fine object, and a very simple outline discusses all his concerns with the roof. He leaves it to the carpenter, whom he frequently puzzles, by his arrangements, with coverings almost impossible to execute. Indeed it is seldom that the idea of a roof is admitted by him into his great compositions; or if he does introduce it, it is from mere affectation, and we may say pedantry. A pediment is frequently stuck up in the middle of a grand front, in a situation where a roof cannot perform its office; for the rain that is supposed to flow down its sides must be received on the top of the level buildings which flank it. This is a manifest incongruity. The tops of dressed windows, trifling porches, and sometimes a projecting portico, are the only situations in which we see the figure of a roof correspond with its office. Having thus lost sight of the principle, it is not surprising that the draughtsman, for he should not be called architect, runs into every whim; and we see pediment within pediment, a round pediment, a hollow pediment, and, the greatest of all absurdities, a broken pediment. Nothing could ever reconcile us to the sight of a man with a hat without its crown, because we cannot overlook the use of a hat.

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But when one builds a house, ornament alone will not do. We must have a cover; and the enormous expense and other great inconveniences which attend the concealment of this cover by parapets, balustrades, and screens, have obliged architects to consider the pent-roof as admissible, and to regulate its form. Any man of sense, not under the influence of prejudice, would be determined in this by its fitness for answering its purpose. A high-pitched roof will undoubtedly shoot off the rains and snows better than one of a lower pitch. The wind will not so easily blow the dropping rain in between the slates, nor will it have so much power to strip them off. A high-pitched roof will exert a smaller thrust on the walls, both because its strain is less horizontal, and because it will admit of lighter covering. But it is more expensive, because there is more of it. It requires a greater size of timbers to make it equally strong, and it exposes a greater surface to the wind.

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There have been great changes in the pitch of roofs. Our forefathers made them very high, and we make them very low. It does not, however, appear that this change has been altogether the effect of principle. In the simple unadorned habitations of private persons, every thing comes to be adjusted by an experience of inconveniences which have resulted from too low-pitched roofs; and their pitch will always be nearly such as suits the climate and covering. Our architects, however, go to work on different principles. Their professed aim is to make a beautiful object. The sources of the pleasures arising from what we call *taste* are so various, so complicated, and even so whimsical, that it is almost in vain to look for principle in the rules adopted by our professed architects. We cannot help thinking, that much of their practice results from a pedantic veneration for the beautiful productions of Grecian architecture. Such architects as have written on the principles of the art in respect of proportions, or what they call the "ordonnance," are very much puzzled to make a chain of reasoning; and the most that they have made of the Greek architecture is, that it exhibits a nice adjustment of strength and strain. But when we consider the extent of this adjustment, we find that it is wonderfully limited. The whole of it consists of a basement, a column, and an entablature, and the entablature, it is true, exhibits something of a connection with the framework and roof of a wooden building; and we believe that it really originated from this in the hands of the orientals, from whom the Greeks certainly borrowed their forms and their combinations. We could easily show in the ruins of Persepolis, and amongst the tombs in the mountains, which were long prior to the Greek architecture, the fluted column, the base, the Ionic and Corinthian capitals, and the Doric arrangement of lintels, beams, and rafters, all derived from unquestionable principle. The only addition made by the Greeks was the pent-roof; and the changes made by them in the subordinate forms of things are such as we should expect from their exquisite judgment of beauty.

But the whole of this is very limited; and the Greeks, after making the roof a chief feature of a house, went no farther, and contented themselves with giving it a slope suited to their climate. This we have followed, because in the milder parts of Europe we have no cogent reasoning for deviating from it; and if any architect should deviate greatly in a building where the outline is exhibited as beautiful, we should be disgusted; but the disgust, though felt by almost every spectator, has its origin in nothing but habit. In the professed architect or man of education, the disgust arises from pedantry. For there is not such a close connection between the form and uses of a roof as shall give precise determinations; and the mere form is a matter of indifference.

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We should not therefore reprobate the high-pitched roofs of our ancestors, particularly on the Continent. It is there where we see them in all the extremity of the fashion; and the taste is by no means exploded, as it is with us. A baronial castle in Germany and France is seldom rebuilt in the pure Greek style, or even like the modern houses in Great Britain; the high-pitched roofs are retained. We should not call them Gothic, and ugly because Gothic, till we show their principle to be false or tasteless. Now we apprehend that it will be found quite the reverse; and that though we cannot bring ourselves to think them beautiful, we ought to think them so. The construction of the Greek architecture is a transference of the practices that are necessary in a wooden building to a building of stone. To this the Greeks have adhered, in spite of innumerable difficulties. Their marble quarries, however, put it in their power to retain the proportions which habit had rendered agreeable. But it is next to impossible to adhere to these proportions with freestone or with brick, when the order is of magnificent dimensions. Sir Christopher Wren saw this; for his mechanical knowledge was equal to his taste. He composed the front of St Paul's Church in London of two orders, and he coupled his columns; and still the lintels which form the architrave are of such length that they could carry no additional weight, and he was obliged to truss them behind. Had he made but one order, the architrave could not have carried its own weight. It is impossible to execute a Doric entablature of this size in brick. It is attempted in a very noble front, the Academy of Arts in St Petersburg. But the architect was obliged to make the mutules and other projecting members of the corniche of granite, and many of them broke down by their own weight.

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Here is surely an error in principle. Since stone is the chief material of our buildings, ought not the members of ornamented architecture to be refinements on the essential and unaffected parts of a simple stone building? There is almost as much propriety in the architecture of India, where a dome is made in imitation of a lily or other flower inverted, as in the Greek imitation of a wooden building. The principles of masonry, and not of carpentry, should be seen in our architecture, if we would have it according to the rules of just taste. Now we affirm that this is the characteristic of what is called the Gothic architecture. In this no dependence is had on the transverse strength of stone. No lintels are to be seen, and no extravagant projections. Every stone is pressed to its neighbours, and none is exposed to a transverse strain. The Greeks were enabled to execute their colossal buildings only by using immense blocks of the hardest materials. The Norman mason could raise a building to the skies without using a stone which a labourer could not carry to the top on his back. Their architects studied the principles of equilibrium; and having attained a wonderful knowledge of it, they indulged themselves in exhibiting remarkable instances. We call this false taste, and say that the appearance of insecurity is the greatest fault in it. But this is owing to our habits; our thoughts may be said to run in a wooden train, and certain simple maxims of carpentry are familiar to our imagination; and in the careful adherence to these consist the beauty and symmetry of the Greek architecture. Had we been as much habituated to the equilibrium of pressure, this apparent insecurity would not have met our eye; we should have perceived the strength and relished the ingenuity.

Rational nature of the Gothic architecture.

The Gothic architecture is perhaps entitled to the name of rational architecture, and its beauty is founded on the characteristic distinction of our species. It deserves cultivation; not the pitiful, servile, and unskilled copying of the monuments; this will produce incongruities and absurdities equal to any that have crept into the Greek architecture; but let us examine with attention the nice disposition of the groins and spaundrels; let us study the tracery and knots, not as ornaments, but as useful members; let us observe how they have made their walls like honeycombs, and admire their ingenuity as we pretend to admire the instinct infused by the great Architect into the bee. All this cannot be understood without mechanical knowledge, a thing which few of our professional architects have any share of. Thus would architectonic taste be a mark of skill; and the person who presents the design of a building would know how to execute it, without committing it entirely to the mason and the carpenter.

These observations are not a digression from our subject. The same principles of mutual pressure and equilibrium have a place in roofs and many wooden edifices; and if they had been as much studied as the Normans and Saracens seem to have studied such of them as were applicable to their purposes, we might have produced wooden buildings as far superior to what we are familiarly acquainted with, as the bold and wonderful churches still remaining in Europe are superior to the timid productions of our stone architecture. The centres used in building the bridge of Orleans and the corn-market of Paris are recent instances of what may be done in this way. The last mentioned is a dome of 200 feet diameter, built of fir planks; and there is not a piece of timber in it more than nine feet long, a foot broad, and three inches thick.

The Norman architects often roofed with stone.

The Norman architects frequently roofed with stone. Their wooden roofs were in general very simple, and their professed aim was to dispense with them altogether. Fond of their own science, they copied nothing from a wooden building, and ran into a similar fault with the ancient Greeks. The parts of their buildings which were necessarily of timber were made to imitate stone buildings; and Gothic ornament consists in cramming every thing full of arches and spaundrels. Nothing else is to be seen in their timber-works, nay even in their sculpture. Look at any of the maces or sceptres still to be found about the old cathedrals; they are silver steeples.

Effects of the rivalship between the masons and carpenters of ancient times.

But there appears to have been a rivalship in old times between the masons and the carpenters. Many of the baronial halls are of prodigious width, and are roofed with timber; and the carpenters appeared to have borrowed much knowledge from the masons of those times, and their wide roofs are frequently constructed with great ingenuity. Their aim, like the masons, was to throw a roof over a very wide building, without employing great logs of timber. We have seen roofs sixty feet wide, without having a piece of timber in it above ten feet long and four inches square. The Parliament House, and the Tron Church of Edinburgh, and the great hall of Tarnaway Castle, near Forres, are specimens of those roofs. They are very numerous on the Continent. Indeed Britain retains few monuments of private magnificence. Aristocratic state never was so great with us; and the rancour of our civil wars gave most of the performances of the carpenter to the flames. Westminster Hall exhibits a specimen of the false taste of the Norman roofs. It contains the essential parts, indeed, very properly disposed; but they are hidden, or intentionally covered, with what is conceived to be ornamental; and this is an imitation of stone arches crammed in between slender pillars, which hang down from the principal frames, trusses, or rafters. In a pure Norman roof, such as Tarnaway Hall, the essential parts are exhibited as things understood, and therefore relished. They are refined and ornamented; and it is here that the inferior kind of taste or the want of it may appear. And here we do not mean to defend all the whims of our ancestors; but we assert that it is no more necessary to consider the members of a roof as things to be concealed, like a garret or privy, than the members of a ceiling, which form the most beautiful part of the Greek architecture. Should it be said that a roof is only a thing to keep off the rain, it may be answered, that a ceiling is only to keep off the dust, or the floor to be trodden under foot, and that we should have neither compartments in the one, nor inlaid work or carpets on the other. The structure of a roof may therefore be exhibited with propriety, and made an ornamental feature. This has been done even in Italy. The church of Santa Maria Maggiore in Rome, and several others, are specimens; but it must be acknowledged that the forms of the principal frames of these roofs, which resemble those of our modern buildings, are very unfit for agreeable ornament. As we have already observed, our imaginations have not been made sufficiently familiar with the principles, and we are rather alarmed than pleased with the appearance of the immense logs of timber which form the couples of these roofs, and hang over our heads with every appearance of weight and danger. It is quite otherwise with the ingenious roofs of the German and Norman architects. Slender timbers, interlaced with great symmetry, and thrown by necessity into figures which are naturally pretty, form altogether an object which no carpenter can view without pleasure. And why should the gentleman refuse himself the same pleasure of beholding scientific ingenuity?

Necessity of science in forming roofs.

The roof is in fact the part of the building which requires the greatest degree of skill, and where science will be of more service than in any other part. The architect seldom knows much of the matter, and leaves the task to the carpenter. The carpenter considers the framing of a great roof as the touchstone of his art; and nothing indeed tends so much to show his judgment and his fertility of resource.

The little attention hitherto paid to it.

It must therefore be very acceptable to the artist to have a clear view of the principles by which this difficult problem may be solved in the best manner, so that the roof may have all the strength and security that can be wished for, without an extravagant expense of timber and iron. We have said that mechanical science can give great assistance in this matter. We may add, that the framing of carpentry, whether for roofs, floors, or any other purpose, affords one of the most elegant and most satisfactory applications which can be made of mechanical science to the arts of common life. Unfortunately the practical artist is seldom possessed even of the small portion of science which would almost insure his practice from all risk of failure; and even our most experienced carpenters have seldom any more knowledge than what arises from their experience and natural sagacity. The most approved author in our language is Price in his British Carpenter. Mathurin Jousse is in like manner the author most in repute in France; but the publications of both these authors are void of every appearance of principle. It is not uncommon to see the works of carpenters of the greatest reputation tumble down, in consequence of mistakes from which the most elementary knowledge would have saved them.

Purpose this arti

We shall attempt in this article to give an account of the leading principles of this art, in a manner so familiar and palpable, that any person who knows the common properties of the lever, and the composition of motion, shall so far understand them as to be able, on every occasion, so to dispose his materials, with respect to the strains to which they are to be exposed, that he shall always know the effective strain on every piece, and shall, in most cases, be able to make the disposition such as to derive the greatest possible advantage from the materials which he employs.

Principle which re- gulate th strength the materials.

It is evident that the whole must depend on the principles which regulate the strength of the materials, relative to the manner in which this strength is exerted, and the manner in which the strain is laid on the piece of matter. With respect to the first, this is not the proper place for considering it, and we must refer the reader to the article Strength of Materials in Mechanics. We shall just borrow from that article two or three propositions suited to our purpose.

The force with which the materials of our edifices, roofs, floors, machines, and framings of every kind, resist being broken or crushed, or pulled asunder, is immediately or ultimately the cohesion of their particles. When a weight hangs by a rope, it tends either immediately to break all the fibres, overcoming the cohesion amongst the particles of each, or it tends to pull one parcel of them from amongst the rest, with which they are joined. This union of the fibres is brought about by some kind of gluten, or by twisting, which causes them to bind each other so hard that any one will break rather than come out, so much is it withheld by friction. The ultimate resistance is therefore the cohesion of the fibre; and the force or strength of all fibrous materials, such as timber, is exerted in much the same manner. The fibres are either broken or pulled out from among the rest. Metals, stone, glass, and the like, resist being pulled asunder by the simple cohesion of their parts.

The force which is necessary for breaking a rope or wire is a proper measure of its strength. In like manner, the force necessary for tearing directly asunder any rod of wood or metal, breaking all its fibres, or tearing them from amongst each other, is a proper measure of the united strength of all these fibres; and it is the simplest strain to which they can be exposed, being just equal to the sum of the forces necessary for breaking or disengaging each fibre. And, if the body is not of a fibrous structure, which is the case with metals, stones, glass, and many other substances, this force is still equal to the simple sum of the cohesive forces of each particle which is separated by the fracture. Let us distinguish this mode of exertion of the cohesion of the body by the name of its *absolute strength*.

When solid bodies are, on the contrary, exposed to great compression, they can resist only a certain degree. A piece of clay or lead will be squeezed out; a piece of freestone will be crushed to powder; a beam of wood will be crippled, swelling out in the middle, and its fibres lose their mutual cohesion, after which it is easily crushed by the load. A notion may be formed of the manner in which these strains are resisted, by conceiving a cylindrical pipe filled with small shot, well shaken together, so that each sphericle is lying in the closest manner possible, that is, in contact with six others in the same vertical plane, this being the position in which the shot will take the least room. Thus each touches the rest in six points. Now suppose them all united, in these six points only, by some cement. This assemblage will stick together and form a cylindrical pillar, which may be taken out of its mould. Now suppose this pillar standing upright, and loaded above. The supports arising from the cement act obliquely, and the load tends either to force them asunder laterally, or to make them slide on each other: either of these things happening, the whole is crushed to pieces. The resistance of fibrous materials to such a strain is a little more intricate, but may be explained in a way very similar.

A piece of matter of any kind may also be destroyed by wrenching or twisting it. We can easily form a notion of its resistance to this kind of strain by considering what would happen to the cylinder of small shot if treated in this way.

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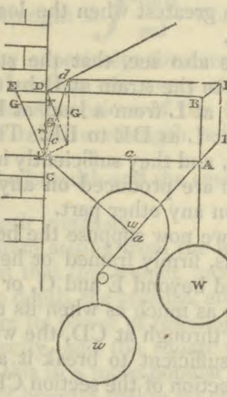
And, lastly, a beam, or a bar of metal, or piece of stone or other matter, may be broken transversely. This will happen to a rafter or joist supported at the ends when overloaded, or to a beam having one end stuck fast in a wall and a load laid on its projecting part. This is the strain to which materials are most commonly exposed in roofs; and, unfortunately, it is the strain which they are the least able to bear; or rather it is the manner of application which causes an external force to excite the greatest possible immediate strain on the particles. It is against this that the carpenter must chiefly guard, avoiding it when in his power, and in every case diminishing it as much as possible. It is necessary to give the reader a clear notion of the great weakness of materials in relation to this transverse strain. But we shall do nothing more, referring him to the articles Strain, and Stress, and Strength.

Let ABCD (fig. 1) represent the side of a beam projecting horizontally from a wall in which it is firmly fixed, and let it be loaded with a weight W appended to its extremity. This tends to break it; and the least reflection will convince any person, that if the beam is equally strong throughout, it will break in the line CD, even with the surface of the wall. It will open at D, while C will serve as a sort of joint, round which it will turn. The cross section through the line CD is for this reason called the *section of fracture*; and the horizontal line drawn through C on its under surface is called the *axis of fracture*. The fracture is made by tearing asunder the fibres, sueh as DE or FG. Let us suppose a real joint at C, and that the beam is really sawed through along CD, and that in place of its natural fibres, threads are substituted all over the section of fracture. The weight now tends to break these threads, and it is our business to find the force necessary for this purpose.

Fig. 1.



It is evident that DCA may be considered as a bended lever, of which C is the fulcrum. If f be the force which will just balance the cohesion of a thread when hung on it so that the smallest addition will break it, we may find the weight which will be sufficient for this purpose when hung on at A, by saying, $AC : CD = f : \varphi$, and φ will be the weight which will just break the thread, by hanging φ by the point A. This gives us $\varphi = f \times \frac{CD}{CA}$. If the weight be hung on at a, the force just sufficient for breaking the same thread will be $= f \times \frac{CD}{Ca}$. In like manner, the force φ, which must be hung on at A in order to break an equally strong or an equally resisting fibre at F, must be $= f \times \frac{CF}{CA}$. And so on of all the rest.

If we suppose all the fibres to exert equal resistances at the instant of fracture, we know, from the simplest elements of mechanics, that the resistance of all the particles in the line CD, each acting equally in its own place, is the same as if all the individual resistances were united in the middle point g. Now this total resistance is the resistance or strength f of each particle, multiplied by the number of particles. This number may be expressed by the line CD, because we have no reason to suppose that they are at unequal distances. Therefore, in comparing different sections together, the number of particles in each are as the sections themselves. Therefore DC may represent the number of particles in the line DC. Let us call this line the depth of the beam, and express it by the symbol d. And since we are at present treating of roofs whose rafters and other parts are commonly of uniform breadth, let us call AH or BI the breadth of the beam, and express it by b, and let CA be called its length l. We may now express the strength of the whole line CD by $f \times d$, and we may suppose it all concentrated in the middle point g. Its mechanical energy, therefore, by which it resists the energy of the weight w, applied at the distance l, is $f \times CD \times Cg$, whilst the momentum of w is $w \times CA$. We must therefore have $f \times CD \times Cg = w \times CA$, or $fd \times \frac{1}{2}d = wl$, and $fd : w = l : \frac{1}{2}d$, or $fd : w = 2l : d$. That is, twice the length of the beam is to its depth as the absolute strength of one of its vertical planes to its relative strength, or its power of resisting this transverse fracture.

It is evident, that what has been now demonstrated of the resistance exerted in the line CD, is equally true of every line parallel to CD in the thickness or breadth of the beam. The absolute strength of the whole section of fracture is represented by fdb, and we still have $2l : d = fdb : w$; or twice the length of the beam is to its depth as the absolute strength to the relative strength. Suppose the beam twelve feet long and one foot deep; then whatever be its absolute strength, the twenty-fourth part of this will break it if hung at its extremity.

But even this is too favourable a statement. All the fibres are supposed to act alike in the instant of fracture. But this is not true. At the instant that the fibre at D breaks, it is stretched to the utmost, and is exerting its whole force. But at this instant the fibre at g is not so much stretched, and it is not then exerting its utmost force. If we suppose the extension of the fibres to be as their distance from C, and the actual exertion of each to be as their extensions, it may easily be shown (see Strength and Strain), that the whole resistance is the same as if the full force of all the fibres were united at a point r distant from C by one third of CD. In this case we must say, that the absolute strength is to the relative strength as three times the length to the depth; so that the beam is weaker than by the former statement in the proportion of two to three.

Even this is more strength than experiment justifies, and we can see an evident reason for it. When the beam is strained, not only are the upper fibres stretched, but the lower fibres are compressed. This is very distinctly seen, if we attempt to break a piece of cork cut into the shape of a beam. This being the case, C is not the centre of fracture. There is some point c which lies between the fibres which are stretched and those that are compressed. This fibre is neither stretched nor squeezed, and this point is the real centre of fracture; and the lever by which a fibre D resists, is not DC, but a shorter one Dc, and the energy of the whole resistances must be less than by the second statement. Till we know the proportion between the dilatability and compressibility of the parts, and the relation between the dilatations of the fibres and the resistances which they exert in this state of dilatation, we cannot positively say where the point *c* is situated, nor what is the sum of the actual resistances, or the point where their action may be supposed concentrated. The firmer woods, such as oak and chestnut, may be supposed to be but slightly compressible; we know that willow and other soft woods are very compressible. These last must therefore be weaker; for it is evident, that the fibres which are in a state of compression do not resist the fracture. It is well known, that a beam of willow may be cut through from C to *g* without weakening it in the least, if the cut be filled up by a wedge of hard wood stuck in.

We can only say, that very sound oak and red fir have the centre of effort so situated, that the absolute strength is to the relative strength in a proportion of not less than that of three and a half times the length of the beam to its depth. A square inch of sound oak will carry about 8000 pounds. If this bar be firmly fixed in a wall, and project twelve inches, and be loaded at the extremity with 200 pounds, it will be broken. It will just bear 190, its relative strength being $\frac{1}{42}$ of its absolute strength; and this is the case only with the finest pieces, so placed that their annual plates or layers are in a vertical position. A larger log is not so strong transversely, because its plates lie in various directions round the heart.

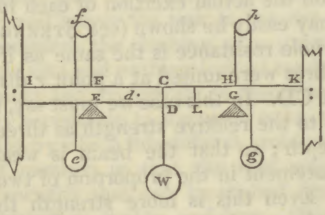
Practical inferences.

These observations are enough to give us a distinct notion of the vast diminution of the strength of timber when the strain is across it; and we see the justice of the maxim which we inculcated, that the carpenter, in framing roofs, should avoid as much as possible the exposing his timbers to transverse strains. But this cannot be avoided in all cases. Nay, the ultimate strain arising from the very nature of a roof is transverse. The rafters must carry their own weight, and this tends to break them across. An oak beam a foot deep will not carry its own weight if it project more than sixty feet. Besides this, the rafters must carry the lead, tiling, or slates. We must therefore consider this transverse strain a little more particularly, so as to know what strain will be laid on any part by an unavoidable load, imposed either at that part or at any other.

Effect when beams are supported at the ends and loaded in the middle.

We have hitherto supposed, that the beam had one of its ends fixed in a wall, and that it was loaded at the other end. This is not an usual arrangement, and was taken merely as affording a simple application of the mechanical principles. It is much more usual to have the beam supported at the ends, and loaded in the middle. Let the beam FEGH (fig. 2) rest on the props E and G, and be loaded at its middle point C with a weight W. It is required to determine the strain at the section CD. It is plain that the beam will receive the same support, and suffer the same strain, if, instead of the blocks E and G, we substitute the ropes F*fe*, H*hg*, going over the pulleys *f* and *g*, and loaded with proper weights *e* and *g*. The weight *e* is equal to the support given by the block E; and *g* is equal to the support given by G. The sum of *e* and *g* is equal to W; and on whatever point W is hung, the weights *e* and *g* are to W in the proportion of DG and DE to GE. Now, in this state of things, it appears that the strain on the section CD arises immediately from the upward action of the ropes F*f* and H*h*, or the upward pressions of the blocks E and G; and that the office of the weight W is to oblige the beam to oppose this strain. Things are in the same state in respect of strain as if a block were substituted at D for the weight W, and the weights *e* and *g* were hung on at E and G, only the directions will be opposite. The beam tends to break in the section CD, because the ropes pull it upwards at E and G, whilst a weight W holds it down at C. It tends to open at D, and C becomes the centre of fracture. The strain therefore is the same as if the half ED were fixed in the wall, and a weight equal to *g*, that is, to the half of W, were hung on at G.

Fig. 2.



Hence we conclude, that a beam supported at both ends, but not fixed there, and loaded in the middle, will carry twice as much weight as it can carry at its extremity, when the other extremity is fast in a wall.

The strain occasioned at any point L by a weight W, hung on at any other point D, is $= W \times \frac{DE}{EG} \times LG$. For EG is to ED as W to the pressure occasioned at G. This would be balanced by some weight *g* acting over the pulley *h*; and this tends to break the beam at L, by acting on the lever GL. The pressure at G is $W \times \frac{DE}{EG}$, and therefore the strain at L is $W \times \frac{DE}{EG} \times LG$.

In like manner, the strain occasioned at the point D by the weight W hung on there, is $W \times \frac{DE}{EG} \times DG$; which is therefore equal to $\frac{1}{2}$ W when D is the middle point.

Hence we see that the general strain on the beam arising from one weight, is proportional to the rectangle of the parts of the beam (for $\frac{W \times DE \times DG}{EG}$ is as $DE \times DG$), and is greatest when the load is laid on the middle of the beam.

We also see, that the strain at L by a load at D, is equal to the strain at D by the same load at L. And the strain at L from a load at D is to the strain by the same load at L as DE to LE. These are all very obvious corollaries, and they sufficiently inform us concerning the strains which are produced on any part of the timber by a load laid on any other part.

If we now suppose the beam to be fixed at the two ends, that is, firmly framed or held down by blocks at I and K, placed beyond E and G, or framed into posts, it will carry twice as much as when its ends were free. For suppose it sawn through at CD, the weight W hung on there will be just sufficient to break it at E and G. Now restore the connection of the section CD, it will require another weight W to break it there at the same time.

Therefore, when a rafter, or any piece of timber, is firmly connected with three fixed points, G, E, I, it will bear a greater load between any two of them than if its connection with the remote point were removed; and if it be fastened in four points, G, E, I, K, it will be twice as strong in the middle part as without the two remote connections.

One is apt to expect from this that the joist of a floor will be much strengthened by being firmly built in the wall. It is a little strengthened; but the hold which can thus be given to it is much too short to be of any sensible service, and it tends greatly to shatter the wall, because, when it is bent down by a load, it forces up the wall with a momentum of a long lever. Judicious builders therefore take care not to bind the joists tight in the wall. But when the joists of adjoining rooms lie in the same direction, it is a great advantage to make them of one piece. They are then twice as strong as when made in two lengths.

Infere

It is easy to deduce from these premises the strain on any point which arises from the weight of the beam itself, or from any load which is uniformly diffused over the whole or any part. We may always consider the whole of the weight which is thus uniformly diffused over any part as united in the middle point of that part; and if the load is not uniformly diffused, we may still suppose it united at its centre of gravity. Thus, to know the strain at D arising from the weight of the whole beam, we may suppose the whole weight accumulated in its middle point D. Also the strain at L, arising from the weight of the part ED, is the same as if this weight were accumulated in the middle point *d* of ED; and it is the same as if half the weight of ED were hung on at D. For the real strain at L is the upward pressure at G, acting by the lever GL. Now, calling the weight of the part DE *e*, this upward pressure will be $\frac{e \times d\mathrm{E}}{\mathrm{EG}}$, or $\frac{\frac{1}{2}e \times \mathrm{DE}}{\mathrm{EG}}$.

Therefore the strain on the middle of a beam, arising from its own weight, or from any uniform load, is the weight of the beam or its load $\times \frac{\mathrm{ED}}{\mathrm{EG}} \times \mathrm{DG}$; that is, half the weight of the beam or load multiplied or acting by the lever DG; for $\frac{\mathrm{ED}}{\mathrm{EG}}$ is $\frac{1}{2}$.

Also the strain at L, arising from the weight of the beam, or the uniform load, is $\frac{1}{2}$ the weight of the beam or load acting by the lever LG. It is therefore proportional to LG, and is greatest of all at D. Therefore a beam of uniform strength throughout, uniformly loaded, will break in the middle.

elation tween e weight strains d the re- ive ength.

It is of importance to know the relation between the strains arising from the weights of the beams, or from any uniformly diffused load, and the relative strength. We have already seen, that the relative strength is $f\frac{dbd}{ml}$, where *m* is a number to be discovered by experiment for every different species of materials. Leaving out every circumstance but what depends on the dimensions of the beam, viz. *d*, *b*, and *l*, we see that the relative strength is in the proportion of $\frac{d^2b}{l}$, that is, as the breadth and the square of the depth directly, and the length inversely.

Now, to consider, first, the strain arising from the weight of the beam itself, it is evident that this weight increases in the same proportion with the depth, the breadth, and the length of the beam. Therefore its power of resisting this strain must be as its depth directly, and the square of its length inversely. To consider this in a more popular manner, it is plain that the increase of breadth makes no change in the power of resisting the actual strain, because the load and the absolute strength increase in the same proportion with the breadth. But, by increasing the depth, we increase the resisting section in the same proportion, and therefore the number of resisting fibres and the absolute strength; but we also increase the weight in the same proportion. This makes a compensation, and the relative strength is yet the same. But, by increasing the depth, we have not only increased the absolute strength, but also its mechanical energy. For the resistance to fracture is the same as if the full strength of each fibre was exerted at the point which we called the centre of effort; and we showed that the distance of this from the under side of the beam was a certain portion (a half, a third, a fourth, &c.) of the whole depth of the beam. This distance is the arm of the lever, by which the cohesion of the wood may be supposed to act. Therefore this arm of the lever, and consequently the energy of the resistance, increases in the proportion of the depth of the beam, and this remains uncompensated by any increase of the strain. On the whole, therefore, the power of the beam to sustain its own weight increases in the proportion of its depth. But, on the other hand, the power of withstanding a given strain applied at its extremity, or to any aliquot part of its length, is diminished as the length increases, or is inversely as the length; and the strain arising from the weight of the beam also increases as the length. Therefore the power of resisting the strain actually exerted on it by the weight of the beam is inversely as the square of the length. On the whole, therefore, the power of a beam to carry its own weight varies in the proportion of its depth directly and the square of its length inversely.

As this strain is frequently a considerable part of the whole, it is proper to consider it apart, and then to reckon only on what remains for the support of any extraneous load.

Power of a beam to carry a load uniformly diffused over its length.

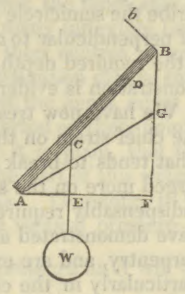
In the next place, the power of a beam to carry any load which is uniformly diffused over its length, must be inversely as the square of the length; for the power of withstanding any strain applied to an aliquot part of the length (which is the case here, because the load may be conceived as accumulated at its centre of gravity, the middle point of the beam) is inversely as the length; and the actual strain is as the length, and therefore its momentum is as the square of the length. Therefore the power of a beam to carry a weight uniformly diffused over it, is inversely as the square of the length.

It is here understood, that the uniform load is of some determined quantity for every foot of the length, so that a beam of double length carries a double load.

Effect when the action of the load is oblique.

We have hitherto supposed that the forces which tend to break a beam transversely are acting in a direction perpendicular to the beam. This is always the case in level floors loaded in any manner; but in roofs, the action of the load tending to break the rafters is oblique, because gravity always acts in vertical lines. It may also frequently happen, that a beam is strained by a force acting obliquely. This modification of the strain is easily discussed. Suppose that the external force, which is measured by the weight W in fig. 1, acts in the direction A*w*′ instead of AW. Draw C*a*′ perpendicular to A*w*. Then the momentum of this external force is not to be measured by W × AC, but by W × *a*′C. The strain therefore by which the fibres in the section of fracture DC are torn asunder, is diminished in the proportion of CA to C*a*′, that is, in the proportion of radius to the sine of the angle CA*a*′, which the beam makes with the direction of the external force.

Fig. 3.



To apply this to our purpose in the most familiar manner, let AB (fig. 3) be an oblique rafter of a building, loaded with a weight W suspended to any point C, and thereby occasioning a strain in some part D. We have already seen, that the immediate cause of the strain on D is the re-action of the support which is given to the point B. The rafter may at present be considered as a lever, supported at A, and pulled down by the line CW. This occasions a pressure on B, and the support acts in the opposite direction to the action of the lever, that is, in the direction B*b*, perpendicular to BA. This tends to break the beam in every part. The pressure exerted at B is $\frac{\mathrm{W} \times \mathrm{AE}}{\mathrm{AB}}$, AE being a horizontal line. Therefore the strain at D will be $\frac{\mathrm{W} \times \mathrm{AE}}{\mathrm{AB}} \times \mathrm{BD}$. Had the beam been lying horizontally, the strain at D, from the weight W suspended at C, would have been $\frac{\mathrm{W} \times \mathrm{AC}}{\mathrm{AB}} \times \mathrm{BD}$.

It is therefore diminished in the proportion of AC to AE, that is, in the proportion of radius to the cosine of the elevation, or in the proportion of the secant of elevation to the radius.

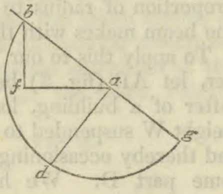
It is evident, that this law of diminution of the strain is the same whether the strain arises from a load on any part of the rafter, or from the weight of the rafter itself, or from any load uniformly diffused over its length, provided only that these loads act in vertical lines.

Strength of roofs having different elevations compared.

We can now compare the strength of roofs which have different elevations. Supposing the width of the building to be given, and that the weight of a square yard of covering is also given. Then, because the load on the rafter will increase in the same proportion with its length, the load on the slant-side BA of the roof will be to the load of a similar covering on the half AF of the flat roof, of the same width, as AB to AF. But the transverse action of any load on AB, by which it tends to break it, is to that of the same load on AF as AF to AB. The transverse strain therefore is the same on both, the increase of real load on AB being compensated by the obliquity of its action. But the strengths of beams to resist equal strains, applied to similar points, or uniformly diffused over them, are inversely as their lengths, because the momentum or energy of the strain is proportional to the length. Therefore the power of AB to withstand the strain to which it is really exposed, is to the power of AF to resist its strain as AF to AB. If, therefore, a rafter AG of a certain scantling is just able to carry the roofing laid on it, a rafter AB of the same scantling, but more elevated, will be too weak in the proportion of AG to AB. Therefore steeper roofs require stouter rafters, in order that they may be equally able to carry a roofing of equal weight per square yard. To be equally strong, they must be made broader, or placed nearer to each other, in the proportion of their greater length, or they must be made deeper in the subduplicate proportion of their length. The following easy construction will enable the artist not familiar with computation to proportion the depth of the rafter to the slope of the roof.

Let the horizontal line *a f* (fig. 4) be the proper depth of a beam whose length is half the width of the building; that is, such as would make it fit for carrying the intended tiling laid on a flat roof. Draw the vertical line *fb*, and the line *ab* having the elevation of the rafter; make *ag* equal to *af*, and describe the semicircle *bdg*; draw *ad* perpendicular to *ab*, then *ad* is the required depth. The demonstration is evident.

Fig. 4.



We have now treated in sufficient detail what relates to the chief strain on the component parts of a roof, namely, what tends to break them transversely; and we have enlarged more on the subject than what the present occasion indispensably required, because the propositions which we have demonstrated are equally applicable to all framings of carpentry, and are even of greater moment in many cases, particularly in the construction of machines. These consist of levers in various forms, which are strained transversely; and similar strains frequently occur in many of the supporting and connecting parts. We shall give, in another article, an account of the experiments which have been made by different naturalists, in order to ascertain the absolute strength of some of the materials which are most generally framed together in buildings and engines. The house-carpenter will derive from them absolute numbers, which he can apply to his particular purposes by means of the propositions which we have now established.

We proceed, in the next place, to consider the other strains to which the parts of roofs are exposed, in consequence of the support which they mutually give each other, and the pressures, or *thrusts*, as they are called in the language of the house-carpenter, which they exert on each other, and on the walls or piers of the building.

Effect of other strains.

Let a beam or piece of timber AB (fig. 5) be suspended by two lines AC, BD; or let it be supported by two props AE, BF, which are perfectly moveable round their remote extremities E, F, or let it rest on the two polished planes KAH, LBM. Moreover, let G be the centre of gravity of the beam, and let GN be a line through the centre of gravity perpendicular to the horizon. The beam will not be in equilibrio unless the vertical line GN either passes through P, the point in which the directions of the two lines AC, BD, or the directions of the two props EA, FB, or the perpendiculars to the two planes KAH, LBM intersect each other, or is parallel to these directions. For the supports given by the lines or props are unquestionably exerted in the direction of their lengths, and it is well known in mechanics that the supports given by planes are exerted in a direction perpendicular to those planes in the points of contact; and we know that the weight of the beam acts in the same manner as if it were all accumulated in its centre of gravity G, and that it acts in the direction GN perpendicular to the horizon. Moreover, when a body is in equilibrio between three forces, they are acting in one plane, and their directions are either parallel or they pass through one point.

Fig. 5.

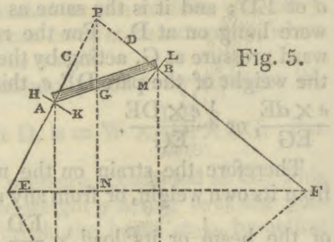
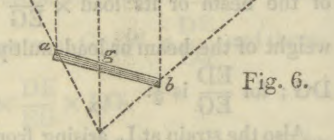


Fig. 6.



The support given to the beam is therefore the same as if it were suspended by two lines which are attached to the single point P. We may also infer, that the points of suspension C, D, the points of support E, F, the points of contact A, B, and the centre of gravity G, are all in one vertical plane.

When this position of the beam is disturbed by any external force, there must either be a motion of the points A and B round the centres of suspension C and D, or of the props round these points of support E and F, or a sliding of the ends of the beam along the polished planes KAH and LBM; and in consequence of these motions the centre of gravity G will go out of its place, and the vertical line GN will no longer pass through the point where the directions of the supports intersect each other. If the centre of gravity rises by this motion, the body will have a tendency to recover its former position, and it will require force to keep it away from it. In this case the equilibrium may be said to be *stable*, or the body to have *stability*. But if the centre of gravity descends when the body is moved from the position of equilibrium, it will tend to move still farther; and so far will it be from recovering its former position, that it will now fall. This equilibrium may be called a *tottering equilibrium*. These accidents depend on the situations of the points A, B, C, D, E, F; and they may be determined by considering the subject geometrically. It does not much interest us at present; it is rarely that the equilibrium of suspension is tottering, or that of props is stable. It is evident, that if the beam were suspended by lines from the point P, it would have stability, for it would swing like a pendulum round P, and therefore would always tend towards the position of equilibrium. The intersection of the lines of support would still be at P, and the vertical line drawn through the centre of gravity, when in any other situation, would be on that side of P towards which this centre has been moved. Therefore, by the rules of pendulous bodies, it tends to come back. This would be more remarkably the case if the points of suspension C and D were on the same side of the point P with the points of attachment A and B; for in this case the new point of intersection of the lines of support would shift to the opposite side, and be still further from the vertical line through the new position of the centre of gravity. But if the points of suspension and of attachment are on opposite sides of P, the new point of intersection may shift to the same side with the centre of gravity, and lie beyond the vertical line. In this case the equilibrium is tottering. It is easy to perceive, too, that if the equilibrium of suspension from the points C and D be stable, the equilibrium on the props AE and BF must be tottering. It is not necessary for our present purpose to engage more particularly in this discussion.

It is plain that, with respect to the mere momentary equilibrium, there is no difference in the support by threads, props, or planes, and we may substitute the one for the other. We shall find this substitution extremely useful, because we easily conceive distinct notions of the support of a body by strings.

Observe farther, that if the whole figure be inverted, and strings be substituted for props, and props for strings, the equilibrium will still obtain. For by comparing fig. 5 with fig. 6, we see that the vertical line through the centre of gravity will pass through the intersection of the two strings or props; and this is all that is necessary for the equilibrium; only it must be observed in the substitution of props for threads, and of threads for props, that if it be done without inverting the whole figure, a stable equilibrium becomes a tottering one, and *vice versa.*

E mples.

This is a most useful proposition, especially to the unlettered artisan, and enables him to make a practical use of problems which the greatest mechanical geniuses have found it no easy task to solve. An instance will show the extent and utility of it. Suppose it were required to make a mansard or kirb roof whose width is AB (fig. 7), and consisting of the four equal rafters AC, CD, DE, EB. There can be no doubt but that its best form is that which will put all the parts in equilibrio, so that no ties or stays may be necessary for opposing the unbalanced thrust of any part of it. Make a chain *acdeb* (fig. 8) of four equal pieces, loosely connected by pin-joints, round which the parts are perfectly moveable. Suspend this from two pins *a*, *b*, fixed in a horizontal line. This chain or festoon will arrange itself in such a form that its parts are in equilibrio. Then we know that if the figure be inverted, it will compose the frame or truss of a kirb-roof $a\gamma\delta\epsilon b$, which is also in equilibrio, the thrusts of the pieces balancing each other in the same manner that the mutual pulls of the hanging festoon *acdeb* did. If the proportion of the height *df* to the width *ab* is not such as pleases, let the pins *a*, *b* be placed nearer or more distant, till a proportion between the width and height is obtained which pleases, and then make the figure ACDEB, fig. 7, similar to it. It is evident that this proposition will apply in the same manner to the determination of the form of an arch of a bridge; but this is not a proper place for a further discussion.

Fig. 7.

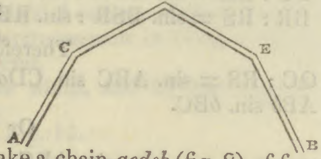


Fig. 8.

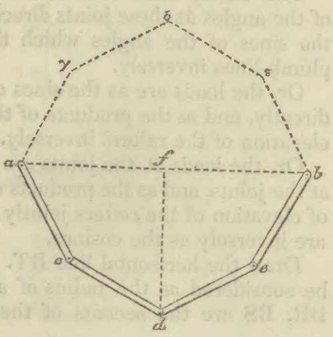
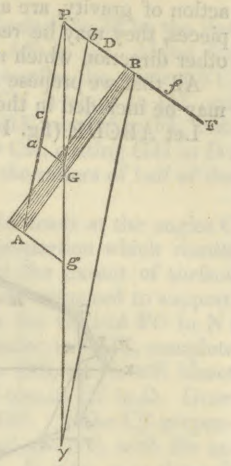


Fig. 9.



We are now enabled to compute all the thrusts and other pressures which are exerted by the parts of a roof on each other and on the walls. Let AB (fig. 9) be a beam standing anyhow obliquely, and G its centre of gravity. Let us suppose that the ends of it are supported in any directions AC, BD, by strings, props, or planes. Let these directions meet in the point P of the vertical line PG passing through its centre of gravity. Through G draw lines G*a*, G*b* parallel to PB, PA. Then

$$\left.\begin{array}{l}\text{The weight of the beam}\\ \text{The pressure or thrust at A}\\ \text{And the pressure at B}\end{array}\right\}\text{ is proportional to }\left\{\begin{array}{l}PG\\ Pa\\ Pb.\end{array}\right.$$

For when a body is in equilibrio between three forces, these forces are proportional to the sides of a triangle which have their directions.

In like manner, if A *g* be drawn parallel to P *b*, we shall have

$$\left.\begin{array}{l}\text{Weight of the beam}\\ \text{Thrust on A}\\ \text{And thrust on B}\end{array}\right\}\text{ proportional to }\left\{\begin{array}{l}Pg\\ PA\\ Ag\end{array}\right.$$

Or, drawing Bγ parallel to P*a*,

$$\left.\begin{array}{l}\text{Weight of the beam}\\ \text{Thrust at A}\\ \text{And thrust at B}\end{array}\right\}\text{ proportional to }\left\{\begin{array}{l}P\gamma\\ B\gamma\\ PB.\end{array}\right.$$

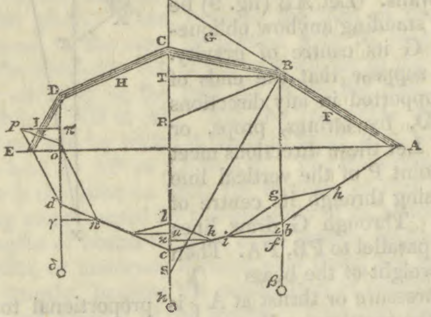
The proper form of a roof is that which puts the whole in equilibrio.

It cannot be disputed that, if strength alone be considered, the proper form of a roof is that which puts the whole in equilibrio, so that it would remain in that shape although all the joints were perfectly loose or flexible. If it has any other shape, additional ties or braces are necessary for preserving it, and the parts are unnecessarily strained. When this equilibrium is obtained, the rafters which compose the roof are all acting on each other in the direction of their lengths; and by this action, combined with their weights, they sustain no strain but that of compression, the strain of all others that they are the most able to resist. We may consider them as so many inflexible lines having their weights accumulated in their centres of gravity. But it will allow an easier investigation of the subject, if we suppose the weights to be at the joints, equal to the real vertical pressures which are exerted on these points. These are very easily computed; for it is plain, that the weight of the beam AB (fig. 9) is to the part of this weight that is supported at B as AB to AG. Therefore, if W represent the weight of the beam, the vertical pressure at B will be $W \times \frac{AG}{AB}$, and the vertical pressure at A will be $W \times \frac{BG}{AB}$. In like manner, the prop BF being considered as another beam, and *f* as its centre of gravity and *w* as its weight, a part of this weight, equal to $w \times \frac{fF}{BF}$, is supported at B, and the whole vertical pressure at B is $W \times \frac{AG}{AB} + w \times \frac{fF}{BF}$. And thus we greatly simplify the consideration of the mutual thrusts of roof frames. We need hardly observe, that although these pressures by which the parts of a frame support each other in opposition to the vertical action of gravity, are always exerted in the direction of the pieces, they may be resolved into pressures acting in any other direction which may engage our attention.

All that we propose to deliver on this subject at present may be included in the following proposition.

Let ABCDE (fig. 10) be an assemblage of rafters in a vertical plane, resting on two fixed points A and E in a horizontal line, and perfectly moveable round all the joints A, B, C, D, E; let it be further supposed to be in equilibrio, and let us investigate what adjustment of the different circumstances of weight and inclination of its different parts is necessary for producing this equilibrium.

Fig. 10.



Let F, G, H, I, be the centres of gravity of the different rafters, and let these letters express the weights of each. Then, by what has been said above, the weight which presses B directly downwards is $F \times \frac{AF}{AB} + G \times \frac{CG}{BC}$.

The weight on C is in like manner $G \times \frac{BG}{BC} + D \times \frac{DH}{CD}$,

and that on D is $H \times \frac{CH}{CD} + I \times \frac{EI}{DE}$.

Let A*bcd*E be the figure ABCDE inverted, in the manner already described. It may be conceived as a thread fastened at A and E, and loaded at *b*, *c*, and *d* with the weights which are really pressing on B, C, and D. It will arrange itself into such a form that all will be in equilibrio. We may discover this form by means of this single consideration, that any part *bc* of the thread is equally stretched throughout in the direction of its length. Let us therefore investigate the proportion between the weight β, which we suppose to be pulling the point *b* in the vertical direction $b\beta$, to the weight δ, which is pulling down the point *d* in a similar manner. It is evident, that since AE is a horizontal line, and the figures A*bcd*E and ABCDE equal and similar, the lines B*b*, C*c*, D*d*, are vertical. Take *bf* to represent the weight hanging at *b*. By stretching the threads *b*A and *bc* it is set in opposition to the contractile powers of the threads, acting in the directions *b*A and *bc*, and it is in immediate equilibrio with the equivalent of these two contractile forces. Therefore make *bg* equal to *bf*, and make it the diagonal of a parallelogram *hbig*. It is evident that *bh*, *bi*, are the forces exerted by the threads *b*A, *bc*. Then, seeing that the thread *bc* is equally stretched in both directions, make *ck* equal to *bi*; *ck* is the contractile force which is excited at *c* by the weight which is hanging there. Draw *kl* parallel to *cd*, and *lm* parallel to *bc*. The force *lc* is the equivalent of the contractile forces *ck*, *cm*, and is therefore equal and opposite to the force of gravity acting at C. In like manner, make $dn = cm$, and complete the parallelogram *ndpo*, having the vertical line *od* for its diagonal. Then *dn* and *dp* are the contractile forces excited at *d*, and the weight hanging there must be equal to *od*.

Therefore, the load at *b* is to the load at *d* as *bg* to *do*. But we have seen that the compressing forces at B, C, D may be substituted for the extending forces at *b*, *c*, *d*. Therefore the weights at B, C, D which produce the compressions, are equal to the weights at *b*, *c*, *d* which produce the extensions. Therefore

$$bg : do = F \times \frac{AF}{AB} + G \times \frac{CG}{BC} : H \times \frac{CH}{CD} + I \times \frac{EI}{DE}.$$

Let us inquire what relation there is between this proportion of the loads upon the joints at B and D, and the angles which the rafters make at these joints with each other, and with the horizon or the plumb-lines. Produce AB till it cut the vertical C*c* in Q; then draw BR parallel to CD, and BS parallel to DE. The similarity of the figures ABCDE and A*bcd*E, and the similarity of their position with respect to the horizontal and plumb lines, show, without any further demonstration, that the triangles QCB and *gbi* are similar, and that $QB : BC = gi : ib = hb : ib$. Therefore QB is to BC as the contractile force exerted by the thread A*b* to that exerted by *bc*; and therefore QB is to BC as the compression on BA to the compression on BC.[1] Then, because *bi* is equal to *ck*, and the triangles CBR and *ckl* are similar, $CB : BR = ck : kl = ck : cm$, and CB is to BR as the compression on CB to the compression on CD. And, in like manner, because $cm = dn$, we have BR to BS as the compression on DC to the compression on DE. Also $BR : RS = nd : do$, that is, as the compression on DC to the load on D. Finally, combining all these ratios,

$$QC : CB = gb : bi = gb : kc,$$
$$CB : BR = kc : kl = kc : dn,$$
$$BR : BS = nd : no = dn : no,$$
$$BS : RS = no : do = no : do, \text{ we have finally}$$
$$QC : RS = gb : od = \text{load at B} : \text{load at D}.$$

Now

$$QC : BC = \text{sin. } QBC : \text{sin. } BQC = \text{sin. } ABC : \text{sin. } ABb,$$
$$BC : BR = \text{sin. } BRC : \text{sin. } BCR = \text{sin. } CDd : \text{sin. } bBC,$$
$$BR : RS = \text{sin. } BSR : \text{sin. } RBS = \text{sin. } dDE : \text{sin. } CDE.$$

Therefore

$$QC : RS = \text{sin. } ABC \text{ sin. } CDd \text{ sin. } dDE : \text{sin. } CDE \text{ sin. } ABb \text{ sin. } bBC.$$

Or

$$QC : RS = \frac{\text{sin. } ABC}{\text{sin. } ABb \text{ sin. } CBb} : \frac{\text{sin. } CDE}{\text{sin. } dDC \text{ sin. } dDE}.$$

That is, the loads on the different joints are as the sines of the angles at these joints directly, and as the products of the sines of the angles which the rafters make with the plumb-lines inversely.

Or, the loads are as the sines of the angles of the joints directly, and as the products of the cosines of the angles of elevation of the rafters inversely.

Or, the loads at the joints are as the sines of the angles at the joints, and as the products of the secants of the angles of elevation of the rafters jointly; for the secants of angles are inversely as the cosines.

Draw the horizontal line BT. It is evident, that if this be considered as the radius of a circle, the lines BQ, BC, BR, BS are the secants of the angles which these lines

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[1] This proportion might have been shown directly without any use of the inverted figure, or consideration of contractile forces; but the substitution gives distinct notions of the mode of acting, even to persons not much conversant in such disquisitions; and we wish to make it familiar to the mind, because it gives an easy solution of the most complicated problems, and furnishes the practical carpenter, who has little science, with solutions of the most difficult cases by experiment. A festoon, as we called it, may easily be made; and we are certain that the forms into which it will arrange itself are models of perfect frames.

Roof.

make with the horizon; and they are also as the thrusts of those rafters to which they are parallel. Therefore, the thrust which any rafter makes in its own direction is as the secant of its elevation.

The horizontal thrust is the same at all the angles. For $i\iota = k\varkappa = m\mu = n\nu = p\pi$. Therefore both walls are equally pressed out by the weight of the roof. We can find its quantity by comparing it with the load on one of the joints. Thus, QC : CB = sin. ABC : sin. AB*b*

BC : BT = rad. : sin. BCT = rad. : sin. CB*b*.

Therefore, QC : BT = rad. × sin. ABC : sin. *b*BA × sin. *b*BC.

e length the ms de- ds on weights he an- s.

It deserves remark, that the lengths of the beams do not affect either the proportion of the load at the different joints, or the position of the rafters. This depends merely on the weights at the angles. If a change of length affects the weight, it indeed affects the form also; and this is generally the case. For it seldom happens, indeed it never should happen, that the weight on rafters of longer bearing is not greater. The covering alone increases nearly in the proportion of the length of the rafter.

If the proportion of the weights at B, C, and D is given, as also the position of any two of the lines, the position of all the rest is determined. If the horizontal distances between the angles are all equal, the forces on the different angles are proportional to the verticals drawn on the lines through these angles from the adjoining angle, and the thrusts from the adjoining angles are as the lines which connect them. If the rafters themselves are of equal lengths, the weights at the different angles are as these verticals and as the secants of the angles of elevation of the rafters jointly.

ctical rences.

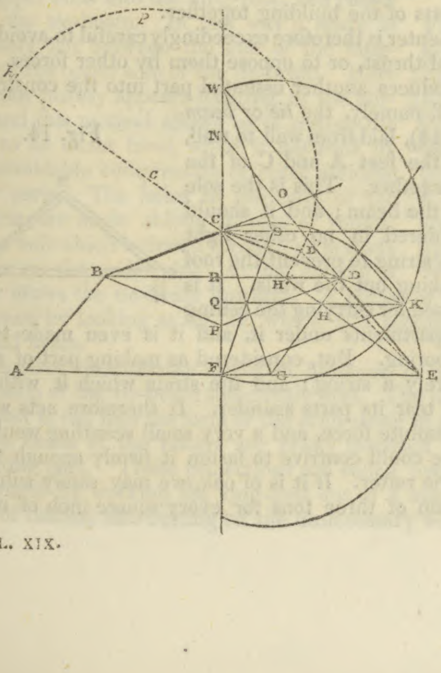
This proposition is very fruitful in its practical consequences. It is easy to perceive that it contains the whole theory of the construction of arches; for each stone of an arch may be considered as one of the rafters of this piece of carpentry, since all is kept up by its mere equilibrium. We may have an opportunity in a future article of exhibiting some very elegant and simple solutions of the most difficult cases of this important problem; and we now proceed to make use of the knowledge we have acquired for the construction of roofs.

T deter- e the form kirb- f.

We mentioned by the by a problem which is not unfrequent in practice, to determine the best form of a kirb-roof. M. Couplet of the Royal Academy of Paris has given a solution of it in an elaborate memoir in 1726, occupying several lemmas and theorems.

Let AE (fig. 11) be the width, and CF the height; it is required to construct a roof ABCDE, whose rafters AB, BC, CD, DE, are all equal, and which shall be in equilibrio.

Fig. 11.



Roof.

Draw CE, and bisect it perpendicularly in H by the line DHG, cutting the horizontal line AE in G. About the centre G, with the distance GE, describe the circle EKC. It must pass through C, because CH is equal to HE and the angles at H are equal. Draw HK parallel to FE, cutting the circumference in K; draw CK, cutting GH in D; and join CD, ED. These lines are the rafters of half of the roof required.

We prove this by showing that the loads at the angles C and D are equal; for this is the proportion which results from the equality of the rafters, and the extent of surface of the uniform roofing which they are supposed to support. Therefore produce ED till it meet the vertical FC in N; and having made the side CBA similar to CDE, complete the parallelogram BCDP, and draw DB, which will bisect CP in R, as the horizontal line KH bisects CF in Q. Draw KF, which is evidently parallel to DP. Make CS perpendicular to CF, and equal to FG; and about S, with the radius SF, describe the circle FKW. It must pass through K, because SF is equal to CG, and CQ = QF. Draw WK, WS, and produce BC, cutting ND in O.

The angle WKF at the circumference is one half of the angle WSF at the centre, and is therefore equal to WSC or CGF. It is therefore double of the angle CEF or ECS. But ECS is equal to ECD and DCS, and ECD is one half of NDC, and DCS is one half of DCO or CDP. Therefore the angle WKF is equal to NDP, and WK is parallel to ND, and CF is to CW as CP to CN; and CN is equal to CP. But it has been shown above that CN and CP are as the loads upon D and C. These are therefore equal, and the frame ABCDE is in equilibrio.

A comparison of this solution with that of M. Couplet will show its great advantage in respect of simplicity and perspicuity; and the intelligent reader can easily adapt the construction to any proportion between the rafters AB and BC, which other circumstances, such as garret-rooms, &c. may render convenient. The construction must be such that NC may be to CP as CD to $\frac{\mathrm{CD}+\mathrm{DE}}{2}$. Whatever proportion of AB to BC is assumed, the point D′ will be found in the circumference of a semicircle H′D′*h*′, whose centre is in the line CE, and having AB : BC = CH′ : H′E = *ch*′ : *h*′E. The rest of the construction is simple.

In buildings which are roofed with slate, tile, or shingles, the circumstance which is most likely to limit the construction is the slope of the upper rafters CB, CD. This must be sufficient to prevent the penetration of rain, and the stripping by the winds. The only circumstance left in our choice in this case is the proportion of the rafters AB and BC. Nothing is easier than making NC to CP in any desired proportion when the angle BCD is given.

The truss for a roof should always be in equilibrio.

We need not repeat that it is always a desirable thing to form a truss for a roof in such a manner that it shall be in equilibrio. When this is done, the whole force of the struts and braces which are added to it is employed in preserving this form, and no part is expended in unnecessary strains. For we must now observe, that the equilibrium of which we have been treating is always of that kind which we call the tottering, and the roof requires stays, braces, or hanging timbers, to give it stiffness, or keep it in shape. We have also said enough to enable any reader acquainted with the most elementary geometry and mechanics, to compute the transverse strains and the thrusts to which the component parts of all roofs are exposed.

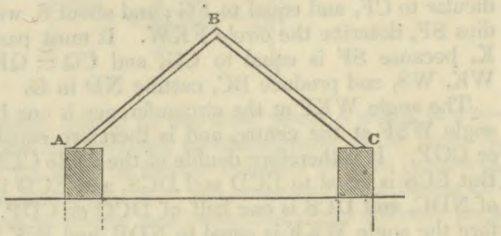
General maxims for all roofs

It only remains now to show the general maxims by which all roofs must be constructed, and the circumstances which determine their excellence. In doing this we shall be exceedingly brief, and almost content ourselves with exhibiting the principal forms, of which the endless variety of roofs are only slight modifications. We shall not trouble the reader with any account of such roofs as receive part of their support from the interior walls, but confine ourselves to the more difficult problem of throwing a roof over a wide building, without any intermediate support; because when such roofs are constructed in the best manner, that is, deriving the greatest possible strength from the materials employed, the best construction of the others is necessarily included. For all such roofs as rest upon the middle walls are roofs of smaller bearing. The only exception deserving notice is the roofs of churches, which have aisles separated from the nave by columns. The roof must rise on these. But if it is of an arched form internally, the horizontal thrusts must be nicely balanced, that they may not push the columns aside.

Simplest notion of a roof.

The simplest notion of a roof-frame is, that it consists of two rafters AB and BC (fig. 12), meeting in the ridge.

Fig. 12.

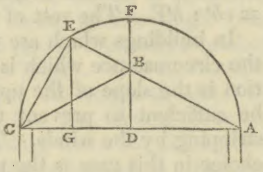


But even this simple form is susceptible of better and worse. We have already seen, that when the weight of a square yard of covering is given, a steeper roof requires stronger rafters, and that when the scantling of the timbers is also given, the relative strength of a rafter is inversely as its length.

Best form of rafters.

But there is now another circumstance to be taken into the account, viz. the support which one rafter leg gives to the other. The best form of a rafter will therefore be that in which the relative strength of the legs, and their mutual support, give the greatest product. Mr Muller, in his Military Engineer, gives a determination of the best pitch of a roof, which has considerable ingenuity, and has been copied into many books of military education both in this island and on the continent. Describe on the width AC (fig. 13) the semicircle AFC, and bisect it by the radius FD. Produce the rafter AB to the circumference in E, join EC, and draw the perpendicular EG. Now AB : AD = AC : AE, and $AE = \frac{AD \times AC}{AB}$, and AE is inversely as AB, and may therefore represent its strength in relation to the weight actually lying on it. Also the support which CB gives to AB is as CE, because CE is perpendicular to AB. Therefore the form which renders AE × EC a maximum seems to be that which has the greatest strength. But AC : AE = EC : EG, and $EG = \frac{AE \times EC}{AC}$, and is therefore proportional to AE × EC. Now EG is a maximum when B is in F, and a square pitch is in this respect the strongest. But it is very doubtful whether this construction is deduced from just principles. There is another strain to which the leg AB is exposed, which is not taken into the account. This arises from the curvature which it unavoidably acquires by the transverse pressure of its load. In this state it is pressed in its own direction by the abutment and load of the other leg. The relation between this strain and the resistance of the piece is not very distinctly known. Euler has given a dissertation on this subject, which is of great importance, because it affects posts and pillars of all kinds; and it is very well known that a post of ten feet long and six inches square will bear with great safety a weight which would crush a post of the same scantling and twenty feet long in a minute; but his determination has not been acquiesced in by the first mathematicians. Now it is in relation to these two strains that the strength of the rafter should be adjusted. The firmness of the support given by the other leg is of no consequence, if its own strength is inferior to the strain. The force which tends to crush the leg AB, by compressing it in its curved state, is to its weight as AB to BD, as is easily seen by the composition of forces; and its incurvation by this force has a relation to it, which is of intricate determination. It is contained in the properties demonstrated by Bernoulli of the elastic curve. This determination also includes the relation between the curvature and the length of the piece. But the whole of this seemingly simple problem is of much more difficult investigation than Mr Muller was aware of; and his rules for the pitch of a roof, and for the sally of a dock-gate, which depends on the same principles, are of no value. He is, however, the first author who attempted to solve either of these problems on mechanical principles susceptible of precise reasoning. Belidor's solutions, in his *Architecture Hydraulique*, are below notice.

Fig. 13.



Reasons of economy have made carpenters prefer a low pitch; and although this does diminish the support given by the opposite leg faster than it increases the relative strength of the other, it is not of material consequence, because the strength remaining in the opposite leg is still very great; for the supporting leg is acting against compression, in which case it is vastly stronger than the supported leg acting against a transverse strain.

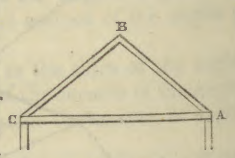
Thrust on the walls.

But a roof of this simplicity will not do in most cases. There is no notice taken, in its construction, of the thrust which it exerts on the walls. Now this is the strain which is the most hazardous of all. Our ordinary walls, instead of being able to resist any considerable strain pressing them outwards, require, in general, some ties to keep them on foot. When a person thinks of the thinness and height of the walls of even a strong house, he will be surprised that they are not blown down by any strong puff of wind. A wall three feet thick, and sixty feet high, could not withstand a wind blowing at the rate of thirty feet per second (in which case it acts with a force considerably exceeding two pounds on every square foot), if it were not stiffened by cross walls, joists, and roof, which all help to tie the different parts of the building together.

How this is avoided.

A carpenter is therefore exceedingly careful to avoid every horizontal thrust, or to oppose them by other forces. And this introduces another essential part into the construction of a roof, namely, the *tie* or *beam* AC (fig. 14), laid from wall to wall, binding the feet A and C of the rafters together. This is the sole office of the beam; and it should be considered in no other light than as a string to prevent the roof from pushing out the walls. It is indeed used for carrying the ceiling of the apartments under it, and it is even made to support a flooring. But, considered as making part of a roof, it is merely a string; and the strain which it withstands tends to tear its parts asunder. It therefore acts with its whole absolute force, and a very small scantling would suffice if we could contrive to fasten it firmly enough to the foot of the rafter. If it is of oak, we may safely subject it to a strain of three tons for every square inch of its sec-

Fig. 14.



tion. And fir will safely bear a strain of two tons for every square inch. But we are obliged to give the tie-beam much larger dimensions, that we may be able to connect it with the foot of the rafter by a mortise and tenon. Iron straps are also frequently added. By attending to this office of the tie-beam, the judicious carpenter is directed to the proper form of the mortise and tenon, and of the strap. We shall consider both of these in a proper place, after we become acquainted with the various strains at the joints of a roof.

These large dimensions of the tie-beam allow us to load it with the ceilings without any risk, and even to lay floors on it with moderation and caution. But when it has a great bearing or span, it is very apt to bend downwards in the middle, or, as the workmen term it, to sway or swag; and it requires a support. The question is, where to find this support. What fixed points can we find with which to connect the middle of the tie-beam? Some ingenious carpenter thought of suspending it from the ridge by a piece of timber BD (fig. 15), called by our carpenters the *king-post.* It must be acknowledged, that there was very great ingenuity in this thought. It was also perfectly just. For the weight of the rafters BA, BC tends to make them fly out at the foot. This is prevented by the tie-beam, and this excites a pressure, by which they tend to compress each other. Suppose them without weight, and that a great weight is laid on the ridge B. This can be supported only by the abutting of the rafters in their own directions AB and CB, and the weight tends to compress them in the opposite directions, and, through their intervention, to stretch the tie-beam. If neither the rafters can be compressed, nor the tie-beam stretched, it is plain that the triangle ABC must retain its shape, and that B becomes a fixed point very proper to be used as a point of suspension. To this point, therefore, is the tie-beam suspended by means of the king-post. A common spectator unacquainted with carpentry views it very differently, and the tie-beam appears to him to carry the roof. The king-post appears a pillar resting on the beam, whereas it is really a string; and an iron rod of one sixteenth of the size would have done just as well. The king-post is sometimes mortised into the tie-beam, and pins put through the joint, which gives it more the look of a pillar with the roof resting on it. This does well enough in many cases. But the best method is to connect them by an iron strap like a stirrup, which is bolted at its upper ends into the king-post, and passes round the tie-beam. In this way a space is commonly left between the end of the king-post and the upper side of the tie-beam. Here the beam plainly appears hanging in the stirrup; and this method allows us to restore the beam to an exact level, when it has sunk by the unavoidable compression or other yielding of the parts. The holes in the sides of the iron strap are made oblong instead of round; and the bolt which is drawn through all is made to taper on the under side; so that driving it farther draws the tie-beam upwards. A notion of this may be formed by looking at fig. 16, which is a section of that post and beam.

Fig. 15.

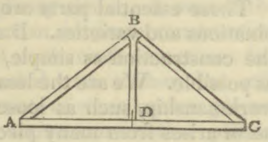
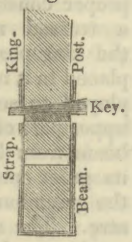


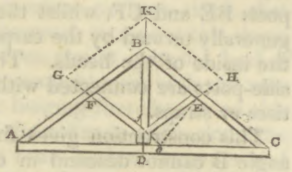
Fig. 16.



It requires considerable attention, however, to make this suspension of the tie-beam sufficiently firm. The top of the king-post is cut into the form of the arch-stone of a bridge, and the heads of the rafters are firmly mortised into this projecting part. These projections are called joggles, and are formed by working the king-post out of a much larger piece of timber, and cutting off the unnecessary wood from the two sides; and, lest all this should not be sufficient, it is usual in great works to add an iron plate or strap of three branches, which are bolted into the heads of the king-post and rafters.

The rafters, though not so long as the beam, seem to stand as much in need of something to prevent their bending, for they carry the weight of the covering. This cannot be done by suspension, for we have no fixed points above them. But we have now got a very firm point of support at the foot of the king-post. *Braces,* or rather *struts,* ED, FD (fig. 17), are put under the middle of the rafters, where they are slightly mortised, and their lower ends are firmly mortised into joggles formed on the foot of the king-post. As these braces are very powerful in their resistance to compression, and the king-post equally so to resist extension, the points E and F may be considered as fixed; and the rafters being thus reduced to half their former length, have now four times their former relative strength.

Fig. 17.

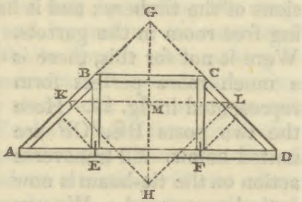


Construction of flat-topped roofs.

Roofs do not always consist of two sloping sides meeting in a ridge. They have sometimes a flat on the top, with two slopping sides. They are sometimes formed with a double slope, and are called *kirb* or *mansarde roofs.* They sometimes have a valley in the middle, and are then called M roofs. Such roofs require another piece, which may be called the *truss-beam,* because all such frames are called *trusses,* probably from the French word *trousse,* because such roofs are like portions of plain roofs *troussés* or shortened.

A flat-topped roof is thus constructed. Suppose the three rafters AB, BC, CD (fig. 18), of which AB and CD are equal, and BC horizontal. It is plain that they will be in equilibrio, and the roof have no tendency to go on either side. The tie-beam AD withstands the horizontal thrusts of the whole frame, and the two rafters AB and CD are each pressed in their own directions in consequence of their abutting with the middle rafter or truss-beam BC. It lies between them like the key-stone of an arch. They lean towards it, and it rests on them. The pressure which the truss-beam and its load excites on the two rafters is the very same as if the rafters were produced till they meet in G, and a weight were laid on these equal to that of BC and its load. If therefore the truss-beam is of a scantling sufficient for carrying its own load, and withstanding the compression from the two rafters, the roof will be equally strong, whilst it keeps its shape, as the plain roof AGD, furnished with the king-post and braces. We may conceive this another way. Suppose a plain roof AGD, without braces to support the middle B and C of the rafters. Then let a beam BC be put in between the rafters, abutting upon little notches cut in the rafters. It is evident that this must prevent the rafters from bending downwards, because the points B and C cannot descend, moving round the centres A and D, without shortening the distance BC between them. This cannot be without compressing the beam BC. It is plain that BC may be wedged in, or wedges driven in between its ends B and C and the notches in which it is lodged. These wedges may be driven in till they even force out the rafters GA and GD. Whenever this happens, all the mutual pressure of the heads of these rafters at G is taken away, and the parts GB and GC may be cut away, and the

Fig. 18.



roof ABCD will be as strong as the roof AGD furnished with the king-post and braces, because the truss-beam gives a support of the same kind at B and C as the brace would have done.

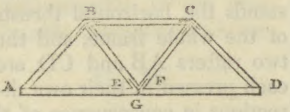
But this roof ABCD would have no firmness of shape. Any addition of weight on one side would destroy the equilibrium at the angle, would depress that angle, and would cause the opposite one to rise. To give it stiffness, it must either have ties or braces, or something partaking of the nature of both. The usual method of framing is to make the heads of the rafters abut on the joggles of two side-posts BE and CF, whilst the truss-beam, or strut as it is generally termed by the carpenters, is mortised square into the inside of the heads. The lower ends E and F of the side-posts are connected with the tie-beam either by mortises or straps.

This construction gives firmness to the frame; for the angle B cannot descend in consequence of any inequality of pressure, without forcing the other angle C to rise. This it cannot do, being held down by the post CF. And the same construction fortifies the tie-beam, which is now suspended at the points E and F from the points B and C, whose firmness we have just now shown.

They are not so strong as the plain roofs.

But although this roof may be made abundantly strong, it is not quite so strong as the plain roof AGD of the same scantling. The compression which BC must sustain in order to give the same support to the rafters at B and C that was given by braces properly placed, is considerably greater than the compression of the braces. And this strain is an addition to the transverse strain which BC gets from its own load. This form also necessarily exposes the tie-beam to cross strains. If BE is mortised into the tie-beam, then the strain which tends to depress the angle ABC presses on the tie-beam at E transversely, whilst a contrary strain acts on F, pulling it upwards. These strains, however, are small; and this construction is frequently used, being susceptible of sufficient strength, without much increase of the dimensions of the timbers; and it has the great advantage of giving free room in the garrets. Were it not for this, there is a much more perfect form represented in fig. 19. Here the two posts BE, CF are united below. All transverse action on the tie-beam is now entirely removed. We are almost disposed to say that this is the strongest roof of the same width and slope. For if the iron strap which connects the pieces BE, CF with the tie-beam have a large bolt G through it, confining it to one point of the beam, there are five points, A, B, C, D, G, which cannot change their places, and there is no transverse strain in any of the connections.

Fig. 19.



When the dimensions of the building are very great, so that the pieces AB, BC, CD, would be thought too weak for withstanding the cross strains, braces may be added as is expressed in fig. 18 by the dotted lines. The reader will observe, that it is not meant to leave the top flat externally; it must be raised a little in the middle, to shoot off the rain. But this must not be done by incurvating the beam BC. This would soon be crushed, and spring upwards. The slopes must be given by pieces of timber added above the strutting-beam.

Members of which the frame of a roof consists.

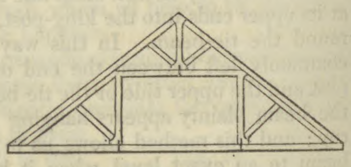
And thus we have completed a frame of a roof. It consists of these principal members: the rafters, which are immediately loaded with the covering; the tie-beam, which withstands the horizontal thrust by which the roof tends to fly out below and push out the walls; the king-posts, which hang from fixed points and serve to uphold the tie-beam, and also to afford other fixed points on which we may rest the braces which support the middle of the rafters; and, lastly, the truss or strutting-beam, which serves to give mutual abutment to the different parts which are at a distance from each other. The rafters, braces, and trusses are exposed to compression, and must therefore have not only cohesion, but stiffness. For if they bend, the prodigious compressions to which they are subjected would quickly crush them in this bended state. The tie-beams and king-posts, if performing no other office but supporting the roof, do not require stiffness; and their places might be supplied by ropes, or by rods of iron of one-tenth part of the section that even the smallest oak stretcher requires. These members require no greater dimensions than what is necessary for giving sufficient joints, and any more is a needless expense. All roofs, however complicated, consist of these essential parts; and if pieces of timber are to be seen which perform none of these offices, they must be pronounced useless, and they are frequently hurtful, by producing cross strains in some other piece. In a roof properly constructed there should be no such strains. All the timbers, excepting those which immediately carry the covering, should be either pushed or drawn in the direction of their length. And this is the rule by which a roof should always be examined.

They ar susceptil of numb less com nations varieties

These essential parts are susceptible of numberless combinations and varieties. But it is a prudent maxim to make the construction as simple, and consisting of as few parts, as possible. We are the less exposed to the imperfections of workmanship, such as loose joints, &c. Another essential harm arises from many pieces, by the compression and the shrinking of the timber in the cross direction of the fibres. The effect of this is equivalent to the shortening of the piece which abuts on the joint. This alters the proportions of the sides of the triangle on which the shape of the whole depends. Now, in a roof such as fig. 18, there is twice as much of this as in the plain pent-roof, because there are two posts. And when the direction of the abutting pieces is very oblique to the action of the load, a small shrinking permits a great change of shape. Thus, in a roof of what is called pediment pitch, where the rafters make an angle of thirty degrees with the horizon, half an inch compression of the king-post will produce a sagging of an inch, and occasion a great strain on the tie-beam, if the posts are mortised into it.

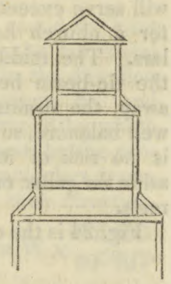
This method of including a truss within the rafters of a pent-roof is a very considerable addition to the art of carpentry. But to insure its full effect, it should always be executed with abutting rafters under the principal ones, abutting on joggles in the heads of the posts. Without this the strut-beam is hardly of any service. We would therefore recommend fig. 20 as a proper construction of a trussed roof; and the king-post which is placed in it may be employed to support the upper part of the rafters, and also for preventing the strut-beam from bending in their direction in consequence of its great compression. It will also give a suspension for the great burdens which are sometimes necessary in a theatre. The machinery has no other firm points to which it can be attached; and the portions of the single rafters which carry this king-post are but short, and therefore may be considerably loaded with safety.

Fig. 20.



We observe in the drawings which we sometimes have of Chinese buildings, that the trussing of roofs is understood by them Indeed they must be very experienced carpenters. We see wooden buildings run up to a great height, which can be supported only by such trussing. One of these is sketched in fig. 21. There are some very excellent specimens to be seen in the buildings at Deptford, belonging to the victualling-office, commonly called the *Red-house*, which were erected about the year 1788, and we believe are the performance of Mr James Arrow of the Board of Works, one of the most intelligent artists in this kingdom.

Fig. 21.



marks
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Thus have we given an elementary, but a rational or scientific, account of this important part of the art of carpentry. It is such, that any practitioner, with the trouble of a little reflection, may always proceed with confidence, and without resting any part of his practice on the vague notions which habit may have given him of the strength and supports of timbers, and of their manner of acting. That these frequently mislead, is proved by the mutual criticisms which are frequently published by the rivals in the profession. They have frequently sagacity enough, for it seldom can be called science, to point out glaring blunders; and any person who will look at some of the performances of Mr Price, Mr Wyatt, Mr Arrow, and others of acknowledged reputation, will readily see them distinguishable from the works of inferior artists by simplicity alone. A man without principles is apt to consider an intricate construction as ingenious and effectual; and such roofs sometimes fail merely by being ingeniously loaded with timber, but still more frequently by the wrong action of some useless pieces, which produces strains that are transverse to other pieces, or which, by rendering some points too firm, cause them to be deserted by the rest in the general subsiding of the whole. Instances of this kind are pointed out by Price in his British Carpenter. Nothing shows the skill of a carpenter more than the distinctness with which he can foresee the changes of shape which must take place in a short time in every roof. A knowledge of this will often correct a construction which the mere mathematician thinks unexceptionable, because he does not reckon on the actual compression which must obtain, and imagines that his triangles, which sustain no cross strains, invariably retain their shape till the pieces break. The sagacity of the experienced carpenter is not, however, enough without science for perfecting the art. But when he knows how much a particular piece will yield to compression in one case, science will then tell him, and nothing but science can do it, what will be the compression of the same piece in another very different case. Thus he learns how far it will now yield, and then he proportions the parts so to each other, that when all have yielded according to their strains, the whole is of the shape he wished to produce, and every joint is in a state of firmness. It is here that we observe the greatest number of improprieties. The iron straps are frequently in positions not suited to the actual strain on them; and they are in a state of violent twist, which both tends strongly to break the straps, and to cripple the pieces which they surround.

In like manner, we frequently see joints or mortises in a state of violent strain on the tenons, or on the heels and shoulders. The joints were perhaps properly shaped for the primitive form of the truss; but by its settling, the bearing of the push is changed. The brace, for example, in a very low-pitched roof, comes to press with the upper part of the shoulder, and, acting as a powerful lever on the tenon, breaks it. In like manner, the lower end of the brace, which at first abutted firmly and squarely on the joggle of the king-post, now presses with one corner in prodigious force, and seldom fails to splinter off on that side. We cannot help recommending a maxim of M. Perronet, the celebrated hydraulic architect of France, as a golden rule, viz. to make all the shoulders of abutting pieces in the form of an arch of a circle, having the opposite end of the piece for its centre. Thus, in fig. 18, if the joggle-point B be of this form, having A for its centre, the sagging of the roof will make no partial bearing at the joint; for in the sagging of the roof the piece AB turns or bends round the centre A, and the counter-pressure of the joggle is still directed to A, as it ought to be. We have just now said *bends* round A. This is too frequently the case, and it is always very difficult to give the tenon and mortise in this place a true and invariable bearing. The rafter pushes in the direction BA, and the beam resists in the direction AD. The abutment should be perpendicular to neither of these, but in an intermediate direction, and it ought also to be of a curved shape. But the carpenters perhaps think that this would weaken the beam too much to give it this shape in the shoulder; they do not even aim at it in the heel of the tenon. The shoulder is commonly even with the surface of the beam. When the bearing therefore is on this shoulder, it causes the foot of the rafter to slide along the beam till the heel of the tenon bears against the outer end of the mortise (See Price's British Carpenter, plate C, fig. IK). This abutment is perpendicular to the beam in Price's book; but it is more generally pointed a little outwards below, to make it more secure against starting. The consequence of this construction is, that when the roof settles, the shoulder comes to bear at the inner end of the mortise, and it rises at the outer, and the tenon, taking hold of the wood beyond it, either tears it out or is itself broken. This joint therefore is seldom trusted to the strength of the mortise and tenon, and is usually secured by an iron strap, which lies obliquely to the beam, to which it is bolted by a large bolt quite through, and then embraces the outside of the rafter foot. This strap is very frequently not made sufficiently oblique, and we have seen some made almost square with the beam. When this is the case, it not only keeps the foot of the rafter from flying out, but it binds it down. In this case, the rafter acts as a powerful lever, whose fulcrum is in the inner angle of the shoulder, and then the strap never fails to cripple the rafter at the point. All this can be prevented only by making the strap very long and very oblique, and by making its outer end (the stirrup part) square with its length, and making a notch in the rafter foot to receive it. It cannot now cripple the rafter, for it will rise along with it, turning round the bolt at its inner end. We have been thus particular on this joint, because it is here that the ultimate strain of the whole roof is exerted, and its situation will not allow the excavation necessary for making it a good mortise and tenon.

Similar attention must be paid to some other straps, such as those which embrace the middle of the rafter, and connect it with the post or truss below it. We must attend to the change of shape produced by the sagging of the roof, and place the strap in such a manner as to yield to it by turning round its bolt, but so as not to become loose, and far less to make a fulcrum for any thing acting as a lever. The strains arising from such actions, in framings of carpentry which change their shape by sagging, are enormous, and nothing can resist them.

Mode of calculating strains or thrusts.

We shall close this part of the subject with a simple method, by which any carpenter, without mathematical science, may calculate with sufficient precision the strains or thrusts which are produced on any point of his work, whatever be the obliquity of the pieces.

Let it be required to find the horizontal thrust acting on the tie-beam AD of fig. 18. This will be the same as if the weight of the whole roof were laid at G on the two rafters GA and GD. Draw the vertical line GH. Then, having calculated the weight of the whole roof that is supported by this single frame ABCD, including the weight of the pieces AB, BC, CD, BE, CF themselves, take the number of pounds, tons, &c. which expresses it from any scale of equal parts, and set it from G to H. Draw HK, HL parallel to GD, GA, and draw the line KL, which will be horizontal when the two sides of the roof have the same slope. Then ML measured on the same scale will give the horizontal thrust, by which the strength of the tie-beam is to be regulated. GL will give the thrust which tends to crush the rafters, and LM will also give the force which tends to crush the strut-beam BC.

In like manner, to find the strain of the king-post BD of fig. 17, consider that each brace is pressed by half the weight of the roofing laid on BA or BC, and this pressure, or at least its hurtful effect, is diminished in the proportion of BA to DA, because the action of gravity is vertical, and the effect which we want to counteract by the braces is in a direction E*e* perpendicular to BA or BC. But as this is to be resisted by the brace *f*E acting in the direction *f*E, we must draw *fe* perpendicular to E*e*, and suppose the strain augmented in the proportion of E*e* to E*f*.

Having thus obtained in tons, pounds, or other measures, the strains which must be balanced at *f* by the cohesion of the king-post, take this measure from the scale of equal parts, and set it off in the directions of the braces to G and H, and complete the parallelogram G*f*HK; and *f*K measured on the same scale will be the strain on the king-post.

Strength of the truss.

The artist may then examine the strength of his truss upon this principle, that every square inch of oak will bear at an average 7000 pounds compressing or stretching it, and may be safely loaded with 3500 for any length of time; and that a square inch of fir will in like manner securely bear 2500. And, because straps are used to resist some of these strains, a square inch of well-wrought tough iron may be safely strained by 50,000 pounds. But the artist will always recollect, that we cannot have the same confidence in iron as in timber. The faults of this last are much more easily perceived; and when the timber is too weak, it gives us warning of its failure by yielding sensibly before it breaks. This is not the case with iron; and much of its service depends on the honesty of the blacksmith.

Sketch of some trussed roofs, &c.

In this way may any design of a roof be examined. We shall here give the reader a sketch of two or three trussed roofs, which have been executed in the chief varieties of circumstances which occur in common practice.

Fig. 22 is the roof of St Paul's Church, Covent Garden, London, the work of Inigo Jones. Its construction is singular. The roof extends to a considerable distance beyond the building, and the ends of the tie-beams support the Tuscan corniche, appearing like the mutules of the Doric order. Such a roof could not rest on the tie-beam. Inigo Jones has therefore supported it by a truss below it; and the height has allowed him to make this extremely strong with very little timber. It is accounted the highest roof of its width in London. But this was not difficult, by reason of the great height which its extreme width allowed him to employ without hurting the beauty of it by too high a pitch. The supports, however, are disposed with judgment.[1]

Fig. 22.

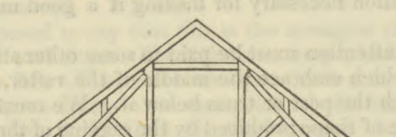


Fig. 23 is a kirb or mansarde roof by Price, and supposed to be of large dimensions, having braces to carry the middle of the rafters. It will serve exceedingly well for a church having pillars. The middle part of the tie-beam being taken away, the strains are very well balanced, so that there is no risk of its pushing aside the pillar on which it rests.

Fig. 23.

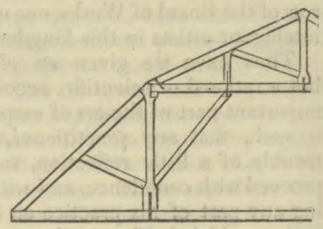
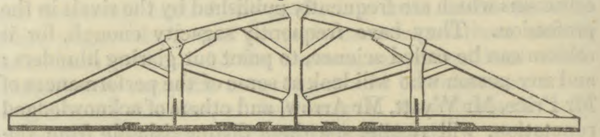


Fig. 24 is the celebrated roof of the Theatre of the University of Oxford, by Sir Christopher Wren. The span between the walls is 75 feet. This is accounted a very ingenious, and is a singular performance. The middle part of it is almost unchangeable in its form; but from this circumstance it does not distribute the horizontal thrust with the same regularity as the usual construction. The horizontal thrust on the tie-beam is about twice the weight of the roof, and is withstood by an iron strap below the beam, which stretches the whole width of the building in the form of a rope, making part of the ornament of the ceiling.

Fig. 24.



Cases in which th thrust ca not be di charged from the walls by the tie-beam.

In all the roofs which we have considered hitherto, the thrust is discharged entirely from the walls by the tie-beam. But this cannot always be done. We frequently want great elevation within, and arched ceilings. In such cases, it is a much more difficult matter to keep the walls free of all pressure outwards, and there are few buildings where it is completely done. Yet this is the greatest fault of a roof. We shall just point out the methods which may be most successfully adopted.

We have said that a tie-beam just performs the office of a string. We have said the same of the king-post. Now suppose two rafters AB, BC (fig. 25), moveable about the point B, and resting on the top of the walls. If the line BD be suspended from B, and the two lines DA, DC be fastened to the feet of the rafters, and if these lines be incapable of extension, it is plain that all thrust is removed from the walls as effectually as by a common tie-beam; and by shortening BD to B*d*, we gain a greater inside height, and more room for an arched ceiling. Now if we substitute a king-post BD (fig. 26), and two stretchers or hammer-beams DA, DC for the other strings, and connect them firmly by means of iron straps, we obtain our purpose.

Fig. 25.

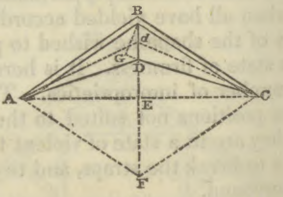
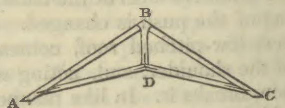


Fig. 26.



Let us compare this roof with a tie-beam roof in point of strain and strength. Recur to fig. 25, and complete the parallelogram ABCF, and draw the diagonals AC, BF, crossing in E. Draw BG perpendicular to CD. We have seen that the weight of the roof, which we may call W, is to the horizontal thrust at C as BF to EC; and if we express this thrust by T, we have $T = \frac{W \times EC}{BF}$. We may at present consider BC as a lever moveable round the joint B, and pulled at C in the direction EC by the horizontal thrust, and held back by the string pulling in the direction CD. Suppose that the forces in the directions EC and CD are in equilibrio, and let us find the force S by which the string CD is strained. These forces must, by the property of the lever, be inversely as the perpendiculars drawn from the centre of motion on the lines of their direction.

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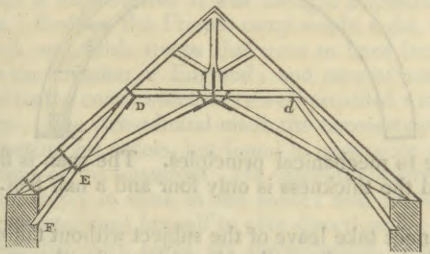
[1] This church was burnt down after the present article was written.

Therefore $BG : BE = T : S$, and $S = T \times \frac{BE}{BG} = W \times \frac{BE \cdot EC}{BF \cdot BG}$.

Therefore the strain upon each of the ties DA and DC is always greater than the horizontal thrust or the strain on a simple tie-beam. This would be no great inconvenience, because the smallest dimensions that we could give to these ties, so as to procure sufficient fixtures to the adjoining pieces, are always sufficient to withstand this strain. But although the same may be said of the iron straps which make the ultimate connections, there is always some hazard of imperfect work, cracks, or flaws, which are not perceived. We can judge with tolerable certainty of the soundness of a piece of timber, but cannot say so much of a piece of iron. Moreover, there is a prodigious strain excited on the king-post when BG is very short in comparison of BE, namely, the force compounded of the two strains S and S on the ties DA and DC.

But there is another defect from which the straight tie-beam is entirely free. All roofs settle a little. When this roof settles, and the points B and D descend, the legs BA, BC must spread further out, and thus a pressure outwards is excited on the walls. It is seldom therefore that this kind of roof can be executed in this simple form, and other contrivances are necessary for counteracting this supervening action on the walls. Fig. 27 is one of the best which we have seen, and is executed with great success in the circus or equestrian theatre (now, 1809, a concert-room) in Edinburgh, the width being sixty feet. The pieces EF and ED help to take off some of the weight, and by their greater uprightness they exert a smaller thrust on the walls. The beam D*d* is also a sort of truss-beam, having something of the same effect. Mr Price has given another very judicious one of this kind (British Carpenter, plate IK, fig. C), from which the tie-beam may be taken away, and there will remain very little thrust on the walls. Those which he has given in the following plate, K, are, in our opinion, very faulty. The whole strain in these last roofs tends to break the rafters and ties transversely, and the fixtures of the ties are also not well calculated to resist the strain to which the pieces are exposed. We hardly think that these roofs could be executed.

Fig. 27.



It is scarcely necessary to remind the reader, that in all that we have delivered on this subject, we have attended only to the construction of the principal rafters or trusses. In small buildings all the rafters are of one kind; but in great buildings the whole weight of the covering is made to rest on a few principal rafters, which are connected by beams placed horizontally, and either mortised into them or scarfed on them. These are called *purlins*. Small rafters are laid from purlin to purlin; and on these the laths for tiles, or the skirting-boards for slates, are nailed. Thus the covering does not immediately rest on the principal frames. This allows some more liberty in their construction, because the garrets can be so divided that the principal rafters shall be in the partitions, and the rest left unencumbered. This construction is so far analogous to that of floors which are constructed with girders, binding, and bridging joists.

It may appear presuming in us to question the propriety of this practice. There are situations in which it is unavoidable, as in the roofs of churches, which can be allowed to rest on some pillars. In other situations, where partition-walls intervene at a distance not too great for a stout purlin, no principal rafters are necessary, and the whole may be roofed with short rafters of very slender scantling. But in a great uniform roof, which has no intermediate supports, it requires at least some reasons for preferring this method of carcass-roofing to the simple method of making all the rafters alike. The method of carcass-roofing requires the selection of the greatest logs of timber, which are seldom of equal strength and soundness with thinner rafters. In these the outside planks can be taken off, and the best part alone worked up. It also exposes to all the defects of workmanship in the mortising of purlins, and the weakening of the rafters by this very mortising; and it brings an additional load of purlins and short rafters. A roof thus constructed may surely be compared with a floor of similar construction. Here there is not a shadow of doubt, that if the girders were sawed into planks, and these planks laid as joists sufficiently near for carrying the flooring boards, they will have the same strength as before, except so much as is taken out of the timber by the saw. This will not amount to one-tenth part of the timber in the binding, bridging, and ceiling joists, which are an additional load, and all the mortises and other joinings are so many diminutions of the strength of the girders; and as no part of a carpenter's work requires more skill and accuracy of execution, we are exposed to many chances of imperfection. But, not to rest on these considerations, however reasonable they may appear, we shall relate an experiment made by one on whose judgment and exactness we can depend.

Confirmed by experiment.

Two models of floors were made, eighteen inches square, of the finest uniform deal, which had been long seasoned. The one consisted of simple joists, and the other was framed with girders, binding, bridging, and ceiling joists. The plain joists of the one contained the same quantity of timber with the girders alone of the other, and both were made by a most accurate workman. They were placed in wooden trunks eighteen inches square within, and rested on a strong projection on the inside. Small shot was gradually poured in upon the floors, so as to spread uniformly over them. The plain joisted floor broke down with 487 pounds, and the carcass floor with 327. The first broke without giving any warning, and the other gave a violent crack when 294 pounds had been poured in. A trial had been made before, and the loads were 341 and 482; but the models having been made by a less accurate hand, it was not thought a fair specimen of the strength which might be given to a carcass floor.

The only argument of weight which we can recollect in favour of the compound construction of roofs is, that the plain method would prodigiously increase the quantity of work, would admit nothing but long timber, which would greatly add to the expense, and would make the garrets a mere thicket of planks. We admit this in its full force;

but we continue to be of the opinion that plain roofs are greatly superior in point of strength, and therefore should be adopted in cases where the main difficulty is to insure this necessary circumstance.

Of the roofs put on round buildings.

It would appear very neglectful to omit an account of the roofs put on round buildings, such as domes, cupolas, and the like. They appear to be the most difficult tasks in the carpenter's art. But the difficulty lies entirely in the mode of framing, or what the French call the *trait de charpenterie*. The view which we are taking of the subject, as a part of mechanical science, has little connection with this. It is plain, that whatever form of a truss is excellent in a square building, must be equally so as one of the frames of a round one; and the only difficulty is how to manage their mutual intersections at the top. Some of them must be discontinued before they reach that length, and common sense will teach us to cut them short alternately, and always leave as many, that they may stand equally thick as at their first springing from the base of the dome. Thus the length of the purlins, which reach from truss to truss, will never be too great.

The truth is, that a round building which gathers in at top, like a glass-house, a potter's kiln, or a spire steeple, instead of being the most difficult to erect with stability, is of all others the easiest. Nothing can show this more forcibly than daily practice, where they are run up without centres and without scaffoldings; and it requires gross blunders indeed in the choice of their outline to put them in much danger of falling from a want of equilibrium. In like manner, a dome of carpentry can hardly fall, give it what shape or what construction you will. It *cannot* fall, unless some part of it flies out at the bottom. An iron hoop round it, or straps at the joinings of the trusses and purlins, which make an equivalent to a hoop, will effectually secure it. And as beauty requires that a dome shall spring almost perpendicularly from the wall, it is evident that there is hardly any thrust to force out the walls. The only part where this is to be guarded against is where the tangent is inclined about forty or fifty degrees to the horizon. Here it will be proper to make a course of firm horizontal joinings.

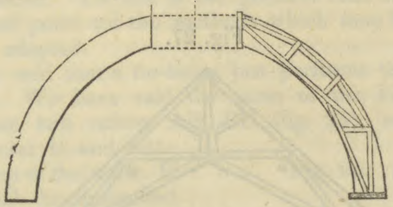
We doubt not but that domes of carpentry will now be raised of great extent. The Halle du Bled at Paris, of two hundred feet in diameter, was the invention of an intelligent carpenter, the Sieur Moulineau. He was not by any means a man of science, but had much more mechanical knowledge than artisans usually have, and was convinced that a very thin shell of timber might not only be so shaped as to be nearly in equilibrio, but that, if hooped or firmly connected horizontally, it would have all the stiffness that was necessary; and he presented his project to the magistracy of Paris. The grandeur of it pleased them, but they doubted of its possibility. Being a great public work, they prevailed on the Academy of Sciences to consider it. The members who were competent judges were instantly struck with the justness of M. Moulineau's principles, and astonished that a thing so plain had not been long familiar to every house-carpenter. It quickly became an universal topic of conversation, dispute, and cabal, in the polite circles of Paris. But the academy having given a very favourable report of their opinion, the project was immediately carried into execution, and soon completed; and now stands as one of the great exhibitions of Paris.

The construction of this dome is the simplest thing that can be imagined. The circular ribs which compose it consist of planks nine feet long, thirteen inches broad, and three inches thick; and each rib consists of three of these planks bolted together in such a manner that two points meet. A rib is begun, for instance, with a plank of three feet long standing between one of six feet and another of nine; and this is continued to the head of it. No machinery was necessary for carrying up such small pieces, and the whole went up like a piece of bricklayer's work. At various distances these ribs were connected horizontally by purlins and iron straps, which made so many hoops to the whole. When the work had reached such a height that the distance of the ribs was two thirds of the original distance, every third rib was discontinued, and the space was left open and glazed. When carried so much higher that the distance of the ribs is one third of the original distance, every second rib, now consisting of two ribs very near each other, is in like manner discontinued, and the void is glazed. A little above this the heads of the ribs are framed into a circular ring of timber, which forms a wide opening in the middle; over which is a glazed canopy or umbrella, with an opening between it and the dome for allowing the heated air to get out. All who have seen this dome say that it is the most beautiful and magnificent object they have ever beheld.

The only difficulty which occurs in the construction of wooden domes is when they are unequally loaded, by carrying a heavy lanthorn or cupola in the middle. In such a case, if the dome were a mere shell, it would be crushed in at the top, or the action of the wind on the lanthorn might tear it out of its place. Such a dome must therefore consist of trussed frames. Mr Price has given a very good one in his plate OP, though much stronger in the trusses than there was any occasion for. This causes a great loss of room, and throws the lights of the lanthorn too far up. It is evidently copied from Sir Christopher Wren's dome of St Paul's Church in London; a model of propriety in its particular situation, but by no means a general model of a wooden dome. It rests on the brick cone within it; and Sir Christopher has very ingeniously made use of it for stiffening this cone, as any intelligent person will perceive by attending to its construction.

Fig. 28 presents a dome executed in the Register Office in Edinburgh by James and Robert Adam, and is very agreeable to mechanical principles. The span is fifty feet clear, and the thickness is only four and a half feet.

Fig. 28.

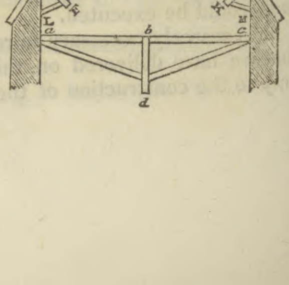


Furthe remark Norma roofs.

We cannot take leave of the subject without taking some notice of what we have already spoken of with commendation by the name of *Norman roofs*. We called them *Norman*, because they were frequently executed by that people soon after their establishment in Italy and other parts of the south of Europe, and became the prevailing taste in all the great baronial castles. Their architects were rivals to the Saracens and Moors, who about that time built many Christian churches; and the architecture which we now call Gothic seems to have arisen from their joint labours.

The principle of a Norman roof is extremely simple. The rafters all abutted on joggled king-posts AF, BG, CH, &c. (fig. 29), and braces or ties were then disposed in the intervals. In the middle of the roof HB and HD are evidently ties in a state of extension, whilst the post CH is compressed by them. Towards the walls on each side,

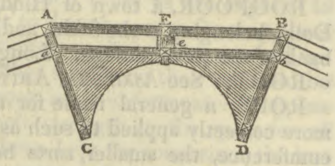
Fig. 29.



as between B and F, and between F and L, they are braces, and compressed. The ends of the posts were generally ornamented with knots of flowers, embossed globes, and the like, and the whole texture of the truss was exhibited and dressed out.

This construction admits of employing very short timbers; and this very circumstance gives greater strength to the truss, because the angle which the brace or tie makes with the rafter is more open. We may also perceive that all thrust may be taken off the walls. If the pieces AF, BF, LF, be removed, all the remaining diagonal pieces act as ties, and the pieces directed to the centre act as struts; and it may also be observed, that the principle will apply equally to a straight or flat roof or to a floor. A floor such as *abc*, having the joint in two pieces *ab*, *bc*, with a strut *bd*, and two ties, will require a much greater weight to break it than if it had a continued joist *ac* of the same scantling. And, lastly, a piece of timber acting as a tie is much stronger than the same piece acting as a strut; for in the latter situation it is exposed to bending, and when bent it is much less able to withstand a very great strain. It must be acknowledged, however, that this advantage is balanced by the great inferiority of the joints in point of strength. The joint of a tie depends wholly on the pins; and for this reason they are never used in heavy works without strapping the joints with iron. In the roofs we are now describing the diagonal pieces of the middle part only act purely as ties, whilst those towards the sides act as struts or braces. Indeed they are seldom of so very simple construction as we have described, and are more generally constructed like the sketch in fig. 30, having two sets of rafters AB, *ab*, and the angles are filled up with thin planks, which give great stiffness and strength. They have also a double set of purlins, which connect the different trusses. The roof being thus divided into squares, other purlins run between the middle points E of the rafters. The rafter is supported at E by a check put between it and the under rafter. The middle point of each square of the roof is supported and stiffened by four braces, one of which springs from *e*, and its opposite from the similar part of the adjoining truss. The other two braces spring from the middle points of the lower purlins, which go horizontally from *a* and *b* to the next truss, and are supported by planks in the same manner as the rafters. By this contrivance the whole becomes very stiff and strong. (B. B. B.)

Fig. 30.



ROOK. See ORNITHOLOGY.

ROOKE, SIR GEORGE, a gallant naval commander, was born of an ancient and honourable family in Kent in 1650. His merit raised him by regular steps to be vice-admiral of the blue, in which station he served in the battle of La Hogue, on the 22d of May 1692, when it was owing to his vigorous behaviour that the last stroke was given on that important day, which threw the French entirely into confusion. But the next day he obtained still more glory, for he had orders to go into La Hogue, and burn the enemy's ships as they lay there. There were thirteen large men of war, which had crowded as far up as possible; and the transports, tenders, and ammunition ships, were disposed in such a manner that it was thought impossible to burn them. Besides, the French camp was in sight, with all the French and Irish troops that were to have been employed in the invasion of England; and several batteries were raised on the coast, which were well provided with heavy artillery. The vice-admiral made the necessary preparations for obeying his orders, but found it impossible to carry in the ships of his squadron. He therefore ordered his light frigates to ply in close to the shore; and having manned all his boats, went himself to give directions for the attack, burned that very night six three-decked ships, and the next day six more, from seventy-six to sixty guns, together with most of the transports and ammunition vessels; and this under the fire of all the batteries just mentioned, and in sight of all the French and Irish troops. Yet this bold action cost the lives of no more than ten men. The vice-admiral's behaviour on this occasion appeared to King William so great, that having no opportunity at that time of promoting him, he settled a pension of L.1000 per annum on him for life; and afterwards going to Portsmouth to view the fleet, went on board Admiral Rooke's ship, dined with him, and then conferred on him the honour of knighthood, having a little before made him vice-admiral of the red.

In consequence of other services, he was in 1694 raised to the rank of admiral of the blue; towards the close of the next year he became admiral of the white, and was also appointed admiral and commander in chief in the Mediterranean.

During King William's reign, Sir George was twice elected member for Portsmouth; and upon the accession of Queen Anne in 1702, he was constituted vice-admiral and lieutenant of the admiralty of England, as also lieutenant of the fleets and seas of this kingdom. Upon the declaration of war against France, he was ordered to command a fleet sent against Cadiz, the Duke of Ormond having the command of the land forces. On his passage home, having received an account that the galleons, under the escort of a strong French squadron, had got into the harbour of Vigo, he resolved to attack them; and on the 11th of October he came before the harbour of Rondondello, where the French commander had neglected nothing necessary for putting the place in the best posture of defence. But notwithstanding this, a detachment of fifteen English and ten Dutch men of war, of the line of battle, with all the fire-ships, were ordered in; the frigates and bomb-vessels followed; the great ships moved after them, and the army landed near Rondondello. The whole service was performed under Sir George's directions, with admirable conduct and bravery; for all the ships were destroyed or taken, prodigious damage was done to the enemy, and vast wealth was acquired by the allies. For this action Sir George received the thanks of the House of Commons, a day of thanksgiving was appointed both by the queen and the states-general, and Sir George was appointed to a seat in the privy-council. Yet notwithstanding this, the House of Lords resolved to inquire into his conduct at Cadiz. But he so fully justified himself, that a vote was passed approving his behaviour.

In the spring of the year 1704, Sir George commanded the ships of war which conveyed King Charles III. of Spain to Lisbon. In July he attacked Gibraltar, when, by the bravery of the English seamen, the place was taken on the 24th, though the town was extremely strong, well furnished with ammunition, and had a hundred guns mounted, all facing the sea and the narrow passes to the land; an action which was conceived and executed in less than a week, though it has since endured sieges of many months' continuance, and more than once baffled the united forces of France and Spain. This brave officer being at last obliged, by the prevalence of party spirit, to quit the service of his country, retired to his seat in Kent, where he spent the remainder of his days as a private gentleman. He was thrice married; and by his second lady, Mrs Luttrel, left one son.

He died on the 24th of January 1708, in his fifty-eighth year.

ROONAY, a town of Bengal, in the district of Birbhoom, which formerly possessed a small fort that commanded the high road. Long. 87. 0. E. Lat 24. 26. N.

ROOPNAGUR, a town of Hindustan, in the province of Ajmeer, belonging to the rajah of Jyenagur. Long. 75. 52. E. Lat. 26. 39. N.

ROOPOOR, a town of Hindustan, in the province of Delhi, belonging to the Sikhs, and situated on the south-east bank of the river Sutlege. Long. 75. 50. E. Lat. 31. 7. N.

ROOT. See ALGEBRA, ARITHMETIC, and EQUATIONS.

ROPE, a general name for all kinds of cordage, but more correctly applied to such as is above one inch in circumference, the smaller sorts being distinguished by the names of twines, cords, and lines.

The art of twisting into lines and ropes various materials, such as thongs of animal hide, the hairs of animals, tough grasses, and vegetable fibres, is of remote antiquity, and has existed even among the rudest people.

The tarabita or rope-bridge of the Peruvians, and the lasso of the Chilian hunter, are formed by twisting together thongs of ox's hide; and in our own country at the present day ropes for particular purposes are made of horse's hair. The coir-ropes of Ceylon and the Maldive islands are made from the fibrous husk of the cocoa-nut; the Manilla rope from the fibres of a species of the wild banana, the *Musa textilis;* and the *Sunn* ropes from those of the *Crotolaria juncea.*

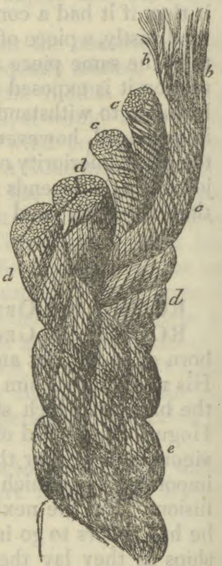
Many other vegetables have fibres of great tenacity, and fitted for the purposes of the rope-maker; but preference is given to those of the *Cannabis sativa,* or cultivated hemp, and the *Linum usitatissimum,* or flax, the fibres of both of which possess in a remarkable degree the essential qualities of flexibility and tenacity. Some idea of the importance of the manufacture under consideration may be obtained from the fact that, in the year ending January 1839, the value of the hemp alone imported into Great Britain and Ireland was L.617,597, and the value of the cordage exported was L.94,639.

The fibres of the hemp are first twisted together to form a thread or yarn. Many yarns are then combined by twisting, and form a strand; three strands are in like manner combined, and form what is properly a rope, and technically termed a shroud-laid rope or hawser-laid rope; and three of these ropes may be again combined, forming what is termed a cable-laid rope. The fibres should be so arranged that each in the finished rope shall offer the greatest resistance to its being torn asunder in the direction of its length.

If we take a bundle of fibres, equal in length and strength, and fasten it at the ends, each fibre will, upon a strain being applied to the bundle, bear its proper share of the stress; and the strength of the bundle will evidently be measured by adding together the strength of the separate fibres. But if we twist this bundle so as to form a thread, the strain will no longer be equally distributed among the fibres; for, by the torsion, the external fibres of the bundle will be wound round those that lie nearest to the centre, and, in proportion to their distance from the heart of the bundle, and the amount of twist given, will form spirals more or less inclined from the axis of the thread. The external fibres will in consequence be longer than the internal ones, and the greatest share of the strain will be borne by the latter. Further, by the operation of twisting, the fibres in a thread are strained, and, on account of their position, the external ones the most. It is of importance to consider the proper length of the primary fibres, and the degree of torsion that ought to be given in forming them into a thread.

All threads require the fibres to be so fine, and of such a length, that the quantity of fibres used, and the number of turns each has round its axis, shall be so great as to produce the necessary compression amongst them, to prevent them from sliding upon each other. If the thread be small, the fibres must be fine, and may be short; and if the thread be large, then must the fibres be long. If the fibres be long in proportion to the size of thread to be made from them, less twisting will obviously be necessary to keep them from sliding; and the finer and softer the fibres are, the more may the twist be diminished; for soft fibres enter into closer combination with each other than those that are hard. Long fibres requiring thus less twist than short ones, it has been a standing rule with all theoretical writers, that fibres should always be spun into the thread endlong, and never by their bight or double. Now, in the practice of hand-spinning, the fibres are always spun into the thread by their bights, and never by their ends.

Fig. 1.



It is certainly an advantage in threads which are to be used merely as such, to secure as great a length of fibre as possible, as any strain tends directly to pull the fibres asunder; and they are retained in their position merely by the compression among the co-fibres, produced by twisting. But many threads are combined in forming strands; new forces are brought into action, and so at every further combination. This will be better explained by the following diagram. Let *aa* be the primary fibres, formed into threads *b;* in each thread the fibres are retained in their position by the compression produced by twisting. Let *bb* be threads twisted together to form a strand. Here the threads mutually compress each other, and the primary fibres of each thread are compressed by the surrounding threads. Let *cc* be strands twisted to form a hawser-laid rope. In this the compression on the primary fibres is again increased, and so in the next combination, where the three hawser-laid ropes are twisted into the cable-rope *d.*

We may from this deduce, that it is not the length so much as the intrinsic strength of the fibre which fits it for the purpose of the rope-maker; and practice perfectly fixes this position, the ropes made from the short waste fibre of the hemp called tow being by no means so weak when compared with those made from the hemp itself, as theory would lead us to suppose, seeing that these fibres are the shortest and weakest of the material. It may therefore be laid down as a rule, that in the making of ropes it is of greater consequence that the fibres should be strong, soft, and finely hackled, than that they should be of great length.

Let us consider a little more how the twist of the thread is affected by its future combination. The fibres are first twisted in a certain direction to form threads. A collection of these threads is then twisted together to form a strand; and this last twist being in a direction contrary to that of the threads, untwists them to a certain extent.

Had the twist in the first instance been no more than would just have kept the fibres from sliding upon each other, it would now be inadequate to produce that effect. Hence one would think it necessary to provide means to put more twist into the threads as they were being formed into strands, or to put as much more twist into the threads while spinning, as the twisting of the strands abstracts from them; but when these strands are combined to form a hawser-laid rope, the direction of the twist is again the same as that of the threads, and restores to them a certain portion of what they had lost. If, however, three of these hawser-laid ropes are formed into a cable-laid rope, the threads are again to a certain extent untwisted. The untwisting suffered by the thread in forming the strands is much greater than the subsequent retwisting in forming the rope; and if the thread had been at the first too little twisted, or too soft, as it is termed, it would never make a serviceable rope; and for such ropes as require to be impervious to water, it would be totally unsuitable.

It is, then, on the proper angle of twist in the *combined* threads, and not in the threads when *separate*, that the efficiency of the rope depends; and this can be determined by experiment alone.

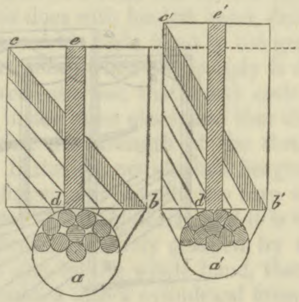
When many threads or yarns are combined to form strands, the effects produced on the latter by strains are analogous to those produced on the fibres when formed into threads, and, from the greater size of the component parts, are more apparent.

In the ordinary method of procedure the threads are all stretched to the same length, and then twisted together in a direction contrary to their individual twist. This, by winding the external yarns round those beneath them, shortens the whole mass, and puckers up the yarns nearest the centre, and thus the greatest share of any strain is thrown on the external yarns. It has therefore been considered of primary importance in all inventions intended to improve the making of ropes, to equalize the strain on the yarns in the strands.

Belfour attempted to effect this by shortening the internal yarns in the degree necessary to prevent their puckering up. Now, although the fibres of hemp are not in themselves very extensible, yet the rope formed from them is; and when such an extension takes place in a rope formed by Belfour's method, the strain is thrown entirely upon the internal yarns, which, if the strain be great enough, will break from the centre outwards.

The manner in which the external yarns of a strand lengthen, will be seen at once by fig. 2. Here *a* is a section of a newly formed strand; *a'* a section of the same strand after having been used; while *b'c'* is a part of the surface of the first, on the stretch out; and *b'c'* a part of the surface of the other. By the straining produced by use, the yarns in *a* are brought into closer contact, and the diameter of the strand is reduced. If in the strand *a*, *bc* represents the angle at which any external yarn is supposed to lie, this, by the reduction of the diameter, will in *a'* be changed to *b'c'*; and if in *a*, *de* represents a heart-yarn, this yarn in *a'* must stretch to *e'*, or break, which, as it is very little extensible, it is likely to do. It is of importance to observe, that the breaking of the heart-yarns of a strand in this manner is attended with much greater danger than the breaking of the external yarns, as the injury not only remains concealed, but water can easily penetrate to the core of the strand, which in consequence speedily decays.

Fig. 2.



It would appear, then, that a certain degree of puckering in the internal yarns of a strand is necessary to compensate for the extension that the superficial yarns undergo by use; and where ropes are made by machinery, it would be perfectly possible to arrange it so that, from the central yarn outwards, every one could be wrought into the strand in due length to allow for the stretching.

The further operations are the forming the strands into hawser-laid ropes, and these again into cable-laid ropes. The many uses to which ropes are applied preclude the possibility of applying specific rules to their manufacture. Some require flexibility, others impenetrability to water; strength may in some be of primary importance, or it may be secondary to other qualities which better adapt the rope for its peculiar purpose. The goodness of the rope depends upon the previous operations; but it must be a standing rule in all the processes, never to make use of so much twist as will impair the strength of the fibre.

To prevent the decay of such ropes as are exposed to continual changes from wet to dry, the yarns forming them are soaked in hot tar previously to their being worked up. It would be well if some other substance than tar could be found suited for this purpose, as it unfortunately happens that ropes lose much of their strength in the operation of tarring; and after having been kept for some time, the loss of strength is progressively increased, and this to a greater extent in hot than in cold climates. M. Duhamel made several experiments on this subject in 1741–1746, and from the results obtained he concludes,

1st, That untarred cordage in constant use is one third more durable than the same cordage when tarred;

2dly, That untarred cordage retains its strength for a longer time when kept in store;

3dly, That untarred cordage resists the ordinary influence of the weather one fourth longer than when it is tarred.

Some experiments were made in 1803 by Mr Chapman, civil engineer, to determine the effects of a new process of washing the tar to free it from the soluble substances contained in it, and for which process he had obtained a patent. Yet although the result of these experiments proved beyond a doubt the superiority of Mr Chapman's method, it is singular that it has never come into use. The same gentleman made some other experiments in 1806–1807, confirmatory of those of M. Duhamel. The result of one series is given in the table below.

Date of Experiment.		Girth in Inches.	Breaking Weight.	Comparative Strength.	Cwts. on each Inch of Square of Girth.
1806, Oct 2.	White rope.	2·75	75 cwt.	100	9·9 cwt.
—— Oct. 24.	Tarred rope.	2·8	55	73·3	7
1807, May 8.	Same rope...	2·8	41·4	55·2	5·3

We shall now offer a few of the rules which have been given by different authors for computing the strength of ropes.

Mr Tredgold says, "that in a hawser-rope, it may be proved that the strength of the straight fibres of hemp is to the strength of the rope as the radius is to the mean between the square and the cube of the cosine of the angle of twist, when the fibres are all equally extended, and the angle of twist measured at the greatest stretch the rope will endure without fracture. The cosine of the angle under these circumstances is in general about 0·87, and therefore the strength is about 0·708 times the strength of the hemp, or very little exceeding two thirds of its strength; but in most cases the loss of strength will be greater than one third, because the stretching of the different parts is unequal. And in a cable-laid rope, that the strength of the hemp is to that of the cable as the radius is to the mean of the third or fourth power of the cosine of the angle of twist under the same circumstances as before; or, that its strength is to that of the ropes which form it simply as the cosine of the angle of twist. This, in usual cases, will be nearly as eighty-seven to a hundred, that is, there are thirteen parts in every hundred of the strength lost in forming cable-laid ropes."

The following rule is given by Dr Robison for finding the strength of ropes: Multiply the circumference of the rope in inches by itself, and the fifth part of the product will be the number of tons which the rope will carry. Thus, in the experiment of Mr Chapman, the weakest tarred rope

Rope-making.

broke with two tons, and by our rule we find that it ought to carry with safety one ton eleven hundredweight.

The following rule may also be of use. To find the weight in pounds of a foot in length of any hempen rope, multiply the square of the circumference in inches by 0·045 for shroud-laid ropes, and by 0·027 for cables. (B. S.)

Rope-making is the art of combining fibrous materials, by twisting in such a manner as to form a continuous flexible cord.

We have before stated, that the fibres used for this purpose are those of flax and hemp; the former for small lines and cords only, and the latter for all kinds of cords, from the smallest to the largest. The preparation and manufacture of hemp and flax into such articles as either are adapted for, being the same in both, we mean, in the following sketch of these operations, to speak of hemp as the material made use of. This article we obtain from Riga and St Petersburg, whence it is shipped for our ports in great bundles, weighing, according to quality, from forty-five to sixty-five poods each, the pood being equal to thirty-six pounds avoirdupois. On the arrival of the vessels, these great bundles are cut up, and the hemp is thrown from the hold in small bundles, bound at one end, and weighing each about twelve pounds. These small bundles are termed heads; and in this condition the rope-manufacturer gets his raw material.

The fibres of hemp, of a good quality, should be long, fine, and thin; smooth and glossy on the surface; of a yellowish-green colour; and free from spills or small pieces of the boon or woody fibre of the hemp plant, which remain after the operation of breaking; and they should, above all, possess the essential qualities of strength and toughness.

Hemp loses many of its good qualities by lying long in warehouses; and when shipped in a damp state it loses its glossy appearance, becomes what is termed rusted, and is then much weaker, and hard and disagreeable to work.

The operations of the rope-maker are carried on in the following order, viz.

1st, Hackling the hemp.

2dly, Spinning or twisting the fibres into threads or yarns.

3dly, Tarring the yarns.

4thly, Making the yarn into strands.

5thly, Laying or forming the strands into ropes, called hawser-laid ropes.

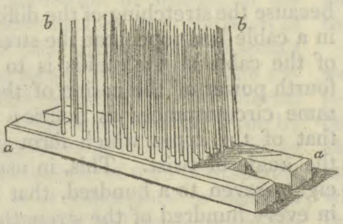
6thly, Laying or forming hawser-laid ropes into cable-laid ropes.

1st, Hackling.—To prepare the fibres for the use of the spinner, they are drawn over pronged instruments called hackles, which clear from them the refuse, and split them into different degrees of fineness, to suit the size of thread into which they are to be spun.

Fig. 1 is a representation of a hackle of the largest kind, called a cag. Here *aa* is a strong board; and *bb* steel prongs, polished and tapered, and made very sharp at the point.

The prongs of the next size of hackle are smaller and closer set, and so on, diminishing to the finest size, which reduces the fibres to the last degree of tenuity.

Fig. 1.



The operation of hackling is performed in the following manner. The operator stands at a convenient distance in front of the hackles, which are fixed on a steady bench at a proper height. He then takes a bundle of hemp, and divides it into such portions as he can conveniently grasp. One of these he holds firmly by one end, and draws it over the hackle, beginning with the end of the bunch farthest from his hand, and by repeated operations disentangles and splits the fibres nearly to where he grasps the bunch. He then takes hold of the finished end, and operates on the part which he before had grasped. To facilitate these operations, he from time to time oils the hemp with a little whale-oil. When the hemp is combed out and split as perfectly as the first size of hackle enables the workman to do, he carries it, if it be necessary for the purpose intended, to the next in degree, and so on to the last. The short fibres which are pulled out of the bunch by the hackle, and remain sticking to it, are collected from time to time by the workman, as they impede his progress, and are laid aside. They are afterwards drawn over the hackle to lay the fibres straight, and are, under the name of tow, used in making inferior ropes.

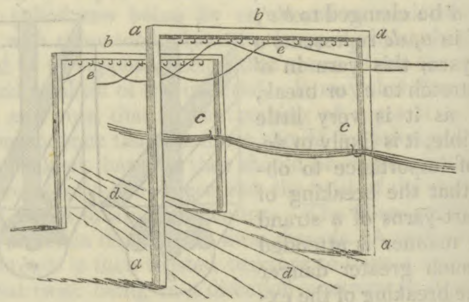
As the workman finishes his handfuls of hemp, he lays them aside in bundles for the spinner.

The operation of hackling would seem to require little skill on the part of the workman; but this is by no means the case, as bad workmanship would convert the greater part of the hemp into tow. Hackling is performed in a house, which ought, for convenience, to be near to where the threads are spun, that the spinners be not put to unnecessary expense of time in getting their stuff.

2dly, Spinning.—The place where the operation of spinning is carried on, is one division of a walk or alley termed the rope-walk, and is generally enclosed by walls, and roofed over; and in some places where ropes and twine are made, the building is in two stories, the rope-yarns being spun below, and the twine in the loft above.

The walk for rope-yarns is, according to circumstances, from 600 to 1200 feet long, and the width is regulated by the extent of the business to be carried on. One end of the walk is termed the head or fore-end, and the other the foot or back-end; at both ends the machines for communicating twist to the yarns are erected; and along both sides of the walk, at equal distances, and opposite to each other, are erected posts. Between every pair of posts a rail stretches across the walk, at the height of eight feet above the ground; and along the under side of the rail, hooks are fixed, on which the yarns are hung as they are spun; and to one of the upright posts of each pair a large hook is fastened, on which the yarns are hung when collected together. Fig. 2 shows this arrangement; *aaaa* being the upright posts, *bb* the rails stretching across the spinning walk, *ee* the hooks for the yarns, and *cc* the large hooks on which the collected mass of yarns is hung. At the head of the walk a stout post is fixed in the ground, and to it the yarns are fastened as they are finished. At the foot of the walk a similar post is fixed for the same purpose. These posts must be at that side of the walk on which the large hooks are fixed.

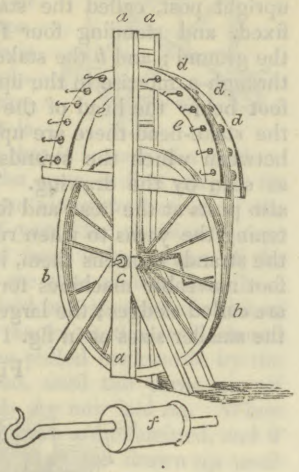
Fig. 2.



The walks on which small threads for twines and small cords are spun, have, in place of these rails and hooks, rails about three feet long, let loosely into mortises sunk in the top of upright posts, about three and a half feet above the ground; and along the top of the rail upright pins are fixed, to keep the threads separate.

The spinning machines for rope-yarns consist of two upright posts, *aaa*, fig. 3, between which the wheel *bb* is hung on its axis *c*. A belt from this wheel passes over and gives motion to a number of small pulleys, called whirls, *ddd*, inserted in a circular arc *ee*, called the head, fixed to the top of the posts. The axis of each of these pulleys is prolonged in front of the head, and bent into a hook, as shown more distinctly at *f*; and on this hook the fibres of hemp are hung to be twisted.

Fig. 3.



The spinning-wheel for the smaller sorts of threads differs from this chiefly in being smaller, and having the parts slightly modified to suit the diminution of size.

The operation of spinning is conducted as follows. The spinner takes a bundle of hemp of sufficient size to make one or more threads the whole length of the walk; he puts this bundle round his waist, the bight or double being in front, and the ends passing each other at his back; and he secures it in this position by buckling a strap round it, or by fastening it with his apron. He then draws out from the face of his bundle as many fibres as he thinks will make the size of yarn required; the bight of these fibres he hangs on one of the whirl-hooks, and the wheel being now turned by an assistant, it throws twist or turn into the fibres. The spinner having laid a piece of thick woollen cloth in the hollow of his right hand, with the end hanging over his fore-finger, grasps with it the fibres he had drawn out, pressing them firmly with his thumb and forefinger, the interposed cloth preserving his fingers from being cut by the fibres as they pass. He now walks backward down the walk, that is, from the head to the foot, the wheel-man all the while turning the wheel just so fast as to keep the turn or twist up to the spinner, of which he is admonished by signs made by the left hand of the latter, or, in complete establishments, by a bell, the cord of which traverses the walk. The aim of the spinner is to regulate the supply of fibres from his bundle in such a manner as to render the thread equal in size throughout. This he does with his left hand, drawing back the fibres as they enter his right hand in too great number, and pulling forward more when the supply is deficient in quantity. He takes care, too, that many ends of fibres do not come together in the same place, and that they so arrange themselves as that the strength of the thread shall be equal throughout. If the spinner slacken his grasp of the fibres with his fore-finger and thumb, the turn will pass his hand, and the thread will be spoiled; and it is necessary not only that the thread be firmly grasped by the thumb and fore-finger, but also by the whole hand, that it may be compressed and moulded into a cylindrical form.

We have hitherto described the operation as performed by one spinner; but as many spinners may work together as there are whirls in the head. Suppose, then, that all the spinners have set on, as the fastening of their threads to the whirls is termed. They proceed together down the walk, and when they are a few paces below the first rail, *b*, fig. 2, every man throws his thread on one of the hooks, and so at each rail, until they arrive at the foot. They then join the ends of every pair of yarns, and hang them over the post already mentioned; and for the convenience of afterwards separating them, the pairs are kept apart in the following manner. A piece of twine is tied by its middle to the first pair, a little in advance of the post; the second pair is then put over the post, and the string is tied over them; and in like manner every pair is tied in. This is called nettling. The spinners now set on at the foot or back-end wheel, and spin up the walk. The fore-end wheel-man having unhooked the yarns from the whirls of his wheel, and hung them over the post, and tied them in pairs as at the back-end, proceeds down the walk, collecting the yarns from the hooks of the rails, and laying them in a heap in the large hooks *c*, *c*, fig. 2. When the spinners again spin down the walk, these same operations are performed by the back-end wheel-man. When the collected yarns number about 400, they are coiled up in a haul, and are ready either for tarring, or laying into white ropes. Previous to the haul being taken up for tarring, there is a slight turn put into it to keep it from getting entangled in the tar-kettle. In the government rope-works, by the regulations of 1802, the spinners had to produce, from a bundle of hemp weighing 64 lbs., 18 threads of 170 fathoms each; 400 of such threads constituted a haul, and weighed 12 cwt. 2 qrs, and when tarred 15 cwt.

3*dly*, *Tarring*.—The next operation is that of tarring. This is variously performed. Here we shall describe the simplest method of doing it.

The apparatus used in tarring consists of a copper bedded in brickwork with a proper furnace below, and flues around it. The copper is termed the tar-kettle, and at one side of it is erected a strong frame, in which a capstan works.

Fig. 4 shows this arrangement. Here *a* is the kettle; *bb* the frame; *cc* the capstan, which may be turned either by manual labour, or horse or other power; *dd* a truck, on which the haul is being coiled away as it comes from the capstan; and *ee* small rollers by which the haul is supported. In the upright nearest the boiler is fixed the nipper for squeezing the superfluous tar out of the haul. The nipper is drawn to a larger size in fig. 5. Here *aa* is a copper-plate with a hole in it about two and a half inches diameter; above it another plate *bb* slides, and out of its lower edge a semicircular piece is cut, corresponding to the hole in the lower plate, so that by sliding this plate down, the aperture is diminished. A lever *dd* of the second order is fixed at one end to the chain *c*, and presses on a stud fixed on the upper plate, so that by moving the weight on the lever the yarn may be pressed to the degree necessary as it passes through the aperture; and as the tar oozes out of the yarn, it is received and carried back to the kettle by the spout *f*, fig. 4.

Fig. 4.

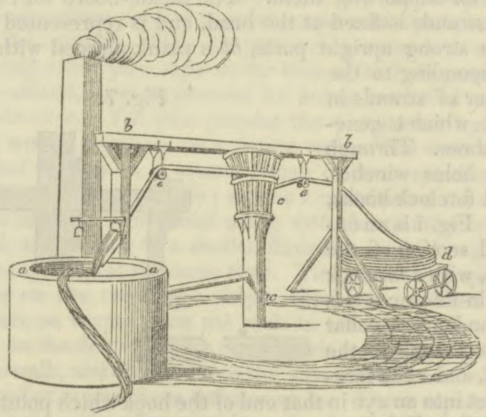
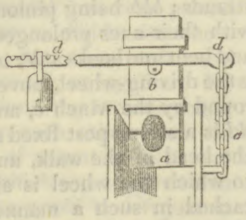


Fig. 5.

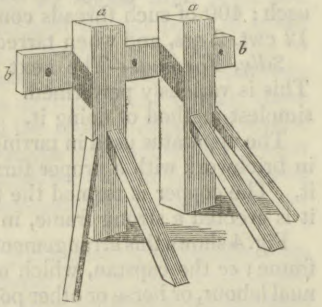


The tar having been put into the kettle and heated to the proper degree, which is about the temperature of boiling water, and is known to the workman, in the absence of more correct means, by a scum closing over its surface, the

Rope-making.

superintendent begins to pass through the haul. A rope attached to the capstan is passed through the nippers, and attached to the end of the haul. The haul is then coiled gradually into the kettle, and the capstan is moved round. The haul is thus drawn slowly through the tar, and the superfluous tar squeezed out of it as it passes through the nippers, the superintendent regulating the weight on the lever, so as to produce the required pressure; and the end of the haul, as it comes from the capstan, is coiled away, or reeled upon large reels. In this operation the heat of the tar is the most important point to be attended to. If it be too hot, the yarn will be charred; and if too cold, it will be black, whereas yarn intended to be made into ropes should be of a bright-brown colour. The proper heat is indicated, as was before stated, by a scum closing over the surface of the tar, which takes place at about 212° Fahrenheit. If this scum do not rise, the tar is too cold; and if there be an appearance of ebullition, the tar is too hot.

Fig. 6.



4*thly, Forming Strands.*—The yarn is now ready for the next operation, which is the making of the strands. This comes under the head of laying. The place where this and the subsequent operations are carried on is termed the laying-walk; it is generally part of the alley of which the spinning-walk forms a portion, and it may be of such a width as to allow of many ropes being made at one time. The fixtures of this walk consist of tackle-boards and wheels for twisting strands, and stakes and stake-heads for supporting them. The tackle-board for twisting large strands is fixed at the head, and is represented in fig. 6; *aa* strong upright posts, *bb* a plank pierced with holes corresponding to the number of strands in a rope, which is generally three. Through these holes winches, called forelock hooks, work. Fig. 7 is an enlarged section of the board, with a forelock hook in its place; *a* is the handle, *b* a collar working against the board, and *c* the forelock let into an eye in that end of the hook which points down the walk. Fig. 8 is a representation of one of the wheels for twisting smaller strands; *bbb* being pinions with their axes prolonged, and bent into hooks at *b'*; *aa* is the driving-wheel, moved round by the winch *c*, and *dd* is a strong post fixed at the head of the walk, and to which the wheel is attached in such a manner that it can be easily disengaged, and a larger or smaller wheel applied, as the rope may require. Corresponding to every twisting apparatus, at the head there is a row of bearers or stake-heads for supporting the strands when twisting, and extending from the top to the bottom of the walk. These are represented in fig. 9, where *aa* is an upright post, called the stake, firmly fixed, and standing four feet above the ground; and *b* the stake-head, let through a mortise in the upright at a foot below the head of the post. In the stake-head there are upright pins, between which the strands are laid, as seen by the drawing. There are also posts at the head and foot for fastening the yarns to when run out for laying. As twisting the strands shortens them, it is necessary to provide at the foot moveable machines for communicating twist. These are called sledges; the largest are formed as in fig. 10, and the smaller sizes as in fig. 11.

Fig. 7.

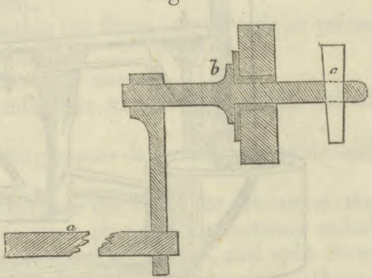


Fig. 8.

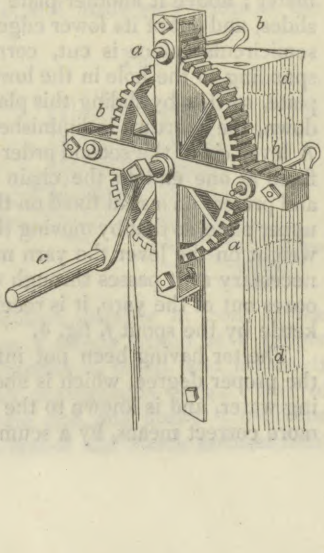


Fig. 9.

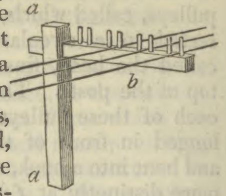
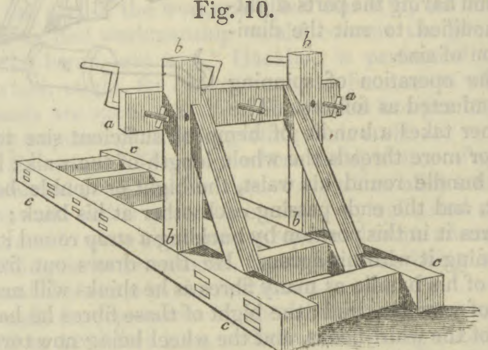
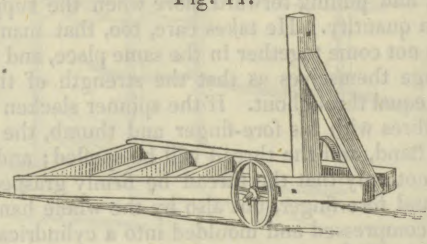


Fig. 10.



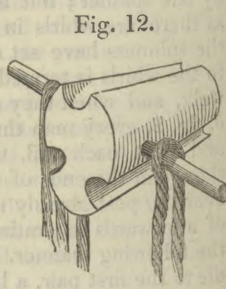
In fig. 10, *aa* corresponds to the tackle-board, and is called a breast-board; it is bolted to the uprights *bb*, which again are firmly fixed and stayed to the frame *cccc*. The part of the frame behind the uprights is called the tail of the sledge, and on it are laid weights to afford pressure enough to keep the strands stretched. These weights consist of old tar-barrels filled with clay, and are called press-barrels. In laying large ropes, sufficient pressure cannot be obtained by the barrels; and in that case a double block and tackle is used, one end being fastened to a strong bolt behind the sledge, and the other to the tail of the sledge, and with the tackle-fall a turn or two is taken round a post. The smaller sledges (fig. 11) have only one upright post, to which some one of the wheels, similar to fig. 8, is fixed; and they have likewise two trucks to run on.

Fig. 11.



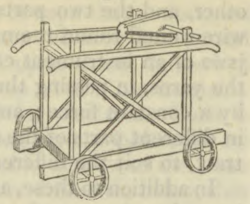
Of the smaller implements used, the first are the tops (fig. 12) for laying the strands into a rope. These consist of conical blocks of wood, of different sizes, having three equidistant grooves along their surface, and pins through them laterally, serving for handles. A piece of soft rope is attached to each handle of the top by its bight, and the ends are used to wrap round the rope in the process of laying. These ropes are called tails. When the top is very large, it requires to be supported on a sledge, as shown in fig. 13; and in that

Fig. 12.



case the tails are attached to the sledge. Woolders are stout pins with a rope fastened to one end, and are used to assist the action of the machine in twisting the rope. In addition to the above, there is used in making white ropes a rubber, formed of steel rings interwoven like linked mail; and it is probably from the resemblance that it is termed a mail.

Fig. 13.



In the operation of laying, the yarn is first warped for the strands. The haul is run out along the bearers of the laying walk, and the number of yarns for the size of rope about to be made is separated from it by means of the nettling. The separated yarns are then divided into three equal portions. Each portion is laid in a separate division of the bearers, and hung upon its hooks at the tackle-board and sledge. The sledge is then pulled backwards by the tackle-purchase before described, until the yarns are all stretched tight, and press-barrels are now laid on. When things are in this position the threads are examined, and if any be longer than the others, they are drawn up until every yarn is equally tight. The hooks at each end are now heaved round *in time*, and in a direction contrary to the spinning twist; and each collection of yarns is twisted round its axis, and becomes a strand. The twisting of the strands shortens them, and draws the sledge up the walk.

When the torsion in all the strands is sufficient, or when, in technical language, the strands are full hard, the twisting is stopped. The sledge is then drawn up the walk a small piece to slacken the strands and allow the outer ones to be taken off their hooks and hung on the middle hook. It is again drawn back by the purchase, and the top (fig. 12) is inserted among the strands which will occupy its grooves.

The top is now forced back as near the hook of the sledge as possible, and the workmen at the head again turn their hooks in the same direction as before. As soon as the workmen at the sledge perceive it moving forward, they remove some of the pressure, and begin to turn their hook in a direction contrary to its former motion. The top is by this forced forward, and the three strands closing behind it form the rope. When the top gets far enough from the sledge to admit of their application, the tails are wrapped round the rope, and by their friction they enable the workmen to keep the top from moving forward by jerks, and they also make the rope close better. The care of the topman is to regulate the speed of his top in relation to the twist at both ends, the mean of doing which is simple. He makes a mark across the strands at every bearer previous to putting in the top. If, when the top reaches a bearer, he find the mark above the bearer, then the turning at the fore-end is too fast for the motion of the top; and if below the bearer, then the turning is too slow.

In the case of a very thick rope, the power of the men applied to the hook of the sledge is insufficient of itself to pass the turn up the rope. To aid them, other workmen apply the woolders at necessary intervals between the sledge and the top. The strap of the woolder is wrapped round the rope, and the pin used as a lever to heave round the twist; the workmen at the woolders keeping time in their heaving with those at the hook of the sledge. And in the case of a heavy rope, the top sledge (fig. 13) is made use of to support the top.

The mail is used for white ropes only. When the strands are hardened, and before the top is put in, workmen rub the strands with the mail to smooth down any rough fibres, and give a good surface to the rope.

We have now seen that in the processes described, every step is dependent on the skill of the workmen. In supplying fibres of hemp in due quantity to form the thread, in giving the proper degree of twist to the thread, in giving the strand the degree of hardness required, and in the proper speed of the laying top, the workman has no certain guide; and it is surprising that, although machinery for the improvement of almost every other manufacture had been introduced, no attempt appears to have been made to apply it to the art under consideration, until about 1783, when a machine to supersede the necessity of a rope-ground was invented by a Mr Sylvester; and this invention was followed up by many others. Such of these as have come under our notice are briefly described in the following account of them, arranged according to their dates.

1783. About this time Mr Sylvester's machinery was invented. In it the threads were spun by bobbins and spindles; the three several quantities required for the strands were wound on three separate reels, which turned individually round their axes, and also round a common centre, by which motions the rope was formed; and by the machinery it was further wound up as it was made. This invention was not patented, and was never carried into effect.

1784. In this year a patent was taken out by a Mr Seymour for improvements in rope-making; but the invention consisted in the substitution of animal for human power to drive the ordinary machinery of the rope-work.

1792. In this year the Rev. Edward Cartwright took out a patent for a rope-machine, which he called a cordelier. A part of this machine was adopted by Mr Huddart in a patent taken out by him in 1805.

In the machines of Sylvester and Cartwright the only advantage proposed was the saving of labour. There was no attempt made to improve upon the old defective principles of rope-making; the merit of the first attempt to do this is due to the next inventor.

1793, March 16. John Daniel Belfour, of Elsineur, obtained a patent for machinery "to improve the manufacture of ropes and cordage, by making every yarn employed in the composition thereof bear its proper and equal proportion of the stress." This the patentee proposed to effect by keeping every yarn tight at the time of its being twisted into the strand, so as to prevent its being puckered up in the inside of it. For this purpose the yarns were by machinery wound regularly on separate reels. The reels were suspended in tiers in a square frame on iron spindles on which they could turn freely; and by a contrivance the reels could be made to turn round along with the spindles when required, and motion in a similar direction could be given to all the spindles at the same time. The yarns were spread regularly on the reels by a simple apparatus. When the yarns were so wound upon the reels in the frame, the ends of those on the first or lowest tier of reels were carried down the rope-walk, and dropped into the separators, one of which was placed at every fifteen fathoms or so. These separators consisted of a series of vertical bars, fixed to a frame at their lower end, the upper ends being left free; into the intervals between these bars the yarns were dropped, and the different tiers kept separate by horizontal iron rods passed through holes in the side bars, so as to divide the whole frame into a series of reticulations; and these rods were so contrived as to be withdrawn separately or together. By being passed through these reticulations, the threads would be suspended at equal distances from each other from the top to the bottom of the walk, and, if meant to form one strand, would be hung on the hook which was to give them motion; and on the reels in the frame would be left just so much yarn as the strand should take up in hardening. The strand would then be ready for twisting; and to do this in such a manner as to make every yarn occupy its proper place, Mr Belfour employed an instrument called a top-minor. This was a block of wood formed somewhat like a sugar-loaf, and having inserted round its larger circumference a number of projecting pins. Into the recesses formed by these pins the yarns were inserted, and motion being given to the wheel, the top was moved slowly up the walk by the workman, the reels at the same time giving out the yarns as they were taken up by the twisting. When the workman arrived at the first separator, the iron rods were, by the contrivance already alluded to, at once withdrawn, and the yarns left free, and so the workman proceeded until he arrived at the reel-frame, when the turning or heaving at the hook was stopped, and the strand prevented from untwisting, by being seized in a kind of nipper formed of iron. The ends of the yarns were then unfastened from the reels, and the strand was completed. By increasing the size of the reel-frames and separators, and by using three top-minors fixed to a sledge or otherwise, three strands could at the same time have been formed. The strands formed by this machinery were then laid together into ropes in the ordinary manner.

1793. In April 12th of this year, Mr Richard Fothergill obtained a patent for rope-machinery, embracing the following objects: First, freeing the hemp from its native husk, and fitting it for the subsequent processes; secondly, dressing the hemp, and drawing it out into slivers fit for spinning; thirdly, spinning the hemp; and, fourthly, twisting or making it into ropes or cordage. All these operations required no rope-walk to carry them on. Engravings of the machinery will be found in the fourteenth volume of the second series of the Repertory of Arts.

1793. In April 25th, Mr Joseph Huddart took out a patent for certain improvements in the formation of ropes. His method of registering the strands, in order to acquire an additional degree of strength, by giving the length of the yarns which compose the strand a certain ratio, according to the angle and hardness or compression the rope is intended to be laid with, and thereby acquiring a more equal distribution of the strain upon the yarns than ropes made in the common way, consisted of the following principles: First, by keeping the yarns separate from each other, and drawing them from bobbins which revolve, to keep up the twist whilst the strand is forming; secondly, by passing through a register which divides them by circular shells of holes, the number in each shell being agreeable to the distance from the centre of the strand, and the angle the yarns make with a line parallel to it, and gives them a proper position to enter; thirdly, by a cylindrical tube, which compresses the strand, and maintains a cylindrical figure to its surface; fourthly, by a gauge to determine the angle which the yarns in the outside shell make with a line parallel to the centre of the strand when registering, and according to the angle made by the yarns in this shell, the length of all the yarns in the strand will be determined; lastly, by hardening up the strand, and thereby increasing the angle in the outside shell, which compensates for the stretching of the yarns and compression of the strand.

In this, as in Belfour's invention, the registering apparatus was moved up the rope-walk by the twisting of the strand; but the machine differs from Belfour's in the following particulars. First, in place of the bobbins or reels being fixed in an upright frame, they are placed in horizontal ranges, each range rising higher from the front towards the back part of the machine. Secondly, in place of the separator of Belfour, sets of horizontal rails, notched to receive the yarns, and hung in cleats fixed to upright posts, are placed at regular intervals down the walk, so as to keep the yarns separate the whole length of the strand. Thirdly, in place of Mr Belfour's *top-minor*, a plate pierced with concentric circles of holes is made use of, the circles being about two inches asunder; and behind this plate a smaller plate, pierced with a similar number of holes, is fixed, the holes in the latter plate being so close together as merely to keep the yarns clear of each other. Immediately behind this last plate is fixed a tube made of thin steel, of a spring temper, and in two parts longitudinally; the thin edges of the one part overlapping those of the other, and the two parts being compressed by a thong or wire wound round them several times, and fastened to the jaws of an instrument called a heaver. By means of this, the yarns, in passing through the tube, can be compressed by a constant force; and if the yarns be thicker or smaller in different parts of the strand, the tube will expand or contract, to suit the difference of size.

In addition to these, an instrument called a register-gauge is used to measure the angle of twist of the yarns in the strands, with the view to employ the same twist when the strands are formed into a rope. Some of the parts of the machinery above noticed, it will be seen, have been adopted by other inventors, and some of them are still in use.

1797, September 13. At this time Mr William Chapman of Newcastle obtained a first patent for laying, twisting, or making ropes or cordage, of any number of yarns or strands, or any number of threads tarred or untarred, from the size of a cable down to the smallest line formed of more than one thread. The machinery for this purpose was less complicated than those formerly mentioned, but was only capable of forming ropes on the common principle. In the month of January 1798 he obtained a patent for Scotland for further improvements in rope-machinery, and containing the substance of his former one and of another taken out for England on the 6th of March 1798. The inventions embrace the making of ropes either by stationary machines, or by moving machinery on a rope-walk. In the former, the operations of forming the yarns into strands, twisting the strands into a rope, and coiling away the rope, on reels or otherwise, go on at the same time. One of the arrangements of the machinery by which these different operations are carried into effect, is as follows. Three or more discs, according to the number of strands, are placed round a common centre, with their planes inclined to each other in such a manner that their produced axes would meet in a given point. These discs are by the inventor termed strand-tables, and each of them is fixed to a hollow shaft, capable of revolving round its axis; which shaft is called the strand-shaft or upper shaft. These shafts are on the sides of the discs which are inclined to each other. On the opposite sides of the discs yarn-reels are suspended on spindles, on which they can turn freely. The yarns from the reels are passed through the shafts, and by the turning of the discs or strand-tables they are twisted into strands. In a part of the shaft there is a transverse opening to admit of two blocks of hard wood or other matter being applied on each side to press the yarns, and retard their passage through the shafts, so that they may be twisted to the degree required. These blocks are called press-blocks or compressors, and are held together by springs or weights. Instead of blocks the patentee sometimes substitutes rollers moving round their axes, and holding the yarns by their friction. Besides these, the yarns pass through a perforated plate called a yarn-guide.

The strand-tables all move round in one direction, and the strands as they proceed from the shafts are concentrated into a point, over a fixed grooved block, corresponding to the top in the ordinary process. Behind this block the strands are received into a hollow axis, which turns round in a direction contrary to the twist of the strand-tables, and in which the strands are formed into a shroud-laid rope, by being twisted by the apparatus attached to the shaft. This consists of a pair of wheels or sheaves, moving easily on their axes, to admit the rope a free passage, and at the same time compel it to twist equally round with the shaft. These sheaves are grooved in such a manner as to prevent the rope from turning sideways, and are called twisting-sheaves. Instead of the sheaves moving freely on their axes, such a motion may be given to them as in every revolution of the rope-shaft, which makes one turn of the rope, the groove of the sheaves shall move such a space as is equivalent to the length of rope that is designed to be made by every turn. When the rope has passed through these sheaves, it is coiled upon a reel in such a manner as merely to require tying up; but if too unwieldy for reeling, it is coiled on a revolving platform. Such is an outline of the process of making shroud-laid ropes by Mr Chapman's machinery. For cable-laid ropes the same or similar machinery is used, the chief difference being, that in cable-laid ropes the twists are contrary, and the disparity of turns in the strands and rope not so great as in shroud-laid ropes; for which reasons, if the same machine be used, the means must be provided for making the shaft to assume contrary motions, and making them to move in different proportions.

"By the method previously described," says Mr Chapman, "for making a complete rope at one operation, I, during the act of making the strands, unite them into a rope by means of what I then call a rope-shaft, in which they are all concentred, and receive the twist which forms them into a rope; but I also occasionally omit the concentring of them, and the subsequent part of the operation, during the making of the strand or strands, and in place of twisting them into a rope, I only draw the strand forward as made, and coil it or them in any manner whatsoever, they in this instance having no rotative motion. The apparatus for drawing them forward is not fixed to the revolving shaft, containing the reel or reels and other necessary appendages, but may be permanent, and receive its motion in any proportion whatever to the revolutions or twists given to the strand by that shaft.

"The principles of making the strand in these two different ways are obviously portions of the process that would, as has been described, make the whole rope at one operation. And these two methods of making the strand, independently of making the complete rope, are reducible to the following principle: That in making a strand simply, one end need only to be twisted, and the other held from turning, but that both be permitted to pass forward, and progressively change place; and that the yarns be, if deemed necessary, so regulated as to come off these reels in such a manner as the part of the strand they come into may require.

"There is a third method of making a strand, compounded of the two preceding, which may be followed, viz. that of using two revolving shafts in place of one; the reels being placed on one of them, and the strand coiling upon the other. These two shafts ought to turn in contrary directions to each other."

The part of the invention in which a common rope-walk is made use of is thus described by the inventor: "At the head of the ropey, or in any other part, I fix upon pins so many reels as will contain all the yarns requisite for a strand, or the given number of strands determined to be made at one time, each reel containing one or more yarns; then in the instance of making three strands, I fix to three different hooks on the foreboard of a sledge, so many yarns, separately concentring to each other, as are requisite; the yarns being previously passed through the openings of these separate fixed tops or yarn-guides, one opposite to or correspondent with each hook. Before, or on the face, or on the face of each top, toward the sledge, there may or may not be fixed a cylinder, such as I have described, below the laying block at the head of the rope-shaft. The yarns are then to be prevented from passing too easily off their reel, either by a pressure on the reels themselves, or on the yarns in their passage to or upon their separate tops, or in any manner that will permit them to come off as wanted.

"The men are then to heave upon, or turn round, the hooks of the sledge in the usual way; and the only remaining difference consists in the sledge being drawn progressively backwards, as the strand is making, until the whole, or any determinate part, of the strand be made. The process of drawing back the sledge may be done in various ways; amongst others, by a rope to a capstan, moved either by a horse or men, according to the strength requisite." When the strands are thus twisted, the rope may be completed in the usual way. Such, then, is a brief outline of the general features of these important inventions of Mr Chapman; but his own specification, with illustrative drawings, will be found in the ninth volume of the first series of the Repertory of Arts.

1798. In this year also Mr Belfour obtained a patent for an improvement on his former machinery; and in 1799 Mr Belfour's machinery was adopted in the government-yards, and the sum of L.4000 was paid to the inventor for his superintendence of the erection of his machine, and the use of his patent.

1798. November 8th, Mr Chapman at this time patented an invention, which was so to regulate the motion of the sledge that for every revolution of the strand it should move backward through the exact length of axis assigned to it, and thus render the twist uniform. The sledge, in this case, travelled backwards on a railroad; and along the whole length of the walk, a rope, called a ground-rope, was laid. This rope was passed in the form of an S round two or more grooved wheels, which were pressed together so as to bind the rope, and having upon their axles toothed wheels connecting them with each other, and with the hooks for twisting the strands, which in this case were driven by one great crank. Thus, when the hooks were driven by the crank to twist the strands, the sledge was also moved backwards by the grooved wheels acting upon the rope; and by changing the connecting toothed wheels the backward motion could be given in any ratio to the twist of the hooks. Besides this, Mr Chapman connected the sledge by a rope to a horse capstan at the foot of the walk; and as the horse's power applied to the capstan could not draw the sledge faster backwards than the ground-rope permitted, the spare power was of course given in aid of the twisting of the strands by means of the wheels which connect that operation with the backward motion.

1798. November 17th, Mr John Curr of Sheffield took a patent for forming flat ropes for the use of mines, &c. "The said flat rope may be formed," says Mr Curr, "by connecting two or more small ropes sideways together, by sewing or stitching, lapping, or interlacing them with thread, or small rope made of hemp, flax, or other fit material, or with brass or iron wire, in such a manner as to prevent their separating from each other, and so as to cause them to exhibit, as nearly as possible, a flat form, or flat pliable rope.

1799. April 30th, Mr Belfour obtained another patent for a further improvement on his invention. This consisted, among other things, in winding a number of yarns, not exceeding four, upon each reel, and forming them, as before, into strands. He farther proposed to spin the hemp after having been tarred; and also to place a spinning-wheel at each end of the rope-walk, to enable the spinners to spin both up and down in the manner now practised. If we mistake not, this method of spinning up and down is mentioned by Duhamel as being in use in his time. However this be, it was, on Mr Belfour's recommendation, adopted in the government rope-works, and, according to the report of Mr Fenwick, the master rope-maker at Chatham, a saving was effected by it to the amount of a sixth part of a day's work to each man.

1799. July 26th, Mr William Chapman, in conjunction with Mr Edward Chapman, took a patent for many improvements in the art; the first of which was for machinery to spin the yarns in such a manner that the fibres of hemp, on entering the thread, were shortened in proportion to their proximity to the axis; and further, that by this machinery, women, children, and invalids could be employed as spinners.

Although the yarn thus produced was of superior strength to hand-spun yarn, yet, as it was attended with additional cost in the manufacture, the invention was laid aside.

The next part of the invention was in the application of locomotive power to the machinery of the rope-work. Part of this consisted in the application of an endless rope, reaching from end to end of the rope-walk, and moved with considerable speed, to any of the machines, whether stationary like the fore-end wheels, or changing position like the sledges. The application of the endless rope to the sledge was effected by passing a turn round suitable grooved wheels fixed to the sledge, and capable of giving motion to its machinery. By this machinery great advantages were gained, as each revolution of the strands and the rope, and the proper motion of the sledge, were predetermined and fixed by changes of wheels. For this purpose tables were made out to show what wheels were to be used for each kind of rope. Instead of two hundred men, the number usually employed in closing a twenty-one inch cable, fourteen only were required; and they, with the help of the steam-engine, which was only of eight horse power, were able to coil away the rope when made.

1799. In the same month Mr Mitchell obtained a patent for a "method of manufacturing cables, hawsers, or shroud-laid ropes, and other cordage, on scientific principles."

These principles consisted in combining by twisting the integral yarns of a strand, in numbers of two, three, or more, previous to their being formed into the strand, and thereby lessening the strain on the external yarns when ultimately formed into a rope. The strain on the external yarns would doubtless be by this method lessened, but the number of yarns exposed to external injury would, at the same time, be increased. The ropes formed on this principle were by the patentee termed selvagee cordage.

1799. August 20th, Mr Huddart took out a patent for an improvement on his apparatus of 1793. In this the registering apparatus, instead of being moved up the walk, was, like Mr Chapman's press-blocks, fixed to the tackle-board, and the machinery for twisting the strands was stationary, and also contained apparatus for winding the strands upon reels as they were formed.

1799. In the same month Mr Grimshaw obtained a patent for improvements in rope-machinery, which consisted, first, in dressing the hemp preparatory to spinning; secondly, in winding up the yarn; thirdly, in preparing the yarns for tarring; and, fourthly, in laying the ropes or cordage. The first step appears to be best entitled to notice. The hemp in this was conducted to rotatory hackles through conical fluted rollers, by which means the hemp was equally mixed.

1800. July 1st, Mr Huddart took another patent for further improvements in the manufacture of cordage. "A considerable expense," says the patentee, "is attached to having the tarred yarns wound upon bobbins; and also the tar, especially when the ropes are laid in cold weather, is not sufficiently incorporated amongst the yarns to render it compact for durability, whether registered or laid in the common way. In order to obviate these inconveniences, I have invented a method of registering the strands of ropes during the operation of tarring the yarns, which may be effected in the following manner. The white yarns must be wound separately on reels or bobbins, and placed upon a frame or otherwise, so that the yarns may be delivered from them with as small and equal a tension as possible, and to pass under rollers, or through holes, or between separating rods of wood or metal, to be guided into the tar, when sufficiently heated in the kettle, and thence to the register, separate from each other, to prevent entanglement, until they enter the tube, which must be placed at the end of the tar-kettle opposite to that where the bobbins of white yarns are placed. The registering tube now acts in a double capacity, viz. in forming the strand fair, as in ordinary cases, and in acting as a nipper to squeeze out the superfluous tar. The strands are now twisted as before, and the twisting forces out some more tar, which must be cleared off by making the strand pass through the common adjustable nipper plate."

1801. July 16th, Mr William Hoard obtained a patent for "a portable machine for manufacturing ropes and cordage of any length in a short space, particularly adapted for shipping." This machine consists of separate reels, one containing the full length and number of yarns for a strand, from which reel they are drawn out to such distance as the two reels can conveniently be placed asunder, and are attached to the other, which is then empty, one of the reels being in a sledge or moveable frame. The process then begins by twisting the intermediate length of strand, until the reels have approached to each other the usual proportional space, namely, one fifth. The length of strand thus made is then wound up on the second described reel, and so much is let off from the first reel as to admit of their being at their greatest distance asunder, which process is necessarily continued until the whole strand be made, and wound up on the second reel. Lastly, three strands thus made have their ends united to a fourth reel placed opposite to them at its greatest convenient distance. By these four reels, the process of making the rope is carried on similarly to that of making a strand, except in the use of a top to regulate the progress of the twist of the rope in its approach to the three strand reels.

In 1801, Mr Archibald Thompson of Plough Court, Lombard Street, took out a patent for "certain new or improved machinery, for the purpose of spinning rope yarn and sailcloth yarn, and for laying and making ropes and cordage." Mr Thompson's invention includes the whole process of spinning, tarring, and laying the cordage. Preparatory to spinning, he draws out the hemp into a long sliver, by different sets of chain hackles, moving with progressively greater speed; and in the end the sliver is spun by a spindle with its plyer and bobbin into a thread. The threads remain wound up on their bobbins until wanted to be made into a rope, tarred or untarred. The bobbins are then, according to the number of yarns wanted in a strand, placed so as to form two circles of the same diameter, round an open cylinder consisting of three hoops or rings, distant from each other the length of a bobbin, and placed near to one end of a long horizontal axis; and, if the rope be to be tarred, the yarns are led through a ring of a few inches diameter, near that end of the described open cylinder which has the spare length of axis projecting from it. The yarns are then diverged in different degrees, so as to form, when passed longitudinally through an open cylindrical frame of several feet in length, so many different concentric circles round the axis mentioned, as there are different shells or concentric coats of yarns in the strand; and from the further extremity of this last-mentioned cylindrical frame, the yarns are concentrated to one focus at the extremity of the axis, which is there concave, and has an opening through which the yarns pass to the machine which is to twist them into a strand, and draw them forward to be coiled up within itself. At the focal point described, there are nippers to express the tar from the yarns, which is put into them in the following manner, viz. the last-mentioned open cylinder, between the ring from which the yarns enter to it, and the perforation of the axis where they concentre and quit it, lies over a tar-kettle, and has a portion of its lower half immersed in the tar, just so far as to imbue either the whole or any portion of the yarns with tar, as may be deemed expedient. This cylinder must, of course, turn round with such a convenient degree of speed as not to let the yarns be drawn off the cylinder before it comes in their rotation to pass through the tar. When the full length of strand is made, the twist of which is principally given by the revolution of the frame, in which it is progressively wound up during the process of making, the yarns are cut off; and three of these strands, from so many stationary strand frames, each of which has performed the operation last described, revolving only round its own separate axis, are concentred together, and pass through the axis of one end of a rotatory frame, which twists them into a rope, and coils it up, progressively as made, upon a barrel within the frame.

1801. Mr Cutting of the United States invented a method of making lines and ropes. His machinery was of much the same kind as Sylvester's, Fothergill's, and others already described.

1802. January, a patent was granted to Mr Chapman for his invention of the application of certain substances to the preservation of cordage. This has already been noticed under the head Rope.

1802. March 9th, a patent was obtained by Messrs Mitchell and Son for further improvements in rope-making, in addition to their patent of 1799. The specification of this patent will be found in the second series of the Repertory of Arts (vol. viii. p. 241).

1804. Mr Huddart took out a patent for a machine for manufacturing hemp and flax into yarn. We have seen that in hand-spinning the fibres of hemp are spun into the yarn by their bight or double, but by this invention they were to be spun into the yarn by their end. The spinner, in this case, instead of walking backwards, remained stationary, with the machine containing the apparatus for twisting at a little distance from him. In front of the spinner a table or other support, containing a number of upright pins like those of the hackle, was fixed. This table was made broad enough to hold on it half the length of the article to be spun, while the other end was held by the spinner. The spinner commenced his work by drawing some fibres of the hemp, and making them fast to the hook of a whirl; the machine was then set in motion, and the spinner with his spinning cloth took hold of and compressed the yarn as it was formed. By this means, says Mr Huddart, in his description, the longest hemp or flax may be spun without having its fibres reduced in length; for the pins before mentioned occasion all the fibres to be drawn out to their full respective length, or nearly so, and also prevent irregular drawing of the fibres.

It may not be amiss to mention in this place, that in France a method of spinning fibres by the end instead of the bight had long existed. Instead of the spinner fastening his bundle of hemp round his waist, it was fastened to a distaff by being laid along it and tied at the upper end, and the distaff was fastened by its lower end to the waist, and lay on the left shoulder of the spinner; the lower end of the bundle of hemp thus hung loose, and the fibres were spun into the thread endlong.

M. Duhamel made certain experiments to ascertain what advantage this method had over the usual way of spinning by the bight, and the result did not warrant him in recommending its adoption where the men had been accustomed to the other mode.

1805. October 30th, Mr Huddard took another patent for improvements in the manufacture of large cables and cordage in general. This invention consisted of a machine for twisting into ropes the strands formed by the machinery formerly invented by him, and resembled in some parts the machine of Mr Cartwright, called the cordelier.

In Mr Huddard's machine the three strands were wound on their separate reels, which were hung in frames having a motion round their own axes, so as to give hardening to the strands; and also a motion round a common centre in an opposite direction, in order to combine the strands into a rope. On the end of the axis round which the reels were carried for the last-mentioned purpose, the top was fixed, having in it three holes for the strands, and behind the top the rope was passed round three whirls, in such a manner as to regulate its tension while twisting.

1805. November 16th, Mr Curr secured by patent an invention of a method of laying or putting together the strands which form a rope.

The invention consisted, first, in so proportioning the teeth of the wheel at the upper end of the walk which twists the strands, to the teeth of that of the lower end which closes the rope, that the workmen, by keeping time with each other in their heaving round the winches of their respective wheels, would give the proper amount of hardening twist to the strands and closing twist to the rope; and, second, in regulating the motion of the laying-top, by having attached to it the end of a line or wire which is wound on a reel fixed to one of the wheels of the sledge, and made to move with a certain velocity according to the size and intended hardness of the rope.

1806. August 9th, Mr Ralph Walker of Blackwall took out a patent for a new mode of making ropes and cordage, applicable to the making of ropes and cordage of any size.

The machinery for effecting these purposes is on the same principles as many of those already described; but the arrangement of the parts is different, and very ingenious. In place of the reels with their yarns being hung on the face of three revolving discs, as in Mr Chapman's machine, they are arranged on the surface of three cylindrical flyers, and the yarns are carried over rollers in the inside of the cylinders, and conveyed to their axes at one extremity, where they are compressed by passing through a hole. These cylinders, like the discs, revolve round their axes, and twist the yarns at that point of the axis where they pass through; and they also revolve round a common axis, which is the main shaft of the machine. When the strands leave the cylinders they are guided by pulleys to a point in the main shaft, where they are formed into a rope. The patentee also describes a manner of tarring the yarns previously to their being wound upon the reels. In this case the tar in the kettle is heated by steam, and the yarns are passed through the kettle under a large roller which keeps them immersed. Engravings of all the machinery may be found in the Repertory of Arts, 2d series, vol. xxvi.

1806. In this year Mr Curr took out a patent for proportioning the number of twists in the yarns to the length, moved by the spinners, so that they might elongate equally on being untwisted in forming the strand. To effect this purpose he had a cord wound upon a barrel attached to the spinning-wheel, and receiving a determinate motion from it; the end of this cord, when the spinners were going to set off, was attached to any one of them, whose speed could thus be regulated by the unwinding of the cord, and the other spinners had to keep pace with him.

1807. October 30th, Messrs Chapman obtained a patent for a method or methods of making a belt or flat band of rope for mining and other purposes. This invention consisted in the combination of two or any greater number of the strands of shroud laid-ropes placed side by side so as to form any determinate breadth of belt or band; and in a locomotive machine for stitching or riveting them together when stretched at full length.

1808. June 25th, Mr S. Gadd took a patent for a method of forming ropes, which consisted in twisting the threads together in pairs, and forming the strands of these doubled threads.

1808. June 28th, Mr John Hall took a patent for regulating the twist of the thread in spinning, by means of an endless band traversing the walk, and moved with a given speed by pulleys fixed on the head of the spinning-wheel. To certain parts of this band marks are attached. When one of these marks is at the wheel, a spinner sets on, and in spinning keeps pace with the motion of the band, as indicated to him by the mark.

1828. September 4th, Mr Robertson took a patent for im-

Rope-making.

provements in the manufacture of hempen rope or cordage. The improvements consist in impregnating the yarns with tannin, by steeping them in an infusion of oak-bark, catechu, sumach, or valonia, previous to their being twisted into cordage.

1832. February 1st, Mr James Lang, flax-dresser, Greenock, obtained a patent for such improvements in the construction of the gill spreading or drawing heads, and roving or spinning frames, as adapted them for the spinning of rope-yarns. Fig. 14 shows a side view, and fig. 15 a top view, of the first drawing or spreading machine; and fig. 16 is a diagram illustrative of its mode of action. The same letters refer to the same parts in all the figures. Here *a* is a portion of a board called the spreading-board. Over the surface of this board an endless band of leather travels, in the direction indicated by the arrow; and on this band the hemp to be operated upon is spread. By the motion of the band the hemp is carried forward until it is taken hold of by the feeding rollers *bb*, by the motion of which it is carried onwards to be acted on by the gills or travelling hackles *ccc*; and the gills are fixed to slips of brass screwed to bars which extend across the machine, as seen in fig. 15. These bars pass through grooves formed in the links of an endless chain, by the motion of which they are carried round; and their ends move in peculiarly formed slits in the framing of the machine, by which they are confined to their proper course. By the gills being made to move faster than the surfaces of the feeding rollers, they pass through the hemp many times in the course of its passage across the space in which it is acted on by them, and they are thus enabled to split and straighten the fibres. The hemp now passes between the drawing rollers *ee*, the surfaces of which can be made to move from forty to sixty times faster than those of the feeding rollers, according to the material to be acted on. By them the hemp is drawn into a sliver of a certain state of fineness, and this sliver, after passing through the delivering rollers, falls into the can *g*. When a certain quantity of sliver is delivered into the can, a bell is rung by the machinery; the filled can is then removed by the attendant, and an empty one substituted. The filled cans are then conveyed to the second drawing machine, which differs from the first chiefly in being smaller, in having no spreading-board, and in having a double set of rollers and gills in the width, as will be seen by the top view, fig. 17. The cans containing the slivers from the first drawing machine are placed at the end of this, in such number as may be required, and many slivers are then passed together through each set of feeding rollers. After having been acted on by the gills and the drawing rollers, the slivers may be delivered separately, or they may be combined, as shown in the drawing, by passing through a tray previous to entering the last pair of delivering rollers. The slivers, after having been subjected to a third drawing, in a machine the parts of which are still finer than those of the second machine, are carried to the roving or spinning machine. This machine has feeding rollers, gills, and drawing rollers similar to the drawing machines; but the parts are still finer than those of the last machine. In fig. 18 the spinning apparatus is shown. The slivers, on leaving the drawing rollers, pass into the trumpet-mouthed tubes *aa*. The upper part of these tubes is in two halves, one of which is fixed to the cross rail of the machine, while the other is pressed against it by means of a spring, in such a manner as gently to compress the sliver on entering the tube. The bottom of the tube is set into another tube serving as a socket, and into this last tube discs of felt or cloth are put, through which a slit is made for the reception of the thread, which is thus com-

Fig. 14.

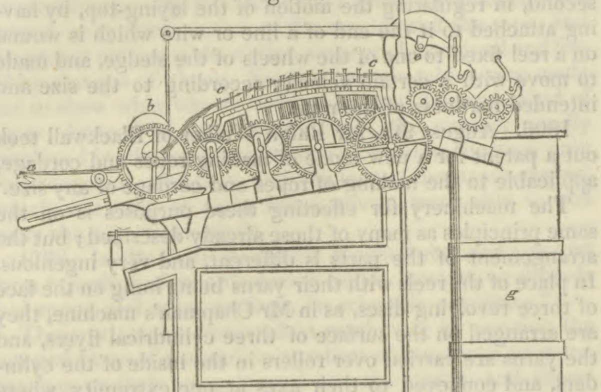


Fig. 15.

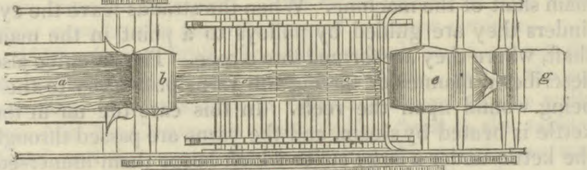


Fig. 16.

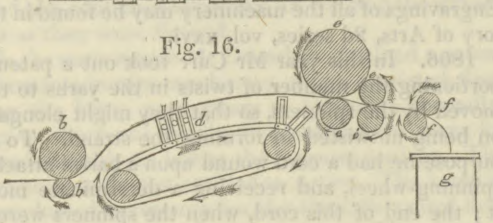


Fig. 17.

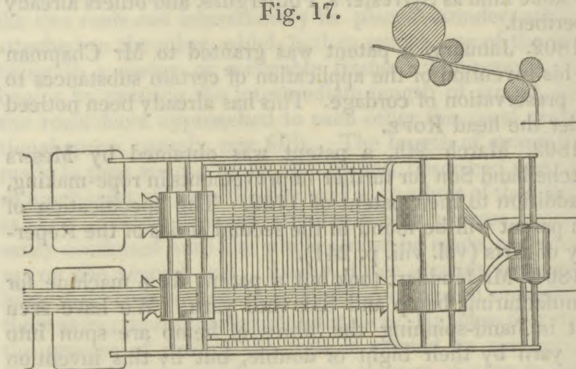
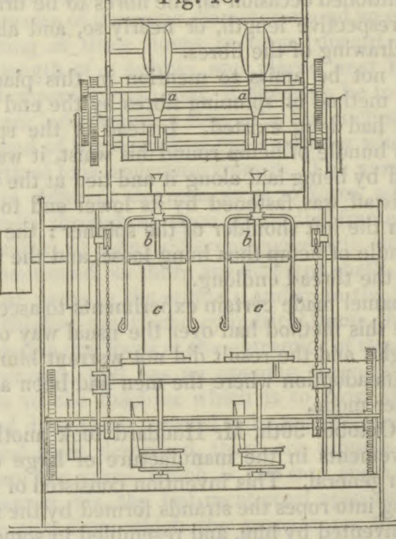


Fig. 18.



pressed and smoothed in the same manner as by the cloth in hand-spinning. From these tubes the threads are led to the flyers *bb* and bobbins *cc*, as in the ordinary spinning apparatus. Any degree of twist and of tension during twisting can be given to the yarn, by making the bobbins take up more or less of it for each revolution of the flyer; and this is simply effected by means of a drag formed of two steel springs fixed to the bobbin-rail. The ends of the springs partly embrace a peculiarly-formed pulley attached to the bottom of the bobbin, and by means of a pinching screw they can be made to bear with a greater or less degree of pressure on this pulley, and, according to the amount of pressure, the motion of the bobbin is in a greater or less degree retarded.

These machines differ from those in common use chiefly in the following particulars: 1st, In the distance between the feeding rollers and drawing rollers being capable of alteration, to suit longer or shorter hemp, by means of the grooves in the framing of the machines, seen in the side view, fig. 14; 2dly, in making the yarn to pass through the compressible tubes and the felt discs, which act in a manner analogous to the cloth in the grasp of the workman in hand-spinning; 3dly, in the power which the manufacturer has in regulating the tension and twist of the yarns while forming, by means of the drag applied to the bobbins.

The yarn produced by this machine is of excellent quality, and is much stronger than hand-spun yarn, as appears from certain experiments made for the purpose of testing them; the result showing, "that the patent-spun yarns are stronger than those of equal grist when spun by hand, and from the best staple or long hemp, by fifty-five per cent."

Mr Lang's machinery has in consequence been adopted by some of the most extensive rope-manufacturers in Great Britain.

1832. August 8th, Mr Crawhall obtained a patent for an improvement in the manufacture of flat rope, such as is used in mines. It will be remembered that in Mr Curr's patent, the method described of forming these bands was by sewing several ropes together side by side; and the improvement of Mr Crawhall consists in adding such wheels to the ordinary rope-work machinery as to enable it to make four ropes of the same size, of the same material, twisted in the same manner, and at the same time. By this equality of the ropes greater strength is insured; and they are put together by sewing or plaiting, as in the other patents.

1832. September 22d, Mr J. H. Kyan obtained a patent for the application to cordage of his now well-known process of steeping materials in a solution of deuto-chloride of mercury for the purpose of preserving them.

1833. May. Mr Norvel of Newcastle at this time took out a patent for machinery for rope-making. In this machinery the bobbins are, like Mr Walker's, arranged on the surface of cylindrical flyers, and in some of its other parts there is a resemblance to that of Mr Chapman; but there is much that is new, and the general arrangement appears to be excellent.

1838. August 8, a patent was obtained by Mr John Stewart, rope-manufacturer in Glasgow, for machinery for spinning yarn, and forming lines, cords, and ropes.

In figs. 19 and 20 a side and end view of the machine for spinning are exhibited. Here *aaa* is the framing; *bb'*, a fast and loose pulley on the principal shaft; *ccc*, bevel-wheels on the same shaft, gearing into pinions fixed on the frames *ddd*, which run in two bearings, one at the foot, and the other at *eee*, fixed to the rail of the frame; *fff* are sliver-cans, with projecting pins for hanging them in the hooks of the frames *dd*, so that any can may be shifted without disturbing the machinery; *gg* is a roller moved by a belt on the principal shaft, round which roller a turn of the thread is taken as it comes from the cans, and the motion of the roller, which may be increased or diminished at pleasure, draws the thread away from the can more or less rapidly. The action of the machine will now be easily understood. The cans having been filled with sliver at the common drawing-frame, are hung in the hooks of the frames; on motion being communicated to the machine, the frames are turned round, and twist the sliver into a thread; and as it is twisted, it is drawn away by the roller.

Fig. 19.

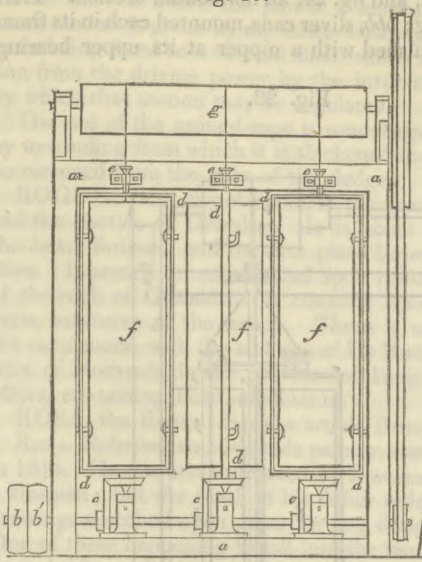


Fig. 20.

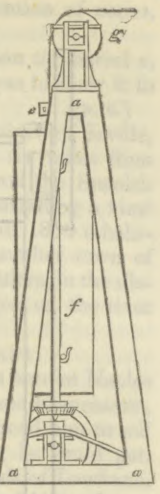


Fig. 21.

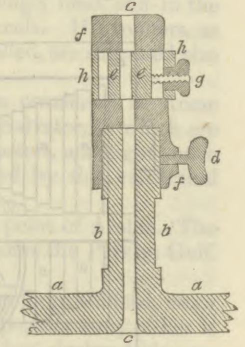
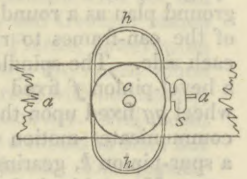


Fig. 22.



An essential part of the machine remains yet to be described. This is the nipper, or apparatus for holding tightly and regulating the twist of the sliver; one of these is fixed to each frame above its upper bearing. Fig. 21 is a section, and fig. 22 a plan, of one of the nippers to a large scale. In it *aa* is a part of one of the frames, *bb* the upper bearing, *cc* the hole through which the sliver passes, *d* a pinching screw to fix the nipper in the top of the frame; the part *e* works through a parallel mortise cut through the part *ff* of the nipper. By turning the nut *gg* the part *ee* is thrust into the mortise, so as to allow the sliver to pass through *cc* with more or less freedom, as may be required. Any irregularity in the thickness of the yarns is provided for by the spring *hh*, which allows *e* to yield a little when a part of the yarn happens to be thicker, or forces it inwards when any part happens to be smaller, than the general size, while the steady pressure is maintained by means of the nut *gg*. Through this part of the apparatus, then, the end of the sliver is put previous to being carried to the roller, and it is between this and the roller that the sliver receives its twist to convert it into a thread or yarn. When the yarns leave the roller they are wound on bobbins, or made use of in some other manner. The patentee describes a method of putting a slight twist into the slivers before the cans are hung in the frames of this machine. He also describes a modification of the frame, in which, in place of the cans, bobbins may be used; and he describes an apparatus for filling the bobbins. His machinery for forming lines, cords, strands, and ropes is represented in fig. 23, a vertical, and fig. 24, an horizontal, section. Here *aaa* is the framing; *bbb*, sliver cans, mounted each in its frame *ccc*, which is furnished with a nipper at its upper bearing. These can-frames run in brackets *dd*, *d'd'*, fixed upon an upright spindle *ee*; the bottom bracket *dd* is shown in the ground plan as a round plate, and the parts for the pivots of the can-frames to run in are raised upon it partly on each side. The spindle *ee* is made to revolve by means of a bevel-pinion *f* fixed upon it, which pinion gears into a wheel *gg* fixed upon the shaft *hh*. A belt from the pulley communicates motion to the main shaft *hh*, which carries a spur-pinion *k*, gearing into a wheel *l* fixed on the shaft *mm*. Upon this shaft the cone *nn* is fixed, which by a belt drives the cone *o*, running loose upon the main shaft *h*. Upon the large end of this cone the bevel-wheel *p* is either cast or fixed; and this gears into the pinion *q* fixed to the wheel *r*, the teeth of which are in its inner edge. This wheel with its pinion turns on the spindle *ee*, and its teeth gear into spur-pinions *ss*, fixed on the bottom of the can-frames. From the nippers at the top of the can-frame, each sliver is conducted to a separate hole near the top of the spindle *ee*; these holes run upwards in an angular direction from under the bracket *i*, and meet in one which is carried to the top of the spindle, where is fixed a nipper similar to those of the can-frames. The roller *v* is for the purpose of pulling away the strand, cord, or rope, as it is formed; and in this case is made slightly conical, so that by shifting it along its shaft, the speed with which it draws may be varied. The action of the machine will be easily comprehended. By the revolution of the spindle *ee* the can-frames are carried round a common centre; and as they turn they receive a motion, each round its own axis, by means of the wheel *r* and the pinions *ss*. If sliver be put into the cans and carried through their nippers, they will be twisted into yarns between the nippers and the holes in the upright spindle, and by the revolution of the spindle they will be combined so as to form a strand or cord. If in place of slivers strands be used, the result will be a rope. The patentee further describes machinery for the formation of flat ropes, or bands for mines and the like purposes.

Fig. 23.

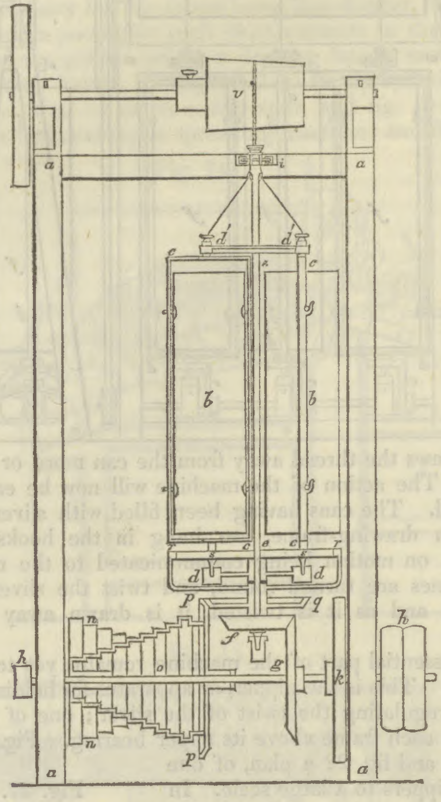
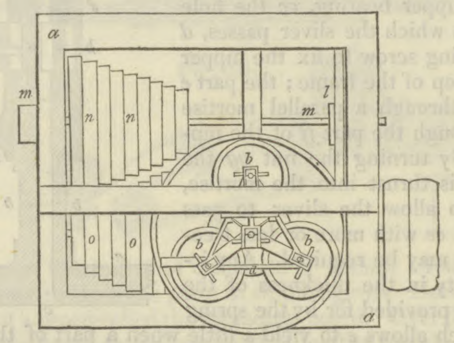


Fig. 24.



Having thus, as far as in our power, given an account of the progressive improvement of the art by the application of machinery, we shall conclude with a description of the most improved forms of machines and apparatus used in laying ropes in the present day.

When the yarns have been spun upon Mr Lang's or other spinning machines, or by hand, they are wound from the bobbins in a haul, upon a large octagonal reel about eight or nine feet diameter: the number of yarns in the haul are, of course, regulated by the conveniences of the manufactory. The haul is then passed from this reel through the tar-kettle, and, after undergoing the action of the nippers, is again wound upon a similar reel. From this reel the yarns are wound singly upon the reels or bobbins to be used in the laying. The bobbins, with their yarns, are then hung in frames, and the further machinery used is an improved form of Mr Chapman's locomotive apparatus. The whole arrangement of these parts will be better understood from the drawings. In the drawings the connection of the different parts with the moving power is not shown. This may be steam, water, or any other power, and may be placed in any convenient situation, so as best to serve all the purposes of the establishment.

Figs. 25 and 26 show the general arrangement of the winding apparatus; fig. 25 an end view, and fig. 26 a back view, of a portion of the winding-table. *aa*, reel about eight feet diameter, on which the haul is wound; *bb*, frame containing eight bobbins or reels *ccc*, fastened on vertical spindles *dd*, on the lower end of which the pulleys *ee* are fixed; on the horizontal shaft a corresponding number of pulleys are fixed, to drive those of the vertical shaft by belts. One end of the horizontal shaft carries a fast and loose pulley *g*,

Fig. 25.

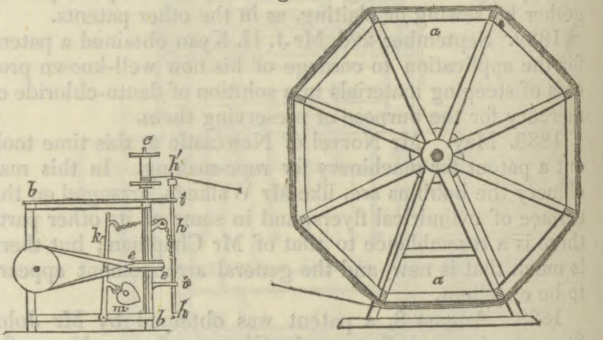
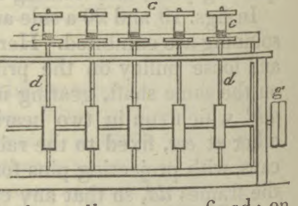


Fig. 26.



to which motion is given by a belt from the driving power. The apparatus for spreading the yarns on the reels consists of a rail *h'*, with loops or eyes opposite to each reel: through these eyes the yarns are passed. The rail is supported by two upright rods *h*, *h*, which slide through holes in the brackets *i*, *i*. To these rods the alternating motion is given by a chain connecting them with the lever *k*, which is wrought by the heart-wheel *m*. Figs. 27, 28, 29, show the arrangement of the apparatus for twisting the strands, and laying them into a rope. *aa* the reel-frame; *bb* the register-plate, through the concentric circles of holes of which the yarns are put. These holes are seen in the detached front-view of the plate at B. Immediately behind the plate the yarns are passed through the press-blocks, one of which is figured detached at C. They are then hung on the hooks of the sledge *cc*. These hooks are on the prolonged axes of pinions driven by a spur-wheel *d*, which again is driven by the mitred wheel *e*. This wheel can be connected with either of the wheels *f* and *g*, by means of a clutch wrought by the lever *h*. On the end of the axes of these mitre-wheels the pinion *k* is fixed, and receives motion from the spur-wheel *l*, fixed on the axis of the gub-wheel *m*. Round the gubs of this wheel a turn of the endless band *nn*, which traverses the walk, is passed, and gives motion to the machinery. On the other end of the gub-wheel axis a pinion *o* is fixed, which drives the spur-wheel *p*. On the middle of the axis of this wheel another gub-wheel is fixed; round it a turn of the ground-rope *q* is passed, and by this the sledge is moved progressively backwards: the wheels of the sledge are flanged, and run upon a railroad *r*. When the endless band is set in motion after the yarns have been hung on the hooks of the sledge, the sledge travels backwards at a rate which may be proportioned to the twist required to be given, by the gubs of the ground-rope wheel being made to shift further from or nearer to its centre, so as to move the sledge through a greater or less space for each revolution of the hooks. When the sledge has reached the foot of the walk, the strands are hung together on the centre-hook of the wheel, and by means of the lever *h* the motion is reversed; at the same time the yarns are cut over by the tackle-board, and hung on the hooks *s*, *s*, *s*, at the fore end. To these motion is given by the spur-wheels *t*, *t'*, the latter of which may be driven either by the pinion *u* and spur-wheel *w*, or directly by the pinion *x*, as a quicker or slower motion is required. To the shaft on which the pinion *x* and spur-wheel *w* are fixed, motion is given by the mitre-wheels *y*, *y'*, *y'*, the two latter being fixed to a vertical shaft, which receives its motion from the driving power by the intervention of cones, by which that motion may be regulated.

Fig. 27.

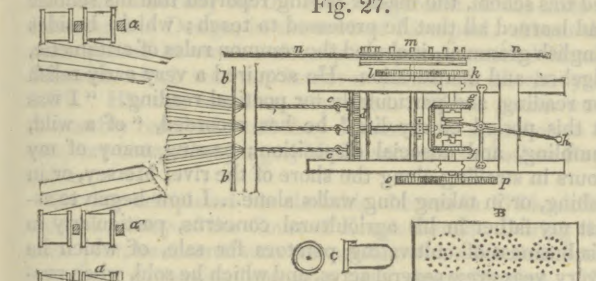


Fig. 28.

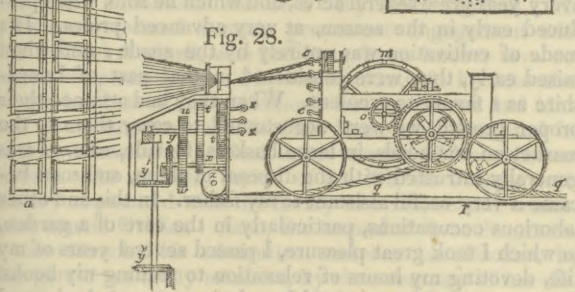
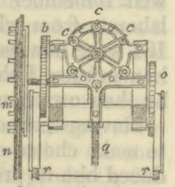


Fig 29.



The end of the ground-rope is wound upon the barrel *z*, by unwinding from which it is slackened so as to allow it to be removed from the gubs of the sledge. (B. S.)

ROQUE, St, a city of Spain, in the province of Seville, and the partido of Gibraltar. It is about six miles from the latter fortress, and the first place beyond the Spanish lines. It stands on an elevated spot, commanding a view of the rock of Gibraltar. It contains about 1800 inhabitants, exclusive of the troops. There is another town of the same name, with the addition of De Rumiera, in the district of Montania, in the province of Burgos, on the river Miera, containing 1250 inhabitants.

ROSA, the Rose. See the article Botany.

Rosa, *Salvator*, an admirable painter, was born at Naples in 1614. He was first instructed by Francesco Francazano, a kinsman; but the death of his father reduced him to sell drawings sketched upon paper for any thing he could get. One of these happening to fall into the hands of Lanfranc, he took him under his protection, and enabled him to enter the school of Spagnoletto, and to be taught by Daniel Falcone, a distinguished painter of battles at Naples. His pieces are exceedingly scarce and valuable; one of the best of them being that representing Saul and the witch of Endor, which was preserved at Versailles. He died in 1673; and as his paintings are in few hands, he is more generally known by his prints, of which he etched a great number. He painted landscapes more than history; but his prints are chiefly historical. The principal landscape of this master is a noble picture at Chiswick. We are told that he spent the early part of his life in a troop of banditti; and that the rocky desolate scenes in which he was accustomed to take refuge, furnished him with those romantic ideas in landscape, of which he is so exceedingly fond, and in the description of which he so greatly excels. His robbers, as his detached figures are commonly called, are supposed also to have been taken from the life.

Amongst the musical manuscripts purchased at Rome by Dr Burney, was a music-book of Salvator, in which are many airs and cantatas of different masters, and eight entire cantatas, written, set, and transcribed by this celebrated painter himself.

ROSALGATE, the most eastern point of Arabia. The coast turns to the north-west, till it joins the Persian Gulf. Long. 60. 10. E. Lat. 22. 20. N.

ROSAMOND, daughter of Walter Lord Clifford, was a young lady of exquisite beauty. The popular story of her is as follows. Henry II. saw her, loved her, declared his passion, and triumphed over her honour. To avoid the jealousy of his queen Elinor, he kept her in a wonderful labyrinth at Woodstock; and by his connection with her had William Longsword earl of Salisbury, and Geoffrey bishop of Lincoln. On Henry's absence in France, however, on account of a rebellion in that country, the queen found means to discover her; and, though struck with her beauty, she recalled sufficient resentment to poison her. The queen, it is said, discovered her apartment by a thread of silk; but how she came by it is differently related. This popular story is not however supported by history. She was buried in the church of Godstow, opposite to the high altar, where her body remained till it was ordered to be removed with every mark of disgrace by Hugh bishop of Lincoln in 1191. She was, however, considered as a saint after her death.

ROSAS, a fortified city of Spain, in the province of Catalonia, and district of Gerona. It stands on an elevation on Cape de Creus, on the Mediterranean Sea, and commands the celebrated bay of that name where so much valour was displayed by our ships of war, whose boats' crews boarded and captured or destroyed many of the enemy's ships during the long hostilities. The bay has a lighthouse, and is protected by two strong forts, and is one of the most secure anchorages on that coast. The city contains 1900 inhabitants, who in time of peace depend chiefly on the fisheries. Long. 3. 31. 2. W. Lat. 42. 16. 6. N.

ROSCIUS, Q. a celebrated comic actor, who is spoken of in terms of the highest commendation by Cicero. The exact period of his birth is unknown; but he must have been somewhat older than Cicero (born B. C. 106), as he had already earned a high reputation before the death of Sulla, B. C. 78. His subsequent career was said to have been predicted by a strange occurrence whilst he was still a child. His early years were spent at Solonium, near Lanuvium; and whilst he was sleeping in his cradle, a serpent entwined itself round his body without injuring him. This circumstance in the life of the actor was afterwards represented by the artist Praxiteles, and celebrated by the poet Archias. The orator afterwards remarks, that it seems ridiculous that the gods should predict the future fate of an actor, whilst they neglected statesmen and heroes, whom the world admired. Of his education we know nothing, except that he and Æsopus the tragic actor used to attend the forum when Hortensius the orator pleaded, that they might imitate on the stage what they admired in him. He had a particular squint of the eye, but this was of course concealed by the mask he wore. His private character was highly respected, and Cicero remarked that he was such an artist that he seemed the only one fit to appear upon the stage, and yet so excellent a man that it was beneath his dignity, which he thought worthy of the senate. He used to contend with Cicero which of them could represent the same sentiment in the greatest variety of ways, he by acting, and Cicero by his eloquence. So high an opinion did he entertain of his profession, that he wrote a work comparing it with oratory. He gave lessons in elocution, and used to say that he never had a pupil whom he could altogether approve of. His gains as an actor are variously stated, by Macrobius at 1000 denarii (L.32. 5s. 10d.) a day; and by Cicero at 600,000 sesterces for ten years (L.48,434. 10s.), which would make it somewhat less than L.5000 a year; but for the last ten years he had refused to receive this pension from the Roman people. He had a dispute with one Fannius Chœrea respecting a slave, of whom they were joint owners, and he was defended by Cicero; but at what time this took place we have no means of judging. Only a part of the speech has been preserved. He died a little before the time (about B. C. 61) that Cicero delivered his oration in defence of Archias.

ROSCOE, William, a distinguished writer, was born at Liverpool on the 8th of March 1753. He was the only son of William Roscoe, who then kept a public-house called the Bowling Green, and who is described as a man below the middle stature, but of remarkable bodily strength and activity; of much vivacity of temperament, and greatly attached to field-sports and other amusements, for which his son never acquired any relish. He had also an only daughter, who became the wife of Daniel Daulby, Esq. With the charge of his public-house he united that of a market-garden; but during his declining age, he retired to Charnock, his native place, and was for many years supported by his son. Two years before his death, Mr Roscoe removed him to his own house at Birchfield, where his latter days were soothed by the assiduous kindness of his two children. Having reached an advanced age, he died in 1796. His wife, whose name was Elizabeth, is said to have been a woman of a superior mind and of warm affections, and to have exercised over the character of her son an influence, of which the effects were never obliterated to the latest period of his life.

The first elements of learning he acquired under the tuition of a schoolmistress; and at the age of six, he was removed to a day-school kept by Mr Martin in Paradise Street. After an interval of about two years, he became the pupil of Mr Sykes, who, in the same house, kept a school for writing, arithmetic, and English grammar. He had a numerous seminary, and was considered as a good instructor in his own department. At the age of twelve Roscoe quitted this school, the master having reported that his scholar had learned all that he professed to teach; which, besides English grammar, included the common rules of arithmetic, algebra, and mensuration. He acquired a very early relish for reading, and particularly for poetical reading. "I was at this period of my life," he has recorded, "of a wild, rambling, and unsocial disposition; passing many of my hours in strolling along the shore of the river Mersey, or in fishing, or in taking long walks alone....I now began to assist my father in his agricultural concerns, particularly in his business of cultivating potatoes for sale, of which he every year grew several acres, and which he sold, when produced early in the season, at very advanced prices. His mode of cultivation was entirely by the spade; and when raised early, they were considered in that part of Lancashire as a favourite esculent. When they had attained their proper growth, we were accustomed to carry them to the market on our heads, in large baskets, for sale, where I was generally intrusted with the disposal of them, and soon became a very useful assistant to my father. In this and other laborious occupations, particularly in the care of a garden, in which I took great pleasure, I passed several years of my life, devoting my hours of relaxation to reading my books. This mode of life gave health and vigour to my body, and amusement and instruction to my mind; and to this day I well remember the delicious sleep which succeeded my labours, from which I was again called at an early hour. If I were now asked whom I consider to be happiest of the human race, I should answer, those who cultivate the earth by their own hands."

Having reached his fifteenth year, he found it expedient to make choice of a profession. His love of reading induced him to prefer the avocation of a bookseller; but he was disappointed in his expectation of finding it altogether pleasant, and after a trial of a month, he returned to his rustic labours. In the course of the ensuing year, 1769, he was articled to a young attorney, who died before the completion of his clerkship. The remainder of it was passed in the office of Mr Peter Ellames, who was eminent in his profession, and who was much satisfied with his pupil's talents and industry. During this period, he still continued to reside with his father, but he had previously the misfortune to lose his mother. Although very punctual in his attention to business, he always found some precious intervals of leisure for the cultivation of his literary talents; and his early love of poetry had its usual effect in purifying and refining the taste. His chief favourite was Shenstone, with whose elegant simplicity he appears to have been greatly captivated. He cultivated an intimate friendship with other ingenuous youths, who cherished the same love of literature. In conjunction with two of these, William Clarke and Richard Lowndes, he applied himself to the study of the ancient languages; and with these individuals, to the close of their lives, he continued in habits of the strictest intimacy. They had another associate, who was capable of directing as well as participating in their studies. This was Francis Holden, a young man of uncommon talents, who was an assistant in his uncle's school, where it was his business to teach, not only mathematics, but likewise the Greek, Latin, Italian, and French languages. They were accustomed to meet early in the morning, and to pursue their classical studies till the hours of business called them to less genial avocations. It was the example of Holden that prompted him to begin the study of the Italian language, in which he at length attained to so great proficiency.

He thus continued to improve his taste, and to enlarge his fund of knowledge. From a fervent admiration of poetry there is generally an easy transition to the composition of poems. He wrote many verses in his early youth; and at the age of twenty, he printed an Ode on the Foundation of a Society for the Encouragement of the Arts of Painting and Design, in the town of Liverpool. About the same period he wrote a descriptive poem, entitled Mount Pleasant, which was not however published till the year 1777. His ode was then reprinted. These poems were favourably received; and they obtained the approbation of two very competent judges, Mr Mason and Sir Joshua Reynolds.

Having completed his clerkship, he was in 1774 admitted an attorney of the Court of King's Bench. During the same year, he entered into partnership with a Mr Bannister, but their connexion was of a very short duration. He afterwards formed a more permanent engagement with Mr Samuel Aspinall, who had long been known as a respectable practitioner. He was assiduous in his attention to the business of his profession; but he did not find himself constrained to abandon his literary studies, and he thus continued the gradual improvement of his excellent talents. At an early period of his life, he became intimately acquainted with the family of a respectable tradesman named Griffies. Jane, the second of three daughters, "soon attracted his admiration, and won his affection, by her gentle yet lively manners, by the sweetness of her disposition, and by the many admirable qualities of her truly feminine mind. Although the state of his circumstances at this time gave little promise of an immediate union with the object of his attachment, it was not the wish, and perhaps it was scarcely in the power, of one possessing the frank and ardent character of Mr Roscoe, to conceal from her the feelings she had inspired. From that moment, to the close of his long and eventful life, he never found reason to regret, for one instant, the judgment of his youth." A considerable interval elapsed before they could prudently fulfil their engagement; but his professional emoluments gradually became more ample, and they were married on the 22d of February 1781. Their union was attended with more than common felicity.

The African slave-trade was now in its fullest vigour; and as it formed a very material part of the commerce of Liverpool, the great body of the inhabitants were interested, either directly or indirectly, in the continuance of this detestable traffic. For any individual to raise a warning voice against it in such a community, required no small portion of moral courage. The generous feelings and manly character of Mr Roscoe urged him to take a very prominent share in those proceedings which finally led to its suppression; a measure which reflected so much honour on that administration which included Fox, Grey, Holland, and Erskine. He composed, in blank verse, a poem entitled "The Wrongs of Africa;" of which the first part was published in 1787, and the second in 1788. It was translated into German by a clergyman named Kühn. In 1787 he likewise published "A general View of the African Slave Trade, demonstrating its Injustice and Impolicy: with Hints towards a Bill for its Abolition." This seasonable tract was followed in 1788 by "A Scriptural Refutation of a Pamphlet lately published by the Rev. Raymond Harris, entitled 'Scriptural Researches on the Licitness of the Slave Trade': in four Letters from the Author to a Friend." Harris was a clergyman of the established church, but had been educated for the popish priesthood. Such talents as he possessed were employed in an attempt to prove that slavery, as a system, has obtained the divine approval; that God has sanctioned the principle of one portion of mankind treating another like beasts of burden. For his satisfactory refutation of this reverend apologist of such enormities, Mr Roscoe received the thanks of the London Abolition Committee. They likewise printed a new edition of his pamphlet, which was extensively circulated, and highly approved. In 1792 he published "An Inquiry into the Causes of the Insurrection of the Negroes in the Island of St Domingo." Of this insurrection the advocates of slavery had endeavoured to avail themselves, as a most powerful argument against the abolition; and he therefore performed another important service by exposing the fallacies of their reasonings and inferences.

In other public transactions of that eventful period, he likewise felt a deep interest. On all subjects his sentiments were humane and liberal. With some of the most enlightened men of the kingdom, he contemplated the French revolution as a glorious event; and his feelings of exultation were expressed in more than one poetical effusion. The atrocities which ensued were revolting to every well-constituted mind: but he still continued true to the great cause of civil and religious liberty, and in the midst of the apostacy of one party, and the phrensy of another, he continued to avow and to maintain those principles which established, and which alone can uphold the British constitution. The most conspicuous apostate of that period was Edmund Burke, who deserted his former principles and his former friends, and made a general declaration of war against all those who breathed an ardent wish for the political or social melioration of mankind. The powers of his eloquence were exerted, with a morbid and phrensied fervour, against those who differed from him after he began to differ from himself; and when we consider that he was instrumental, beyond any other individual, in promoting war abroad, and despotism at home, it may without any breach of charity be affirmed, that his memory deserves the execration of posterity. In the year 1796 Roscoe published "Strictures on Mr Burke's Two Letters, addressed to a Member of the present Parliament." Here he animadverts on the exaggerated statements of his adversary, and exposes the real object of his recent publications, the suppression of all liberal and independent speculation on the subject of politics. This famous orator was evidently disposed to acquiesce in the opinion of Bishop Horsley, that the people have nothing to do with the laws but to obey them. At an earlier period, 1791, Roscoe had printed a merry ballad concerning "The Life, Death, and wonderful Achievements of Edmund Burke;" and had adorned it with a frontispiece etched by himself, and representing Burke equipped like a knight-errant, and assaulting Fox in the House of Commons.

About this period his mind was vigorously devoted to an undertaking of a more important nature. The plan of preparing a biographical account of Lorenzo de' Medici had occurred to him at a very early stage of his literary career. He long continued to collect books, and to amass materials; and at the close of the year 1789, he communicated his design to his intimate friend Mr Clarke, who was then residing in Italy for the benefit of a milder climate. This gentleman had been engaged in commercial pursuits, but is said to have been skilled in ancient as well as modern literature. With great alacrity he undertook the task of exploring the archives and libraries of Florence, in quest of materials for the projected work; and the author acknowledged himself deeply indebted to the assistance which he had thus received. The sale of the Crevenna and Pinelli libraries enabled him to procure many rare books, for which he might otherwise have made a hopeless search. "The Life of Lorenzo de Medici, called the Magnificent," was at length published in the year 1796, in two volumes quarto. It was elegantly printed by John Maccreery, who, at his suggestion, had recently established a press in Liverpool. The success of this publication exceeded the most sanguine expectations which the author could have ventured to cherish. From the periodical critics he obtained ample praise. He received letters of warm commendation from men of rank and men of letters, with several of whom he had no previous acquaintance or correspondence. One of these was the eccentric earl of Bristol and bishop of Derry, who was then residing in Rome. He first applied to Mr Cadell, the bookseller, in order to ascertain the author's profession, resources in life, and what present of books, pictures, or statues, might be most acceptable to him. Dr Parr's fervent zeal in the cause of literature likewise prompted him to seek the correspondence of the elegant biographer. The first letter which he addressed to him contains the subsequent passage: "You will pardon my zeal, Sir, and you may confide in my sincerity, when I declare to you that the contents of your book far surpassed my expectation, and amply rewarded the attention with which I perused it. You have thrown the clearest and fullest light upon a period most interesting to every scholar. You have produced much that was unknown, and to that which was known you have given perspicuity, order, and grace. You have shown the greatest diligence in your researches, and the purest taste in your selection; and upon the characters and events which passed in review before your inquisitive and discriminating mind, you have united sagacity of observation with correctness, elegance, and vigour of style." The correspondence thus begun led to an intimate friendship. The work obtained a very high compliment from another individual, from whom it was less to be expected. Mathias so completely overcame the violence of his political animosities, as to bestow this eulogium on the author:

> But hark! what solemn strains from Arno's vales
> Breathe raptures wafted on the Tuscan gales!
> Lorenzo rears again his awful head,
> And feels his ancient glories round him spread;
> The Muses starting from their trance revive,
> And at their Roscoe's bidding wake and live.

To these lines, in his Pursuits of Literature, he has subjoined a long note, which contains the subsequent passage: "I have not terms sufficient to express my admiration of his genius and erudition, or my gratitude for the amusement and information I have received." An intercourse of civilities with the anonymous writer was a very natural result; and he was afterwards extolled by Mathias in Italian verse as well as prose.

The first edition of this work was printed at the expense of the author; but soon after its appearance, Cadell and Davies offered him no less a sum than L.1200 for the copyright. Of this liberal offer he did not hesitate to accept; and little doubt can be entertained that the booksellers found it a very advantageous transaction. The fourth edition, in three volumes octavo, was printed in 1800. In other countries, the success of this book was equally brilliant. Three editions were speedily circulated in America. The work, translated into German by Sprengel, was published at Berlin in 1797. In 1799 a French translation, by François Thurot, was published at Paris. During the same year, an Italian version, by the Cavaliero Gaetano Mechirini, made its appearance at Pisa, in four volumes octavo. It was undertaken at the suggestion of the elegant Fabroni, who had himself published a Latin life of Lorenzo, which he intended to translate into his native language; but he was so much delighted with Roscoe's work, that he abandoned his design, and recommended the other task to Mechirini. In the course of the ensuing year, he addressed a very gratifying letter to the author. Similar letters were addressed to him by Bandini, the learned keeper of the Laurentian Library in Florence, and by the Abate Andres, a Spanish Jesuit, resident in Italy, and deeply skilled in Italian literature.

For the avocation of an attorney Mr Roscoe never had any hearty relish, and he finally relinquished it in the year 1796. With his last partner, Mr Lace, he made an arrangement which secured him some interest in the business; and during the following year he entered himself at Gray's Inn, with the view of being called to the bar. He kept Hilary term, but made no further progress in this new career, although, according to the opinion of his son, he possessed qualities which must in all probability have rendered his success certain. In conjunction with Mr Thomas Wakefield, he had in 1793 obtained a lease of an extensive tract of peat-moss in the vicinity of Manchester; and from the draining and improvement of this land he anticipated an ample return. In 1799 he purchased one half of the Allerton estate, a valuable property situate about six miles from Liverpool. Allerton Hall, which belonged to his portion, was originally built in the reign of James the First; but that structure had been partly taken down about the middle of last century, and a handsome stone-edifice had been erected in its place. The house was surrounded by gardens disposed in the old English taste, and was environed on every side with ample woods. Here it was his wish to spend the remainder of his days in studious retirement; but within the brief period of twelve months, he found himself deeply involved in the labours and anxieties of commercial life. The family of his intimate friend Mr Clarke, which had long been connected with an extensive banking-house at Liverpool, was at the close of the year 1799 placed in circumstances of considerable difficulty. "The aid of Mr Roscoe, as a confidential adviser, was requested by the partners, and he did not hesitate to lend his best assistance. Chiefly through his instrumentality, the difficulties which existed between the Liverpool bank and their London correspondents were removed, and it was the anxious wish of the latter, as well as the former, that Mr Roscoe should render his labours complete, by becoming an active partner in the banking-house at Liverpool." It was rather his friendship for the family of Clarke, than any motive more personal to himself, that induced him to embrace this offer.

By great and unremitting exertions, he brought the affairs of the house into a better train of management; and towards the close of the year 1800, he could again command some portion of leisure for his favourite pursuits. He had previously published "The Nurse, a poem translated from the Italian of Luigi Tansillo." This elegant version was favourably received, and it reached a third edition in 1804. But he had for some time contemplated a more magnificent undertaking, a life of Leo the Tenth; and on receiving, through the kindness of Lord Holland, some important and unpublished materials from Florence, he reverted to it with new ardour. "The History of the Life and Pontificate of Leo X." was published in four volumes quarto in the year 1805. It had been in the press upwards of two years. For one half of the copyright Cadell and Davies paid the sum of L.2000. This work, notwithstanding its great and varied merit, experienced a less favourable reception than its precursor. The author's brilliant success appears to have excited no small degree of spleen in some of the periodical critics, who accordingly treated him with little candour or courtesy. This production however, relating to a most important era in the civil, ecclesiastical, and literary history of Europe, was highly estimated by many very competent judges. The history of the revival of learning was itself a very extensive, as well as a very arduous field for disquisition. The history of the fine arts required knowledge and taste of a different denomination. The history of the reformation of religion involved many questions of subtle disputation, as well as many topics of character and conduct; and for a writer of great candour and discernment, it was scarcely possible to satisfy either the Papists or the Protestants. The Life of Leo, with the omission of the documents contained in the appendix, was speedily reprinted at Philadelphia; but the sale was not there so rapid as that of his former work. A German translation, by Professor Glaser, was published at Leipzig in three volumes octavo, which successively appeared in 1806, 1807, and 1808. A preface, notes, and disquisitions, were contributed by Henke. In 1808 a French translation, by P. F. Henry, was published at Paris, and a corrected edition appeared in 1813. An Italian version was subsequently undertaken by Count Luigi Bossi, who began by translating from the French. This work extended to twelve volumes octavo, published at Milan in 1816 and 1817. He added a variety of notes and documents illustrative of the text, together with numerous engravings of portraits and medals. The sovereign pontiff, Leo XII., inserted this translation in the catalogue of prohibited books, but in spite of his denunciation, 2800 copies of it have been dispersed in Italy, where the name of the elegant author continues to be held in no common estimation.

Soon after the appearance of his great work, he was suddenly induced to place himself in a new sphere of action. "Although from a very early period of life Mr Roscoe had taken a deep interest in public affairs, and had manifested, not only by his writings, but also by the part he had taken in promoting public meetings in Liverpool, the strong desire he felt to render himself useful to the country, he had yet never entertained the idea that he should be called upon to fill the responsible situation of a representative of the people. It was therefore with the greatest surprise that, on the eve of the general election in 1806, he received a requisition from a number of the most respectable burgesses of Liverpool, requesting him to come forward as a candidate for the representation of his native town." This requisition he received on the 30th of October; he issued his address to the electors on the following day, and the election commenced on the first of November. His two opponents were General Gascoigne and General Tarleton; of whom the former had represented the borough for ten, and the latter for sixteen years. They were both Tories, but with this difference, that Tarleton was a deserter from the Whigs. They were both supported by the corporation; but after a very strenuous contest of seven days, the election terminated in favour of Roscoe, who had nearly two hundred votes over Tarleton, and thirteen over Gascoigne. During the progress of the election, he had uniformly been the popular candidate; his success was hailed with the most enthusiastic rejoicings; and he was chaired through a greater concourse of people than the town had probably ever beheld on any former occasion.

Of the House of Commons he was not a silent member. He took a respectable share in various debates; and he had the high satisfaction of raising his voice in favour of the abolition of the slave-trade. He likewise made a judicious speech in support of Romilly's bill for subjecting real estates to debts of simple contract. The unhappy and inveterate prejudices of the king led to the dissolution of the ministry in the spring of 1807. On the 15th of April, Mr Littleton moved a resolution, expressing the regret of the house at the recent change in his majesty's councils; and Mr Roscoe then spoke with manly indignation against the conduct of Canning, who, in a previous debate, had thought proper to threaten the house, that if its members did not vote according to the will of the ministry, his majesty would be advised to appeal to the people, or, in other words, to dissolve his parliament. The parliament was dissolved, and the senseless cry of "No Popery," and "the Church in danger," resounded from one end of the island to the other. It was the peculiar infelicity and infatuation of the old king's administration, that he was uniformly averse from employing men who supported the principles which had placed his family on the British throne.

Mr Roscoe returned to Liverpool in the month of May, and, on approaching the town, was received by a numerous procession of friends, partly on horseback, and partly on foot. Their progress was speedily obstructed by large bodies of men, chiefly consisting of the crews of vessels recently engaged in the slave-trade, armed with bludgeons and other weapons, and disposed along the range of streets. The procession moved with difficulty, and not without danger. Many personal injuries were sustained on both sides; and if great forbearance had not been displayed towards the ruffianly assailants, the most fatal consequences might have ensued. When he reached the bank, and attempted to address the crowd, the clamour was so loud and unceasing that he found it impossible to obtain a hearing. He had honourably given a vote against the traffic in human flesh, and by that craft most of the disorderly multitude had their living. Disgusted at such a display of popular violence, he speedily declared his resolution of declining to offer himself as a candidate at the ensuing election; but he was nominated without his own consent, and the contest was protracted till the seventh day, when it terminated by the return of the two generals.

Although he thus ceased to be a member of parliament, he did not cease to take an interest in public affairs. In 1808 he published "Considerations on the Causes, Objects, and Consequences of the present War, and on the Expediency or the Danger of Peace with France." This was an able as well as a seasonable publication; but we cannot add, that it produced any extensive or speedy effects. The war, which had been carried on at such an enormous expense of blood and treasure, was profitable to an immense multitude of individuals: it served to extend the patronage and influence of the ministry; loans, contracts, and other contingencies, enriched one class of their adherents; an immense field of employment and promotion was opened in the army and navy; while another class of men, who were specially bound to act as messengers of peace, were too generally disposed to keep in the onward path of preferment by preaching in favour of "this just and necessary war." The real object of the war was a matter so extremely doubtful, that it was not unusual to hear a variety of objects specified by different individuals all equally fervent in the same cause. By one great personage, the hopeful project of restoring the Bourbons was doubtless contemplated as the great and paramount object. Roscoe's tract was published in January, and a fourth edition was sent to press before the end of that month. It was speedily followed by "Remarks on the Proposals made to Great Britain for opening Negociations for Peace, in the year 1807." The several tracts which he had published on such topics, were in 1810 collected into a volume bearing the title of "Occasional Tracts relative to the War." This collection, which includes several tracts that have not been enumerated, remains a monument of his wisdom, in the midst of the general phrensy which then prevailed. In 1812 he published "A Review of the Speeches of the Right Hon. George Canning on the late Election for Liverpool, so far as they relate to the Questions of Peace and Reform." Roscoe was an able and enlightened advocate of parliamentary reform, as of all other attempts to improve the general welfare. During this general election, some of the inhabitants entertained a plan of returning him free of expense. He was likewise solicited to allow his friends to put him in nomination at Westminster; but he had no inclination to resume his seat in the House of Commons. Some of the electors of Leicester, where any opposition to the prevalent corruption was nearly hopeless, nominated him as a candidate without his previous knowledge; and, under these peculiar circumstances, he obtained 412 votes, while the second of the successful candidates had only 967. This homage to an individual personally unknown, was paid to him as "the friend of peace, of reform, and of religious liberty." In his printed address to the independent electors of this borough, he expressed his "conviction that the great work, which must eventually produce the reformation and happiness of the people, was already begun." An eventful period of twenty years served to evince how well he had discerned the signs of the times.

The return of peace did not immediately produce all the benefits that were anticipated. The war-establishment, with its lavish profusion of expenditure, had long contributed to maintain an artificial state of things. When the war was at length brought to a termination, we were overwhelmed with an enormous national debt; and under such burdens as this debt imposed, it was difficult for manufactures and trade to find a favourable channel. The banking-house with which Roscoe was connected did not escape the commercial pressure of that period. Great exertions were made by the partners to avert the crisis by which they were threatened; but suspicions having been excited, large balances were suddenly withdrawn from the bank; and after struggling for a few days in the vain hope of supporting their credit, they were, on the 25th of January 1816, reduced to the necessity of suspending their payments. A committee appointed by the creditors reported that, after the liquidation of the debts, there would remain a surplus of L.61,144. The bank was never shut; and the house was allowed six years for discharging all the debts, with interest. Roscoe undertook the management of its affairs, and exerted himself with surprising energy. One of the greatest trials which he sustained, was the necessity of parting with his library, pictures, and other works of art, the valuable and cherished accumulation of nearly half a century. The auction of his library, which was sold by Winstanley of London, extended to fourteen days, commencing with the 19th of August 1816. It included rare and precious works in several departments, but was particularly rich in Italian literature. The sale of the books was immediately followed by that of the prints, which occupied eleven days, and, being divided into 1352 lots, produced the sum of L.1915. 1s. The drawings, consisting of 610 lots, and the paintings, of 156, were sold for L.2825. 19s.

In the midst of these vicissitudes and trials, which he endured with exemplary fortitude, he still retained his love of literature. In the establishment of the Royal Institution of Liverpool, he lent his effective aid. A plan for such an institution had in 1813 been written by Dr Traill, now professor of medical jurisprudence in the university of Edinburgh. The scheme was at length brought towards maturity; and, after an interval of four years, Mr Roscoe, as chairman of a committee, prepared an explanatory report. He was induced, though not without considerable difficulty, to compose and to deliver the inaugural address at the opening of the institution. The attendance was very numerous, and he received the most gratifying applause. On the ensuing day, he was requested by the committee to publish his discourse, and it accordingly appeared under the subsequent title: "On the Origin and Vicissitudes of Literature, Science, and Art, and their Influence on the present State of Society: a Discourse delivered on the Opening of the Liverpool Royal Institution, 25th November 1817." In 1819 he published his "Observations on Penal Jurisprudence, and the Reformation of Offenders." In 1822 appeared his "Additional Observations" on the same subject; and a third part followed in 1825. He afterwards published two tracts on the penitentiary discipline of the United States. In all his literary undertakings, he aimed at improving the morals and increasing the happiness of mankind.

In the mean time, the affairs of the bank had reached their final crisis. The partners found themselves unable to contend with the difficulties which beset and impeded their progress, and a commission of bankruptcy was issued in the year 1820. Having now withdrawn from business, he seems to have placed his chief reliance on the remuneration of his literary labours. Some of his friends privately raised the sum of L.2500, and vested it in trustees for the benefit of himself and his family. "The office of communicating to him this kind and liberal act, on the part of his friends, was confided to Dr Traill, who by his judicious representations, and affectionate remonstrances, succeeded in removing from the mind of Mr Roscoe the objections which he felt to incur obligations of so serious a nature." About this period, he found a pleasing employment in arranging and improving the library of Mr Coke, now earl of Leicester, and in preparing a catalogue of the numerous manuscripts. His visits to Holkham were rendered peculiarly pleasant; and this gentleman, as we are informed, "conferred upon him obligations of no ordinary nature." His literary ardour was still unabated; and in 1822 he published an octavo volume, under the title of "Illustrations, Historical and Critical, of the Life of Lorenzo de' Medici, called the Magnificent; with an Appendix of original and other Documents." An Italian version, exclusive of the appendix, was published at Florence by Pecchioli in the course of the following year. In 1822 he likewise published a "Memoir of Richard Roberts Jones of Aberdaron, in the county of Carnarvon, in North Wales, exhibiting a remarkable instance of a partial power and cultivation of intellect." This extraordinary character, who was originally a fisher-lad, "continues to display a love of learning and an extent of erudition seldom exhibited within the walls of schools or universities, united with a want of common sense amounting almost to idiocy, and a squalor and wretchedness of appearance of which a common mendicant would be ashamed." At Allerton he had a conversation with Dr Parr on languages, oriental and occidental; and on being afterwards asked his opinion of the learned stranger, he replied, "He is less ignorant than most men."

During this year he quitted his residence in Liverpool, and took a house in Lodge Lane, Toxteth Park, about a mile from the town. Two years afterwards he had the severe misfortune to lose the excellent and cherished partner of all his joys and sorrows. She died on the 24th of September 1824. This event was very deeply felt; but the affectionate attention of his two daughters afforded some compensation of a loss which it was impossible to repair. In the early part of the year he had been elected an honorary associate of the Royal Society of Literature; and after an interval of a few months he was appointed an associate of the first class. He thus became entitled to a pension of one hundred guineas; but, on the death of the king, the annual grant from the privy purse was withheld by his successor. As its total amount was only a thousand pounds, this cannot but be considered as a miserable piece of economy. In 1827 the great gold medal of the society was awarded to him for his merits as an historian. From other learned associations he obtained various honours; nor must we omit to state that, during the same year, he was elected a corresponding member of the Accademia della Crusca.

In the spring of 1821 he had been engaged by the London booksellers to undertake a new edition of the Works of Pope. It appeared in 1824, in ten volumes octavo. He contributed a copious and elegant life of the author, and to a selection of the notes of former editors added a few of his own. Of the character of Pope, both as a man and as a poet, he formed a more favourable estimate than either Dr Warton or Mr Bowles. Those who deny or reluctantly concede to Pope the name of a poet, seem to judge according to a very arbitrary standard. A few months after the appearance of this edition, Mr Bowles published "A final Appeal to the Literary Public, relative to Pope, in Reply to certain Observations of Mr Roscoe, in his Edition of that Poet's Works; to which are added, some Remarks on Lord Byron's Conversations, so far as they relate to the same subject and the Author: in Letters to a Literary Friend." To this publication Mr Roscoe speedily replied in "A Letter to the Rev. W. Lisle Bowles, A. M. Prebendary of Sarum, &c. in Reply to his 'Final Appeal to the Literary Public relative to Pope.'" His edition, as well as his Letter, obtained a favourable notice in the Quarterly Review for October 1825; and Mr Bowles was induced to publish "Lessons in Criticism to William Roscoe, Esq. F. R. S. &c. in Answer to his Letter to the Rev. W. L. Bowles, on the Character and Poetry of Pope. With further Lessons in Criticism to a Quarterly Reviewer." These lessons in criticism were not very satisfactory to the public, and Mr Roscoe wisely desisted from any further controversy.

In 1827 he published an edition of the Life of Lorenzo in two, and of the History of Leo in four volumes octavo. He had now reached an advanced period of life, and had begun to feel the pressure of age. Towards the close of this year, he was suddenly attacked with paralysis, which affected one side of his face, and deprived him of the use of one hand; but medical aid was promptly procured, and he recovered the use of his hand, as well as of his speech. Botany had been among the number of his favourite pursuits. He had been a contributor to the Transactions of the Linnæan Society, and was regarded as no mean proficient in this science. After his recovery from the paralytic attack, he published the fifteenth and concluding number of a splendid volume on Monandrian Plants. Towards the end of June 1831 he experienced a severe attack of influenza; and after he seemed to be recovering, he was on the 27th of that month seized with a violent fit of shivering, accompanied with almost total prostration of strength. The near approach of death he contemplated with calm resignation to the will of God. On the 30th he closed his mortal career, after having completed the seventy-eighth year of his age. The proximate cause of his death was an effusion into the chest. His remains were interred in the burying ground of the Unitarian chapel in Renshaw Street, the service being performed by his intimate friend Mr Shepherd. Six sons and two daughters survived him. One daughter he had lost in her infancy, and a son in his mature age. His eldest daughter was married to Thomas Jevons, Esq. of Liverpool. One of his sons, who still survives, is well known as a man of letters. Another has too speedily followed the father to the grave. He was a barrister at law; and, besides several works connected with his own profession, he published an interesting though somewhat diffuse account of his honoured father's life.[1]

Dr Traill, the friend and physician of this eminent man, speaks of him in the following terms. "In person, Mr Roscoe was tall and rather slender. In early life he possessed much bodily activity. His hair was light auburn, almost inclining to red; his full grey eye was clear and mild; his face expressive and cheerful. As he advanced in life, the benevolent expression of his countenance remained, but the vivacity of the features was tempered into a noble dignity, which it was impossible to see without respect and admiration; while the mouth bespoke taste and feeling, and the clustering hoary hair round his temples gave a venerable air to his manly features.... Of the qualities of his heart, as a private individual, it is impossible to speak too highly. In the relations of husband, father, and friend, his conduct was most exemplary; and it would be difficult to point out a man who possessed the fascination of manner which attracts and rivets attachment, in a higher degree than William Roscoe."[2]

ROSCOMMON, an inland county in the province of Connaught, in Ireland, is bounded on the north by the county of Sligo, on the east by those of Leitrim, Longford, and Westmeath, on the south-east by the King's County, on the south-west by Galway, and on the west by the same county and by Mayo. It extends over a surface of 609,405 acres, of which 453,555 are cultivated, 131,063 are uncultivated mountain or bog, and 24,787 are under water. According to Ptolemy, it was inhabited by the Auteri; afterwards the tribes or septs of the O'Conors, O'Kellys, M'Dermots, O'Flanegans, O'Flyns, and O'Hanlys, were the chief possessors of it. Shortly after the arrival of the English in the reign of Henry II. it was seized upon by the new settlers, and their maintenance of it secured by the erection of several fortresses. For a long period afterwards the whole province was considered as consisting but of two counties, that of Roscommon being one, and all the remainder, with the county of Clare included, the other, under the name of the county of Connaught. This arrangement continued until the beginning of the reign of Elizabeth, when the whole province underwent a new classification, and the county of Roscommon was divided into the baronies of Athlone, Ballintubber, Boyle, Moycarnon, and Roscommon. At the close of the war of 1641, nearly all the former proprietors were dispossessed for having espoused the royal cause, and their possessions transferred to the republican adventurers and soldiers; since which period, that branch of the O'Conor family, once sovereigns of all Ireland, now known by the name of the O'Conor Don, is the only one of the former possessors who holds any part of ancestral possessions in the country. The five baronies are subdivided into fifty-three parishes, and four parts of parishes, the remaining parts of which are in some of the adjoining counties. According to the ecclesiastical arrangements of the country, Roscommon contains fifty-seven parishes, of which fifty-one are in the diocese of Elphin, three in Tuam, two in Clonfert, and one in Ardagh. The seat of the bishopric of Elphin is in the town of the same name in the county.

Roscommon is in shape long and narrow, extending sixty miles in a northern and southern direction, whilst its breadth from east to west, where greatest, is but thirty-two miles; and it decreases gradually until it terminates in a point in its southern extremity. The greatest part of it is level, forming the western portion of the central flœtz limestone field of Ireland; varied, however, by frequent inconsiderable elevations, and by long low ridges or escars formed of limestone gravel. In the north the country rises into rugged mountains with abrupt precipitous sides and flattened summits, the highest of which, Bracklieve and Slieve Corkagh, are upwards of a thousand feet above the level of the sea. The equally wild though less elevated range of the Curlew Mountains also forms part of the northern boundary. The Slieve Bawn Mountains range along the middle part of the eastern boundary. Slieve Aluyn, in the west, is also of considerable height. No large river passes through the county, but both its eastern and western limits are watered by navigable streams. To the east the Shannon rolls its immense volume of waters along that whole side, and on the west the Suck, which is navigable for barges to Ballinasloe, unites with the Shannon at the extreme south point. The rivers in the interior, which are small and insignificant, are all tributaries to one or other of these main channels, and chiefly to the former, discharging themselves into their streams, either directly, or through the medium of some of the numerous lakes dispersed throughout various parts. Of these smaller rivers, the Arigna, the Fiorish, and the Gara or Boyle river, are tributaries to the Shannon; the Bresgue and the Lung, the latter of which flows through a subterraneous channel during part of its course, discharge their contents into Lough Gara. The most remarkable of the lakes, both for size and beauty, is Lough Kea in the northern part, near the town of Boyle, from which place it also takes a name, as likewise that of Rockingham Lake, from the seat of Lord Lorton upon its shore. It is about three miles in length by two in breadth, and studded with several picturesque islands, amongst which Trinity Island is noted for its monastic ruins, and Castle Island for an ancient fortress of the M'Dermots, now modernized into an elegant villa. The lake derives its supply from the neighbouring boundary lake of Lough Gara upon the borders of Sligo, which, though larger, and still more irregular in its outline, is less attractive in appearance than that on which it bestows its redundant waters. To the north of Lough Kea the two smaller lakes, Lough Skeen and Lough Meelagh, are connected by a short channel with the Shannon. The lakes of Bodarrig, Boffin, and Reagh, on its eastern side, which are, strictly speaking, expansions of the Shannon, may also be considered as partially belonging to the county. The principal of the smaller lakes are Loughs Errit, Glynn, Funcheon, and Aluyn. There are several extensive furloughs or winter lakes, which, being generally dry in summer, afford rich pasturage for sheep. Between Frenchpark and Elphin, that of Mantua covers seven hundred acres; another near Lough Glynn, in the extreme west of the county, is half a mile long.

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[1] The Life of William Roscoe, by his son, Henry Roscoe. Lond. 1833, 2 vols. 8vo.

[2] Edinburgh New Philosophical Journal, vol. xiii. p. 220.

The limestone, which forms the base of all the level districts, is of various kinds, some gray, containing numerous fossil remains, chiefly madrepores; some of the formation called calp, which is often found blended with layers of Lydian stone; and some black, being susceptible of a high polish, as is a light gray marble found in the southern parts. Sandstone shows itself in the eminences that protrude through the limestone. Slieve Bawn is mostly composed of it; and in the neighbourhood of Frenchpark it is raised in laminæ so thin as to be used for the covering of roofs. The northern district is of the coal formation, which extends also into the adjoining county of Leitrim; but the principal stores of this most valuable mineral, and of ironstone, are to be found on the Roscommon side. The entire area, which is divided into two parts by the Arigna, extends over six thousand five hundred acres, of which two thousand are to the north and four thousand five hundred to the south of that river. The strata of coal rise into the mountains of Bracklieve and Slieve Corkagh, where the outcrop may be distinctly seen in several places in the precipitous sides of the declivities. The coal is of the blazing or bituminous character, less inflammable than that of Scotland, but more so than that of the north of England. The principal beds are the Rover, Gubberother, and Aughabehy collieries, in the latter of which, the chief seam, and the only one deemed sufficiently rich to defray the expense of working, is from one foot to two and a half feet thick, and promises to be abundant in quantity, although subject to interruptions, or what the workmen call faults, occasioned by the strata of one part of a hill having slipped down to a depth of from twenty to fifty yards, and settled on a lower level. The principal beds of iron ore are also on the south side of the Arigna river, whence the workings derive their name. They exhibit decisive indications of having been in operation at an early period; but, most probably in consequence of the exhaustion of timber for fuel, they were latterly inoperative until 1788, when the pit-coal found in the neighbourhood led to a new speculation in them, which, however, was dropped at the end of twenty years. The workings were resumed by three of the mining companies which the extravagant spirit of joint-stock enterprise gave rise to about the year 1825; but only one of them, the Arigna company, persevered in the experiment, until involved in a chancery suit as to the right of tenure, which being decided against them in 1836, the works have been resumed by their successful opponent, by whom they are now carried on upon a very extended scale, and with a prospect of adequate remuneration for the capital sunk in the concern. Both the ironstone and the limestone used as a flux have been pronounced to be of prime quality. Potters' clay is found in several places, and is manufactured into the coarser kinds of wares. Fire-bricks are made at Arigna, of fire-clay, which forms some of the mineral strata there.

The soil varies nearly according to the nature of its substratum, that on the limestone being much the most productive; except in the hilly district between the Shannon and the Suck, in which the stone rises so near the surface that the superincumbent vegetable mould is scarcely of depth sufficient to admit the use of the plough. The borders of the rivers which flow through the level parts, and are therefore liable to overflow their banks during winter, become, on the return of dry weather, pastures and meadows of the richest quality. Bogs of every size, from an extent of a thousand acres to patches merely adequate for the domestic demands of the immediate neighbourhood in which they lie, are to be found in many parts. The mountains are mostly covered with bog and marsh, interspersed with dry patches on which heath grows most luxuriantly. In the southern part, large tracts of a very light sandy soil, lying on the low hills between the Suck and the Shannon, afford excellent pasturage for sheep. The borders of Lough Aluyn are in some parts formed of sand, apparently carried from the lake by the wind. Large deposits of gravel and different kinds of loam are often found between the surface-soil and the rock which forms the substratum.

The population, according to calculations made at different periods, was as follows:

Year.	Authority.	Population.
1760	De Burgo	41,172
1792	Beaufort	86,000
1812	Parliamentary Return	158,111
1821	Ditto	208,729
1831	Ditto	239,903

The latest of these returns gives a ratio of one inhabitant to every 2·54 acres, or of one to every 1·89 cultivated acre. The returns of the Commissioners of Public Instruction in 1834 having been made up according to dioceses, though they do not give results sufficiently accurate to be placed along with those in the preceding table, afford data sufficient respecting the comparative numbers of the three principal religious persuasions, to justify the statement, that if the whole population of the county be estimated at 240,000 (a close approximation to that of 1831), the numbers of Protestants are 7000, and of Roman Catholics 233,000, being an average of one to thirty-three nearly. The total number of protestant dissenters in the county, according to the same return, was but forty-three.

This population was represented in the Irish parliament by eight members; two for the county at large, and two for each of the boroughs of Boyle, Roscommon, and Tulsk. The number was reduced to two at the Union, all the boroughs being deprived of the right of election. The number of registered electors for the county is about two thousand; elections are held at Roscommon. The local government is vested in a lieutenant, ten deputy-lieutenants, all appointed by the crown during pleasure, and a hundred magistrates, in which number the lieutenant and his deputies are included, appointed by the lord chancellor, and continued during good behaviour. The constabulary force consists of a sub-inspector, six chief constables, seven head constables, forty-three constables, and a hundred and eighty-seven sub-constables; total two hundred and forty-four.

The state of education, according to the parliamentary returns made in 1821 and 1824–26, was as follows:

Year.	Boys.	Girls.	Sex not ascertained.	Total.
1821	6981	3306	—	10,287
1824–26	8937	4998	711	14,646

Of the numbers stated in the latter of these returns, 1041 were Episcopalian Protestants, and 13,262 Roman Catholics; the religious persuasion of the remaining 343 was not specified. The total number of schools in the county was 309; of which seventeen, containing 545 pupils, were maintained by grants of public money; thirty-eight, containing 1954 pupils, by the voluntary contributions of societies or individuals; and the remaining 254 schools, which afforded the means of instruction to 12,147 pupils, were maintained wholly by the pupils' fees. The report of the Commissioners of National Education in 1837 (the latest published) states the number of schools, teachers, and pupils, connected with their board, as follows: Schools, eleven; teachers, twelve; boys, 941; girls, 757; total of pupils, 1698. The diocesan school of the see of Elphin is in the county.

The habits of the population are so thoroughly rural, that there are but four towns of which the population of each exceeds a thousand souls, two of them containing between three and four thousand, and the other two between one and two thousand. There are several fine mansions and demesnes in the hands of resident noblemen and gentlemen, and numerous villas and country-seats belonging to independent landed proprietors; but as to the small farmers and cottiers, the appearance of their dwellings and homesteads in many cases are far from showing those indications of internal comfort that might be expected in a district so highly favoured by nature. Agriculture is carried on with much spirit amongst the higher classes, by whom the latest improvements in tillage, and the best constructed vehicles and implements, have been introduced; but the old customs and antiquated implements are pertinaciously adhered to by most of the smaller farmers. Wheat is largely sown; a judicious rotation system is carried on; and green crops are frequent, with the exception of turnips and mangel-wurzel, which have not been found to answer. In the mountainous districts the spade is frequently used instead of the plough. In these also the neighbouring landholders generally club their labour together, particularly in planting and raising potatoes, all uniting to complete the work of one farm, and then proceeding successively in a body to execute that of the other partners in the amicable joint-stock concern. The pastures are amongst the best in Ireland, and as their proprietors are almost fastidiously particular in the selection of live stock of every description, the best-fed beasts are to be met with here. This is peculiarly the case with respect to bullocks; the sheep also are of first-rate quality, both as to fleece and flavour of carcass. In prime grazing land an acre feeds a bullock and a sheep. Notwithstanding the superior capabilities of the soil for pasturage, there are not many large dairies. But few farms, however small, are without one cow, if not more, so that butter of excellent quality is made, not only sufficient for the internal demand, but for forming a material article of export. The breed of horses is much esteemed. The annual fair of Ballinasloe, in October, is the principal mart at which the black cattle and sheep are disposed of. Fences in general are made of stone-walls, raised to a considerable height, as they are considered to afford better shelter for cattle than those of timber. That the county was once well wooded, appears not only from the evidence of history, but from the fact that wherever the impediments to its growth are removed, the soil spontaneously throws up shoots of those species of forest-trees with which the whole face of the country was once covered. The excessive clearing of the woods, without precautionary measures to secure a new growth, has left the surface very bare; but this defect, equally unsightly to the eye of taste and injurious to the progress of improvement, is annually diminishing, through the exertions of the landed gentry, many of whose mansions are surrounded with noble plantations. Manufactures, with the exception of those already noticed, and of coarse woollens and linens for domestic consumption, are almost unknown. The articles of export are confined to agricultural produce and live stock, for which the recent improvements on the course of the Shannon have afforded great facilities. The navigation of this fine river, which, as has already been said, skirts the county along the whole of its eastern verge, was so much obstructed by several rapids as to render it useless as a channel of enlarged inland traffic. These impediments have been obviated by means of short canals along the side of the river in those parts where the rapids occur. The first is from Lough Allen in Leitrim to Battlebridge, whence the river-stream is available somewhat farther than Carrick, where a second canal serves to avoid the rapids between Jamestown and Drumsna. Other short canals occur at the falls of Ruskey, of Lanesborough, and of Athlone. Thence the channel is clear to the junction with the Suck, where it quits the county. The connection by water with the eastern counties to Dublin is maintained by the Royal and Grand Canals, which communicate with the Shannon at Tarmonbarry and Shannon Harbour. The principal exports are corn and butter, all the coal as yet raised being not more than sufficient for the supply of the districts surrounding the collieries. As all the great lines of land conveyance to Connaught from Leinster and Ulster pass through the county, the roads are numerous, and generally well kept up.

The monastic antiquities are very numerous. The ruins of the abbey of Boyle still exhibit a large part of its highly ornamented church, with its tower rising from the middle of the building, and resting on four columns of colossal dimensions, enriched with a variety of sculptures; and the Dominican friary at Roscommon contains a monument of an ancient member of the O'Conor family, exhibiting an effigy of an armed warrior in a lying posture, with four other armed figures on the base. Derhan Abbey, in the neighbourhood of Roscommon, is little more than a heap of stones. The others of which some relics still exist, are Trinity Abbey in Lough Kea, Tulsk, Clonshanvill, and Clontuskert, in which there are several monuments and inscriptions relating to the O'Kellys and other ancient families. In the parish of Oran on the Suck, in the west of the county, are the remains of an ancient pillar-tower, about ten feet high; and in every part there are raths so numerous that nearly five hundred are still visible. The county contained a great number of small fortresses, evidently built when it was one of the marches or border districts, to repress the incursions of the Connaught Irish, besides which there were a few of great extent and strength, as is testified by that of Roscommon, forming a quadrangle of 220 by 180 feet, with towers at the angles and at the gateway, and containing the remains of a large building, supposed to be the residence of the governor. The most remarkable of the other castles are those of Athlone, Ballinasloe, Ballynafad, and Lough Glynn.

Roscommon, the county town, is built on the sides of a hill, near the middle of the county, in a plain between the Shannon and the Suck. It consists but of one main street, with several minor avenues branching out into five main roads, in various directions. It was incorporated at a very early period, and was considered to be one of the chief places in these parts. Writs for the better defence of the town and castle are frequent among the earlier records. It returned two members to the Irish parliament till the Union. Here are all the buildings connected with the local administration of justice. The county court-house is a spacious and well-arranged edifice, with an elegant Grecian-Doric portico in front. The county prison, built on the radiating plan, contains accommodations for upwards of a hundred prisoners, and has a tread-mill. The county infirmary, which also contains a fever hospital and infirmary, admits an average of three hundred patients annually. The modern ecclesiastical buildings are not remarkable for architectural elegance. The parish church is a neat structure. The old court-house has been converted into a Roman Catholic chapel. The town is a place of very limited trade, except in that of grain, large quantities of which are sent to Lanesborough to be exported thence by means of the Royal Canal or the Shannon. The population in 1831 was 3306. That of other towns the number of whose inhabitants exceeded 1000, was Boyle, the largest and most commercial in the county, 3433; Strokestoun, 1548; and Elphin, in which there is a poor cathedral to a very wealthy diocese, and a diocesan school, 1507. That part of the town of Athlone on the Shannon, in which the fortified magazines and works intended for the defence of the pass of the Shannon have been built, is on the Roscommon side of the river. The greater part of the town of Ballinasloe, celebrated for its great annual fair of sheep and horned cattle, is also in this county.

Roscommon, *Wentworth Dillon, Earl of*, a celebrated poet of the seventeenth century, was the son of James Dillon, earl of Roscommon, and was born in Ireland, under the administration of the first Earl of Strafford, who was his uncle, and from whom he received the name of *Wentworth* at his baptism. He passed his infancy in Ireland; after which the Earl of Strafford sent for him into England, and placed him at his own seat in Yorkshire, under the tuition of Dr Hall, afterwards bishop of Norwich, who instructed him in Latin, without teaching him the common rules of grammar, which he could never retain in his memory, though he learned to write in that language with classical elegance and propriety. On the Earl of Strafford's being impeached, he went to complete his education at Caen in Normandy; and after some years he travelled to Rome, where he became acquainted with the most valuable remains of antiquity, and in particular was well skilled in medals, and learned to speak Italian with such grace and fluency that he was frequently taken for a native. He returned to England soon after the Restoration, and was made captain of the band of pensioners; but a dispute with the lord privy-seal about a part of his estate obliged him to resign his post, and revisit his native country, where the Duke of Ormond appointed him captain of the guards. He was unhappily very fond of gaming; and as he was returning to his lodgings from a gaming-table in Dublin, he was attacked in the dark by three ruffians, who were employed to assassinate him. The earl defended himself with such resolution, that he had despatched one of the aggressors, when a gentleman passing that way took his part, and disarmed another, on which the third sought his safety in flight. This generous assistant was a disbanded officer of good family and fair reputation, but reduced to poverty; and his lordship rewarded his bravery by resigning to him his post of captain of the guards. He at length returned to London, when he was made master of the horse to the Duchess of York, and married the Lady Frances, the eldest daughter of Richard earl of Burlington, and the widow of Colonel Courtney. Here he distinguished himself by his writings; and, in imitation of those learned and polite assemblies with which he had been acquainted abroad, he began to form a society for refining and fixing the standard of the English language, in which his great friend Dryden was a principal assistant. This scheme, however, was entirely defeated by the religious commotions which ensued on King James's accession to the throne. In 1683 he was seized with the gout; and being too impatient of pain, he permitted a bold French empiric to apply a repelling medicine, in order to give him immediate relief. This drove the distemper into his bowels, and in a short time put a period to his life. He died in the month of January 1684, and was buried with great pomp in Westminster Abbey.

His poems, which are not numerous, are in the body of English poetry collected by Dr Johnson. His Essay on Translated Verse, and his translation of Horace's Art of Poetry, have been much commended. Upon the latter, Waller addressed a poem to his lordship when he was seventy-five years of age. "In the writings of this nobleman we view," says Fenton, "the image of a mind naturally serious and solid; richly furnished and adorned with all the ornaments of art and science; and these ornaments unaffectedly disposed in the most regular and elegant order. His imagination might probably have been more fruitful and sprightly, if his judgment had been less severe; but that severity (delivered in a masculine, clear, succinct style) contributed to make him so eminent in the didactical manner, that no man with justice can affirm he was equalled by any of our nation, without confessing at the same time that he is inferior to none. In some other kinds of writing his genius seems to have wanted fire to attain the point of perfection; but who can attain it?" He was a man of an amiable disposition, as well as a good poet; as Pope, in his Essay on Criticism, has testified in the following lines:

> Roscommon not more learned than good,
> With manners generous as his noble blood;
> To him the wit of Greece and Rome was known,
> And every author's merit but his own.

We must allow of Roscommon, what Fenton has not mentioned so distinctly as he ought, and what is yet very much to his honour, that he is perhaps the only correct writer in verse before Addison; and that, if there are not so many or so great beauties in his composition as in those of some contemporaries, there are at least fewer faults. Nor is this his highest praise. For Pope has celebrated him as the only moral writer of King Charles's reign.

> Unhappy Dryden! in all Charles's days,
> Roscommon only boasts unspotted lays.

"Of Roscommon's works," as Dr Johnson has remarked, "the judgment of the public seems to be right. He is elegant, but not great; he never labours after exquisite beauties, and he seldom falls into gross faults. His versification is smooth, but rarely vigorous; and his rhymes are remarkably exact. He improved taste, if he did not enlarge knowledge, and may be numbered among the benefactors to English literature.

ROSE. See Rosa.

Rose of Jericho, so called because it grows in the plain of Jericho, though it did not originally flourish there. It has perhaps been so named by travellers who did not know that it was brought from Arabia Petræa. Rose-bushes are frequently found in the fields about Jericho; but they are of a species much inferior to those so much extolled in Scripture, the flowers of which some naturalists pretend to have in their cabinets.

Roses, *Ottar* or *Essential Oil of*, is obtained from roses by simple distillation. A quantity of fresh roses, for example forty pounds, is put in a still with sixty pounds of water, the roses being left as they are with their calyxes, but with the stems cut close. The mass is then well mixed together with the hands, and a gentle fire is made under the still; when the water begins to grow hot, and fumes to rise, the cap of the still is put on, and the pipe fixed; the chinks are then well luted with paste, and cold water put on the refrigeratory at top. The receiver is also adapted at the end of the pipe; and the fire is continued under the still, neither too violent nor too weak. When the impregnated water begins to come over, and the still is very hot, the fire is lessened by gentle degrees, and the distillation continued till thirty pounds of water are come over, which is generally done in about four or five hours. This rose-water is to be poured again on a fresh quantity (forty pounds) of roses, and from fifteen to twenty pounds of water are to be drawn by distillation, following the same process as before. The rose-water thus made will be found, if the roses be good and fresh, and the distillation carefully performed, highly scented with the roses. It is then poured into pans either of earthen ware or of tinned metal, and left exposed for the night to the fresh air. The ottar or essence will be found in the morning congealed, and swimming on the top of the water; and this is to be carefully separated and collected either with a thin shell or a skimmer, and poured into a phial. When a certain quantity has thus been obtained, the water and feces must be separated from the clear essence; which, with respect to the first, will not be difficult to do, as the essence congeals with a slight cold, and the water may then be made to run off. If, after that, the essence is kept fluid by heat, the feces will subside, and may be separated; but if the operation has been neatly performed, these will be little or none. The feces are as highly perfumed as the essence, and must be kept, after as much as possible of the essence has been skimmed from the rose-water. The remaining water should be used for fresh distillations, instead of common water, at least as far as it will go.

The above is the whole process, as given in the Asiatic Researches (vol. i. p. 332), of making genuine ottar of roses. Attempts, as the writer states, are often made to augment the quantity, though at the expense of the quality. Thus the raspings of sandal-wood, which contain a deal of essential oil, are used; but the imposition is easily discovered, both by the smell, and because the essential oil of sandal-wood will not congeal in common cold. In other places they adulterate the ottar by distilling with the roses a sweet-scented grass, which colours it of a high clear green. This does not congeal in a slight cold. There are numerous other modes, far more palpable, of adulteration. The quantity of esential oil to be obtained from roses is very precarious, depending on the skill of the distiller, on the quality of the roses, and on the favourableness of the season. The colour of the ottar is no criterion of its goodness, quality, or country. The calyxes by no means diminish the quality of ottar, nor do they impart any green colour to it. They indeed augment the quantity, but the trouble necessary to strip them is such as to prevent their being often used.

The following is a simpler and less expensive process for preparing this delicate and highly valued perfume, but whether it be equally productive we know not. A large earthen or stone jar, or a large clean wooden cask, is filled with the leaves of the flowers of roses, well picked and freed from the seeds and stalks; and as much spring-water as will cover them being poured into the vessel, it is set in the sun in the morning at sunrise, and allowed to stand till the evening, when it is removed into the house for the night. In the same way it is to be exposed for six or seven days successively. At the end of the third or fourth day a number of particles of a fine yellow oily matter is seen floating on the surface; and these particles in the course of two or three days more collect into a scum, which is the ottar of roses. This is taken up by means of cotton tied to the end of a piece of stick, and squeezed with the finger and thumb into a small phial, which is immediately well stopped; and this is repeated for some successive evenings, or whilst any of this fine essential oil rises to the surface of the water.

ROSEHEARTY, a burgh of barony in the county of Aberdeen, situated on the shores of the Moray Frith, and eighteen miles from Banff. The inhabitants, who amount to about 800, are mostly employed in fishing. It possesses a harbour, which may eventually become of importance, situated as it is on an exposed part of the coast, with a considerable depth of water. Its revenues amount to about L.100 yearly.

ROSENAU, a city of the Austrian kingdom of Hungary, in the province of the Hither Theiss, and circle of Gomör. It is situated on the river Sajo, and is the seat of a bishop, and of an episcopal seminary. It contains several churches, 680 houses, and 5400 inhabitants, trading in linen, paper, woodware, and ironmongery, and also producing good wine. Long. 20. 27. 13. E. Lat. 48. 39. 2. N.

ROSENGYN, one of the Banda Isles, about seven miles south-east of Lantore. Convicts were sent here when the island was in possession of the Dutch. The productions are nutmegs, mace, and yams; and here a few cattle are also fed.

ROSETO, a small city of Italy, of the province of Principato Ulteriore, and of the kingdom of Naples. It was long celebrated from possessing in its church an image of the Virgin Mary, brought there, according to a legend, in a miraculous manner, which induced many pilgrims from all parts of Europe to resort to it for purposes of devotion, and to present very valuable offerings. It was taken and plundered by the French, and the venerated image having been obtained by a private individual, has been restored to its former place; but the number of votaries has much diminished. The inhabitants amount to about 3000, who subsist principally in making holy trinkets, and from supplying lodging and provisions to the pilgrims who still resort to it.

ROSETTA, a town of Africa, in Egypt, is pleasantly situated on the west side of that branch of the Nile called by the ancients *Bolbitinum*, affirmed by Herodotus to have been formed by art; the town and castle being on the right hand as you enter the river. Any one who sees the hills about Rosetta would judge that they had been the ancient barriers of the sea, and conclude that the sea has not lost more ground than the space between the hills and the water.

Rosetta is esteemed one of the most pleasant places in Egypt. It is about two miles in length, and consists only of two or three streets. The country about it is most delightful and fertile, as is the whole Delta on the other side of the Nile, exhibiting the most pleasant prospect of gardens, orchards, and corn-fields, excellently cultivated. This place is also famous for having produced the celebrated monument which, interpreted by Dr Young, led to the discovery of hieroglyphical literature, and threw new light on a subject of great antiquity. It consists of a black basalt, fragmented, which the French troops had found when digging the foundation of Fort St Julian; and is inscribed, as far as it is entire, with the hieroglyphic or sacred, the demotic or enchorial, and the Hellenic or Greek character.

In the country to the north of Rosetta are delightful gardens, full of orange, lemon, and citron trees, and almost all sorts of fruits, with a variety of groves of palm-trees; and when the fields are green with rice, it adds greatly to the beauty of the country. It is about twenty-five miles north-east of Alexandria, and a hundred north-west of Cairo. Long. 30. 45. E. Lat. 31. 30. N.

ROSICRUCIANS, the name of a sect of philosophers, called hermetical philosophers, who arose, as it has been said, or at least became first conspicuous, in Germany, in the beginning of the fourteenth century. They bound themselves together by a solemn secret, which they all swore inviolably to preserve; and obliged themselves, at their admission into the order, to a strict observance of certain established rules. They pretended to know all sciences, and chiefly medicine, of which they professed themselves

Rosicrucians.

the restorers. They pretended to be masters of important secrets, and, amongst others, that of the philosopher's stone; all which they affirmed to have received by tradition from the ancient Egyptians, Chaldæans, the Magi, and Gymnosophists. They have been distinguished by several names, accommodated to the several branches of their doctrine. Because they pretended to protract the period of human life, by means of certain nostrums, and even to restore youth, they were called *Immortales;* as they pretended to know all things, they have been called *Illuminati;* and because they have made no appearance for several years, unless the sect of Illuminated which lately started up on the Continent derives its origin from them, they have been called the *Invisible Brothers.* Their society is frequently signed by the letters F. R. C. which by some amongst them are interpreted *Fratres Roris Cocti;* it being pretended, that the matter of the philosopher's stone is dew concocted or exalted. Some, who are no friends to free-masonry, make the present flourishing society of free-masons a branch of Rosicrucians, or rather the Rosicrucians themselves under a new name or relation, namely, as retainers to building.

Notwithstanding the pretended antiquity of the Rosicrucians, it is probable that the alchemists, Paracelsists, or fire-philosophers, who spread themselves through almost all Europe about the close of the sixteenth century, assumed about this period the obscure and ambiguous title of Rosicrucian brethren, which commanded at first some degree of respect, as it seemed to be borrowed from the arms of Luther, which were a cross placed upon a rose. But the denomination evidently appears to be derived from the science of chemistry. It is not compounded, as many imagine, of the two words *rosa* and *crux,* which signify rose and cross, but of the latter of these words, and the Latin *ros,* which signifies dew. Of all natural bodies, dew was deemed the most powerful dissolvent of gold; and the cross, in the chemical language, is equivalent to light, because the figure of a cross exhibits, at the same time, the three letters of which the word *lux,* or light, is compounded. Now *lux* is called, by this sect, the seed or menstruum of the red dragon, or, in other words, that gross and corporeal light, which, when properly digested and modified, produces gold. Hence it follows, if this etymology be admitted, that a Rosicrucian philosopher is one who, by the intervention and assistance of the dew, seeks for light, or, in other words, the substance called the philosopher's stone. The true meaning and energy of this denomination did not escape the penetration and sagacity of Gassendi, as appears by his *Examen Philosophiæ Fluddanæ,* sect. 15, tom. iii. p. 261; and it was more fully explained by Renaudot, in his *Conferences Publiques,* tom. iv. p. 87.

At the head of these fanatics were Robert Fludd, an English physician, Jacob Böhm, and Michael Mayer. The common principles which serve as a kind of centre of union to the Rosicrucian society are the following. They all maintain that the dissolution of bodies by the power of fire is the only way by which men can arrive at true wisdom, and come to discern the first principles of things. They all acknowledge a certain analogy and harmony between the powers of nature and the doctrines of religion; and believe that the Deity governs the kingdom of grace by the same laws with which he rules the kingdom of nature, and hence they are led to use chemical denominations to express the truths of religion. They all hold that there is a sort of divine energy, or soul, diffused through the frame of the universe, which some call the *archeus,* others the *universal spirit,* and which others mention under different appellations. They all talk in the most superstitious manner of what they call the signatures of things, of the power of the stars over all corporeal beings, and their particular influence upon the human race, of the efficacy of magic, and the various ranks and orders of demons. These demons they divide into two orders, *sylphs* and *gnomes;* which supplied the beautiful machinery of Pope's Rape of the Lock. In fine, the Rosicrucians and all their fanatical descendants agree in proposing the most crude and incomprehensible notions and ideas, in the most obscure, quaint, and unusual expressions.

ROSLIN, or Rosslyn, a village in the county of Mid-Lothian, Scotland, about seven miles south from Edinburgh, celebrated for the picturesque ruins of its castle, the architectural grace of its chapel, and the sequestered but variegated scenery of the vale in which they are placed. Roslin was formerly a place of some note, being next to Edinburgh and Haddington in importance, and was made a burgh of barony by James II. of Scotland, and privileged by holding fairs and markets. The sole dependence of the inhabitants at the present time is on agriculture and the bleaching of linen. The castle is situated on a peninsular rock, round which the South Esk river pursues its course; and is connected with the adjacent ground by an old narrow bridge thrown over a deep cut chasm in the solid rock. The original castle was most likely erected in the eleventh century. It must have been increased from time to time in after years, as we learn that when the Earls of St Clair were in their glory, the castle was not only a massive and extensive building, but characterized by great splendour in its internal decorations. All that now remain are some high fragments of the walls and battlements, and a triple tier of vaults. Amidst the ruins, and partly above these vaults, was built a more modern house, bearing the date of 1622, which is still inhabited.

The chapel was founded in the year 1446, by William St Clair, prince of Orkney and lord of Rosslyn, for a provost, six prebendaries, and two choristers, and consecrated to St Matthew. Tradition states that the design of the building, which was intended for a large collegiate church, was drawn at Rome; and that the prince employed the best workmen that could be procured, both from the Continent and at home, in the erection. The chapel, which is merely the chancel and part of the transept of the original design, is unique in style, and cannot be said to belong to any order of architecture. It however combines the solidity of the Norman with the elegance and minute profusion of ornament characteristic of the latest species of the Tudor age. The interior is sixty-eight feet in length, thirty-four feet in breadth, and forty feet in height. It is divided into a centre and aisles, by two ranges of clustered pillars, eight feet in height, adorned with sculptured foliage and figures of human beings and animals, of the most exquisite workmanship. The pillars are so arranged that their ceilings are thrown into one, so as to form a continued arch along the centre of the building. One pillar, conspicuous for its elaborate decorations, is called the "prentice pillar," from its having been sculptured by an apprentice, who is said to have lost his life from having thus excited the professional jealousy of his master. At the reformation in 1688 this chapel was, like many other sacred edifices of taste, defaced by a mob from Edinburgh; but it was repaired in the following century by General St Clair. The present Earl of Rosslyn is judiciously, and with great taste, restoring this venerable structure to its original state. Beneath this chapel lie the barons of Roslin, all of whom were, till the time of James VII., buried in armour. Near this was fought, in February 1302, the three celebrated battles of Roslin, where the Scots, under the regent Sir John Comyn, and Sir Simon Frazer, attacked and defeated three divisions of the English army.

ROSS, a market-town of the county of Hereford, in the hundred of Greytree, 115 miles from London. It is finely situated on a hill rising from the river Wye. Its chief trade is in the sale of cider. Pope has immortalized the place by his laudatory description of one of its residents, John

Kyrle, who died in 1724, having spent his income on works of utility and of beneficence. The market is held on Thursday. The population amounted in 1801 to 2347, in 1811 to 2261, in 1821 to 2962, and in 1831 to 3078.

Ross, or Ross Carbery, a town in the county of Cork, Munster, Ireland, is situated on an eminence, at the head of a narrow creek in Ross Bay. It is a place of great antiquity. The town is laid out on a regular plan, and consists of a square, from the four corners of which diverge so many streets. It has an ancient cathedral, embosomed in trees, which, with the wooded banks of the bay, forms a remarkably beautiful feature in the appearance of the town. The harbour is spacious, but of little use, in consequence of being blocked up by the sand. The population amounted in 1831 to 1522.

Ross, *New*. See New Ross.

ROSSIANO, a city of Italy, in the province of Calabria Citeriore, and the kingdom of Naples. It stands on the sea-shore, between the rivers Lucena and Celano. It is the see of a bishop, and has a cathedral, and twenty-three other churches, of which nine belong to the same number of monasteries or nunneries. The inhabitants amount to 7700.

ROSS-SHIRE, a county of Scotland, having that of Cromarty so curiously intermixed with it, that the description of both under one head is a matter not only of convenience, but of necessity. Ross-shire, comprising the districts of Ardross, Easter Ross, Ardmeanach or the Black Isle, Kintail, Strathcarron, and the island of Lewis, is the most extensive county in Scotland, and second only to Yorkshire as regards Great Britain. The county of Cromarty, on the other hand, is comparatively small. It is divided into ten portions, which are whimsically inserted into various parts of the larger county of Ross, like fragments of a more ancient rock in some newer geological formation. One of these parts is the original county of Cromarty, so called from *Cromba*, that is, crooked bay, from the windings of its shores, consisting of that portion which lies in the peninsula to the south of the Cromarty Frith, and which surrounds the county town. This part rises like a huge lump to a height of 470 feet above the level of the sea, which washes the base of its cliffs. As a county, it was very inconsiderable both in extent and in value. But by the straggling additions which were made to it towards the end of the seventeenth century, it was increased to fifteen times its former extent. Of these additions, one is that district surrounding Tarbat House, on the northern shore of Cromarty Bay; and a second runs from the south side of Dornoch Frith to Moray Frith, cutting off that portion of the county of Ross which terminates in Tarbat Ness. Two more fragments are found lying on the north of the river Carron, which has its embouchure near Bonnar Bridge; a fifth is that which runs northward from the burgh of Dingwall, taking in Castle Leod and part of Ben Weavish; the sixth lies to the north of Loch Fannich, at some distance to the north-west of which a triangular morsel is found to the north of Loch Nid; the eighth is that which stretches along the southern shore of Little Loch Broom; and the ninth is the large district of Coygach, lying between the northern shore of Loch Broom and Sutherlandshire; to which may be added the Summer Islands at the mouth of Loch Broom, which are about sixty miles distant from the town of Cromarty. As we have already mentioned under the article Cromarty, this strange arrangement of territory was produced by the influence of that great and powerful proprietor, George viscount Tarbat, afterwards earl of Cromarty, who, wishing to have all his various lands included in one shire, got them annexed to his own county in 1685 and 1698. But these were not all, nor the most extraordinary, annexations which he accomplished. For, as a part of the county of Cromarty, we are compelled to notice Royston, or Caroline Park, locally situated within the county of Edinburgh, and but a couple of miles from the Scottish capital. But such arrangements were by no means singular. The district of Ferintosh, belonging locally to Ross-shire, is in fact a part of Nairnshire; and from similar causes many of the houses in the Canongate of Edinburgh belong to different counties in Scotland, from their having been the town residences of Scottish noblemen whose estates lay in those different shires. By the addition of all those portions which we have enumerated, the extent of Cromarty is calculated to be equal to an area of 345 square miles, or about 220,800 imperial acres. It contains only one entire parish, that of Cromarty, the other parts of it being parochially connected with parishes belonging to Ross-shire. The two towns of Cromarty and Ullapool belong to it, and its whole population may be estimated at about 5000 or 6000 souls. It is judicially under the jurisdiction of the sheriff of Ross, the sheriff-court being held at Cromarty every alternate Friday; and it is politically united with Ross-shire in returning a member to parliament. It contains about 20,000 arable acres. It has a considerable trade in pork for the English market; and at Cromarty there is a thriving manufactory of hempen cloth, which employs about two hundred individuals.

Having thus given a general notion of the county of Cromarty as distinct from that of Ross, we may now proceed to consider the united counties under one view. Ross has its name from *Ross*, a promontory, and probably from that of Tarbat Ness. The united shires lie between 57. 8. and 58. 10. north latitude, and between 4. 0. and 5. 46. west longitude from Greenwich. From the extreme northern point of Coygach, to the southern extremity of the Ross-shire boundary, which lies to the north-east of Loch Hourn, in Inverness-shire, the distance may be about seventy-two miles; whilst from Strath Oikel to the Cowrie Water the measurement is not more than thirty or thirty-five miles. The breadth from Tarbat Ness to the extreme western coast to the north of Gairloch is about eighty-five miles. The whole surface may be about 2424 square miles, or about 1,545,600 acres; but to this must be added the Lewis, which contains four of the thirty-three parishes of which the united county of Ross and Cromarty consists. The boundaries are Sutherlandshire and Dornoch Frith on the north, and Moray Frith on the east, Inverness-shire on the south, and the Western Ocean on the west. On the eastern coast Cromarty Frith shoots inland from that of Moray through the narrow strait produced by those grand and picturesque headlands called the Sutors of Cromarty, and expands into a still and land-locked basin, capable of holding the whole navy of Great Britain. The headlands themselves are so lofty and precipitous, that it is not uncommon during gales of wind from the north-eastward, to see waves breaking upon them to the height of an hundred feet, whilst all within is smooth. Stowe, in his Chronicle, calls it "an exceeding quiet and saue hauen;" Boyce calls it "the hail of seamen;" and Buchanan is still more particular in his praise of it. It is rather more than five miles broad at the widest part, and its length is about eighteen. The depth averages from nine to twelve fathoms, but in the entrance it in some places exceeds thirty, a depth which nearly doubles that of Moray Frith, into which it opens. The continuity of outline of the western coast is interrupted by many bays and sea-lochs, which afford numerous havens of shelter. From south to north, these are Loch Alsh, with its two branches Loch Duich and Loch Ling; Loch Carron, with its branch Loch Keeshorn; Loch Torridon, Gairloch, Loch Ewe, Loch Greinord, Little Loch Broom, Loch Broom, and Loch Enard. All these exhibit magnificent scenery. That of Loch Torridon, for example, is of the grandest and wildest character; as is likewise that of Loch Duich, rendered peculiarly interesting by the remains of the Castle of Eilean Donnan, the ancient stronghold of the Mackenzies, the Lords of Kintail. The outer headlands of the western coast of Ross-shire, north of Loch Carron, are composed of sandstone, exhibiting the usual smooth and regular outline characteristic of that formation; and hence the promontories are tame, and of an unvaried reddish coloured aspect, and the shores of the bays are for the most part covered over with brown heath. It is therefore more in the inner recesses of these inlets, and perhaps somewhat inland, that truly beautiful and romantic scenery is to be found. The coast of the island of Lewis is so indented with bays, lochs, creeks, and long and tortuous arms of the sea, as to bid defiance to any enumeration or description within the confined limits assigned to this article.

The general surface of Ross and Cromarty is wild and mountainous, the mountain chains and groups being interspersed with valleys, glens, lakes, and rivers, exhibiting nature in every variety of form and character. The mountains, and particularly those towards the west, are covered with excellent pasture for sheep. Some of the sheep-farms are extensive, and possessed by sheep-farmers of capital, who have introduced the Cheviot breed of sheep, or a cross of that breed. The valleys and glens are depastured by large herds of cattle. Although agriculture is found in patches in the valleys and on the shores of the west coast, the great agricultural district of Ross and Cromarty is that extending from Dingwall along the northern shore of Cromarty Frith, and so onwards in a north-eastern direction along the Moray Frith and that of Dornoch. The soil and climate of Easter Ross are as fine as any in Scotland, the agriculture is of the very best description, and the numerous gentlemen's seats and extensive plantations with which it is ornamented render this one of the most pleasant, smiling, and cheerful countries that the stranger can visit. All the grains and other agricultural produce of Britain are here raised in perfection; and if we were desired to fix on a spot in any part of Scotland where the best fruits could be produced, or where the rarest or most delicate plants or trees could best be reared, we should be disposed to fix on Tarbat House, on the northern shore of the Bay of Cromarty. We may further venture to assert, that no traveller of taste can possibly drive along that northern shore, from Dingwall eastwards, without very great enjoyment. The roads made in Ross-shire by the parliamentary commissioners are extensive and excellent, and they are kept in the highest state of repair. Many of the wildest and most unapproachable districts have thus been opened; but there are still many left hermetically sealed against all but the adventurous horseman or the unwearied pedestrian.

Amongst the numerous fresh-water lakes and rivers to be found in Ross and Cromarty, we may particularize the following. On the eastern side of the island we have Loch Ailsh and Loch Craggan, that give birth to the river Oikel, which divides Ross-shire from Sutherland, and which, after a course of forty miles, finds its way into the upper end of Dornoch Frith, near the fine iron-arched bridge of Bonnar. Then, as we move southwards, we have the river Carron and the Water of Fearn, discharging themselves into the same frith. Cromarty Frith receives the large and important stream of the river Conan, which drains off the waters of Lochs Tolimuir, Garrogan, and Garve; Loch Fannich, Loch Roslik, Lochs Lett, Achin, Hular, and Luichart; Loch Benachan, Loch Scolbuck, and Lochs Negin and Nerick, and Loch Gowrie, by the important tributary river Orrin. Lochs Calavie and Gedd furnish their supplies to the river Beauly of Inverness-shire. Loch Clunie, half of which is in Ross-shire, pays its tribute to Loch Ness by the river Morrison. On the west coast we have the rivers Sheil and Ling, the one tributary to Loch Duich, and the other to Loch Ling; the river Carron discharging into Loch Carron the waters of Lochs Doule and Scaven. In Applecross we have Lochs Lundie and Damph, and the rivers of Applecross and Torridon, the last mentioned discharging itself into Loch Torridon. Loch Vallich, and a great chain of small lakes, empty their waters into Gairloch, as do Lochs Naheig, Padnascally, and Slattadale. The river Ewe, which is only one mile in length, discharges into Loch Ewe the waters of the grand Loch Maree, together with those of Loch Clare and its chain of small lochs, and those of Loch Gurraig; Loch Poolewe also sends its stream into Loch Ewe. Loch Fuir and Loch Shallag have their embouchures in Loch Greinord. The waters of Lochs Arin and Druin find their way into Loch Broom, as do those of Loch Damph and Loch Auchall, and those of Loch Cruisk through the stream of the Strakemort; Loch Kynoch, Loch Lurgan, and Loch Baddagyle send their streams into Loch Enard; and Lochs Skinaskink, Achyle, Vattie, and Fin also discharge themselves into the same bay, at the north-western point of the Coygash part of Cromarty. All these lochs and streams abound with fish, and salmon are particularly abundant in all the rivers, especially in the Oikel and in the Ewe. Short as is the course of this last-mentioned stream, it so swarms with salmon that twenty fish are no uncommon number for an expert angler to take in one day. Loch Maree, from which it derives its stream, is by far the largest and finest lake in Ross-shire. It is eighteen miles long, and from one to three miles broad; and the greater part of it is full sixty fathoms deep, so that it has never been known to freeze even in the most intense frosts. It contains no less than twenty-four islands, and its mountains are magnificent. The highest of the group is Sliabhach or Slioch, which is estimated at about three thousand feet. The Messrs Andersons of Inverness, in their admirable Guide to the Highlands and Islands of Scotland, tell us that the scenery of this lake is the most utterly savage and terrific, in its barrenness and loneliness, of any part of this land of the mountain and the flood. A few ash-trees, oaks, birches, and pines, the latter but remnants of a gigantic ancient forest, are seen along the water's edge, and beautify some of the islands in a high degree. But above this narrow zone scarcely a blade of grass exists, and eternally recurring sheets, precipices, and tables of dark-brown sandstone and quartz rock meet the eye in every direction. Ben Eye, at the south-eastern end, is the only exception, for it consists of two high sharp peaks of pure white quartz rock, and its form is altogether beautiful and stately. The Corries, and the solitudes of Glen Logan, opposite to it, on the other side of the lake, are the favourite haunts of the red deer. Ben Lairg and Stengach, also on the northern shore, are both stupendous mountains: the former recedes to a considerable distance from the margin of the lake, while the latter is visible at once from its base to the summit. Its lower acclivities are remarkably steep, and in one part it presents a front of abrupt lofty cliffs, disposed in great horizontal sections, along the crevices of which a few aged and fantastically shaped pine-trees are seen casting forth their arms against the western breeze. Its rocks contain an unexampled number of varieties of quartz, and the view from its top is unusually grand and extensive. The easiest way to survey its scenery is from a boat. The path on the northern shore by Letterewe is hardly passable, and that on the opposite side is surpassed by none in the Highlands for ruggedness and sterility. It clambers up many rocky channels of torrents, and then, adapting its course to the shelf of a long ledge of sandstone, it stops suddenly over a precipice, leaving the bewildered stranger in utter uncertainty where he is next to step. Yet there are many beauties mingled with all this ruggedness, and some of the numerous little bays are full of the loveliest features of fairy landscape. In the middle of this romantic lake, there is an island, called Island Maree, on which there is a very ancient burying-ground. Some think that it was dedicated to the Virgin Mary, and that, from this circumstance, both the island and the lake derived their name. It contains a number of tombstones covered with inscriptions and hieroglyphical figures, which can hardly now be satisfactorily deciphered. Some of these are believed to be tombs of Danish kings, which induces certain individuals to believe that the name is a corruption from *Eilean-nan-Righ*, or the King's Island; whilst others take it from a good man called Saint Maree, who inhabited this island many generations ago, and of whose benevolent and charitable actions many traditions are still preserved in the surrounding districts. In the centre of the island there is a deep well, dedicated to Saint Mary or Maree. To this a strange superstition attaches. Unhappy maniacs are carried to it and made to drink of its waters; after which they are plunged into the lake, and towed round the island at the stern of a boat, in the absurd hope that they will be thus restored to their senses. Fortunately for humanity, this absurd practice is fast wearing out.

The scenery on the river Conan and some of its tributaries is beautiful and interesting. The falls of Rogie are by many considered as inferior only to those of Foyers and Moness. We may indeed affirm that most of the valleys or river-courses in the united counties are more or less worth visiting, for the wild, the romantic, or the retired pastoral scenes which they contain. The waterfall of Glomach, in the parish of Kintail, is one of the highest and finest in the kingdom. It is to be found in a remote uninhabited valley on the estate of Mr Mackenzie of Applecross, about seven miles from the inn of Sheal-house; and it will well repay the lover of the grandeur of nature for any fatigue or trouble which he may have in visiting it. Its height, lately ascertained, without instruments, but as accurately as the nature of the ground admitted, is about 350 feet. At the height of about fifty feet the water meets with a slight interruption from a shelving projection in the rock. This, however, is a circumstance that adds greatly to the effect, by increasing the volume of spray, and producing variety in the form of the fall. But when the river Girsac is swollen, the sheet of water is unbroken, terrific, and sublime. The fall is best viewed from a solitary tree standing on a narrow neck of rock projecting towards the water, about 100 feet down the ravine, to the south-west of the fall. There the stream appears to issue from an oblong fissure in the rock, from whence, with a fearful rush, it urges its way, chiefly in one great column, to the pool below, from which, at this station, no outlet can be perceived. The environs of the fall are wild and barren, consisting of great naked sheets of perpendicular rocks partially covered with tufts of grass, ferns, or mountain saxifrage, adding, if possible, to the savage character of the scene.

The mountain groups of Ross and Cromarty are very lofty. They rise gradually from the east coast, and more suddenly and boldly from the western sea, to which the summit-level of the country is more generally approximated. The mountains are all of the primitive formation, the secondary strata being found reclining on it on both sides of the island. The granitic series present extremely abrupt sections towards Moray Frith, and there we also find the older and other sandstones, with argillaceous formations abounding in animal remains, with plates resembling those of the tortoise, pieces of rough skin like that of the shark, the scales and bones of fish; and in a ridge of bituminous shale, near the Cromarty rocks, we find ammonites, bellemnites, scallops plain and striated, pieces of wood, and a thick fleshy-looking leaf resembling that of the aloe. The mineralogical catalogue is large. Limestone, and primitive limestone of the character of marble, are very commonly to be met with. Ironstone is disseminated in great abundance. A vein of iron was worked above 150 years ago on the shores of Loch Maree, the works having been discontinued solely from the failure of wood necessary for fuel. There is a rich vein of iron ore in the parish of Alness, and in the same vicinity there is a vein of lead, and indications of that metal have been found in the parish of Kiltearn. A copper-mine at Keeshorn, in the northern district of the parish of Applecross, was considered by Williams as equally rich with any mine of the same metal to be found in Great Britain. On the farm of Scorraig, on the Dundonnell estate, there is a prodigious quantity of bog-iron ore, which gives a strong and harsh chalybeate taste to all the springs in the neighbourhood. There are various mineral springs in the united shires of Ross and Cromarty, but those which have attained the greatest celebrity are the two wells of Strathpeffer, which have now for many years attracted numerous visitors to their neighbourhood in search of health and recreation. Both of these springs have the smell of sulphuretted hydrogen gas, but the upper spring is stronger than the lower. According to Dr Thomson, the temperature of the lower well, on the 24th of June 1824, was 39°, and that of the upper 39¾°, the day being rainy, and the temperature of the air rather under 60°. The specific gravity of the water of these wells was as follows:

Upper well	1·00193.
Lower well	1·00091.

An imperial gallon of the upper spring was found to contain,

Sulphuretted hydrogen gas	26·167	cubic inches.
Sulphate of soda	67·770	grains.
Sulphate of lime	39·454	...
Common salt	24·728	...
Sulphate of magnesia	6·242	...

An imperial gallon of the water from the pump-room yielded

Sulphuretted hydrogen gas......13·659 cubic inches.

The saline contents were similar to those of the upper spring, but in the proportion to them of seven to nine, viz.

Sulphate of soda	52·710	grains.
Sulphate of lime	30·686	...
Common salt	19·233	...
Sulphate of magnesia	4·855	...

Many of the mountains of Ross and Cromarty are of first-rate British magnitude. Scuirvullin is about 2500 feet high. It consists entirely of micaceous schist, inclining in some places to gneiss, and traversed by a few granite and quartz veins. The rocks lie in thin upright stratiform shapes, which dip in opposite directions all round the mountain; and they contain numerous round nodules of quartz, feldspar, and red garnets. All the common alpine plants are to be met with on Scuirvullin. Ben Weavish, or Ben Uaish, that is, the mountain of storm, is one of the most remarkable mountains, not only in Ross and Cromarty, but in Scotland. Its height, by the late trigonometrical survey, is 3720 feet; but it is most wonderful for its immense bulk, by which it stands prominently distinguished from the other hills around it, so as to be peculiarly striking from great distances. Its corries or ravines are never without snow, so that the proprietor can always fulfil his quit-rent by paying a snowball to his sovereign when required to do so, on any day of the year. The primitive rocks of which it is composed are chiefly a gray gneiss, abounding in large scales of mica and garnets, which impart great beauty to the unpolished rock, though they are not sufficiently pure or free from cracks to be used as ornamental stones. The plants which it presents most interesting to the botanist are, *Saxifraga oppositifolia, Arbutus alpina, Azalea procumbens, Betula nana*, &c. Bean Dearig on Loch Broom is 3551 feet in height. It is composed of gneiss, with granite veins and beds of quartz. We might mention many other mountains, but we shall content ourselves with stating, that Tullochard, on the north side of Loch Duich, merits particular notice, from being the crest of the Seaforth family, and from its summit in ancient times being used to blaze with those beacon-fires that raised up the whole country at the will of its lord.

The natural woods in Ross and Cromarty, though much diminished, are still numerous, and widely scattered through the glens and over the mountain sides. The trees are chiefly firs, oaks, ash, birch, and alder. The whole face of the wilder country bears the strongest evidence of its having been once covered with extensive forests, fragments of which only now remain in certain places, whilst the mosses or bogs still preserve the trees which have probably fallen by extensive conflagrations. In the central district, the forest of Fainish still stands, twenty miles in extent. But as these ancient forests are diminishing, artificial plantation, already very extensive, is every day increasing with rapid strides; and in many parts of the country even the soil that is apparently the most barren appears to have a tendency to throw up young plants of birch, and in some places of oak, proving that it is so filled with the seeds or roots of those trees that preservation from sheep and cattle is all that is wanting to restore the ancient natural forests. The island of Lewis is almost entirely destitute of trees.

From the great extent and immense variety of elevation and of surface of Ross and Cromarty, it naturally contains by much the greater part, if not nearly all, the plants to be found in the Flora Scotica; and in the same way, speaking generally, almost all the animals to be found in the zoology of Scotland have been discovered to belong to it. The larger wild quadrupeds are red and roe deer, hares, alpine hares, foxes, badgers, wild cats, &c. Grouse, ptarmigan, black game, and partridges abound; and in some places pheasants have been introduced, and have amazingly increased. We are not aware that any attempt has been as yet made to restore to the older forests that magnificent bird, once indigenous to them, we mean the *Tetrao urogallus*, cappercailzie, or cock of the woods; but such an attempt would be highly desirable, and, from the facility with which the live birds may now be obtained from Norway, it might be made with comparative ease. The golden eagle and the ospray are both common, as well as all the other birds of prey. Water-fowls of all kinds abound on the coasts; and the frith of Cromarty is especially remarkable for the number and variety of sea-fowl which may be obtained by the skilful sportsman. In severe winters it frequently happens that many wild swans are shot there. The list of fishes, both marine and fresh-water, is very ample. Salmon, as already noticed, are especially abundant; and the trouts of Loch Luichart, and many other lakes, are far famed. The pearl mussel, *Mya margaritifera*, is found in the stream of the river Conan, and frequently affords pearls of remarkable beauty. In Strath Conan bees are much cultivated, and a great deal of honey is made in that district.

The landed property of these united counties is chiefly divided into estates, which are more extensive in surface than valuable in rent, the average of them being upwards of 16,000 imperial acres. The whole is valued in the cess-books at L.75,043. 10s. 3d. Scots, and in 1811 the real rent was valued at about L.91,089. 18s. 8d. sterling, affording a mean rental for each estate of not more than L.1075, or about one shilling and fourpence an acre. But we are disposed to think that this last calculation would now be considerably increased, both by the more extensive and better managed occupation of the hills with sheep-farms, and the improvement which has taken place on the agricultural districts. As a sample of the best soil, we may state, that the average rent of arable land in the parish of Dingwall is about L.2 an acre, though some of it is as high as L.4. 10s. The wages of farm-servants in the same district are L.7 or L.8 in money, seven bolls of meal, a quarter of an acre of potatoes, and a free house and garden, altogether worth about L.20. Occasional labourers get about seven shillings and sixpence a week, and country artisans about nine shillings. Mason-work is from L.1. 16s. to L.2 a rood, journeymen being paid about twelve shillings a week. Carpenters are paid from ten to twelve shillings, and slaters about twelve shillings a week. The gentlemen's seats are numerous in Ross and Cromarty, but they are chiefly situated in the eastern or more cultivated districts.

We have already said that the system of agriculture pursued in the more favourable and more strictly agricultural districts of Ross and Cromarty does not fall below the standard of more southern counties. The farms are extensive, and generally let on leases of nineteen years' duration. They are for the most part well enclosed, and the dwelling-houses and other buildings are large and commodious. In the poorer districts, and especially on the west coast, and in Lewis, where the farmers hold only a few acres of arable land, they raise oats, bear or big, and potatoes; and in many places where grazings are attached, they rear a great many cattle and horses of the Highland breed, both of which are often very much stinted in their growth for want of sufficient food in severe winters. Illicit distillation, which once so much occupied these smaller tenants, has now, we believe, been effectually put an end to, chiefly by the introduction of legal small stills. The climate, particularly towards the west coast, may well be termed rather a weeping one; and the carrying of the crops in the western districts is often an exceedingly precarious operation. But where there is so great a variety of surface, we must also look for a great variety of climate. The following meteorological tables, taken from the Statistical Account of the Parish of Dingwall, may furnish a general average view of the climate of the more thickly inhabited districts.

Years.	January.			February.		
	Bar.	Ther.	Hygr.	Bar.	Ther.	Hygr.
			Inches.			Inches.
1831	29·803	35·80	1·09	29·61	39·10	2·33
1832	29·740	40·00	0·95	29·84	41·91	1·07
1833	30·120	30·00	0·41	29·245	36·53	2·26
1834	29·350	41·40	3·53	29·763	42·60	2·55
1835	29·795	37·35	3·21	29·350	39·30	4·17

Years.	March.			April.		
	Bar.	Ther.	Hygr.	Bar.	Ther.	Hygr.
			Inches.			Inches.
1831	29·658	43·90	3·71	29·723	47·80	1·75
1832	29·614	43·15	3·56	29·965	47·95	1·52
1833	29·915	39·25	0·43	29·615	45·59	1·06
1834	29·860	43·40	4·33	30·160	47·98	0·53
1835	29·725	41·05	2·60	30·000	45·29	3·12

Years.	May.			June.		
	Bar.	Ther.	Hygr.	Bar.	Ther.	Hygr.
			Inches.			Inches.
1831	29·945	57·30	2·13	29·845	60·50	1·37
1832	29·903	50·29	1·56	29·806	56·96	3·38
1833	29·950	57·50	1·12	29·630	57·80	2·49
1834	29·890	56·00	1·20	29·775	58·60	3·26
1835	29·750	51·65	2·24	29·957	57·60	1·22

Years.	July.			August.		
	Bar.	Ther.	Hygr.	Bar.	Ther.	Hygr.
			Inches.			Inches.
1830	29·940	93·80	...	29·470	56·00	...
1831	29·730	62·20	1·52	29·834	63·60	1·40
1832	30·010	59·40	...	29·750	60·25	...
1833	29·910	62·00	3·31	29·865	58·60	1·33
1834	30·120	64·15	3·57	29·755	60·21	1·46
1835	29·840	59·85	2·15	29·892	58·58	1·43

Years.	September.			October.		
	Bar.	Ther.	Hygr.	Bar.	Ther.	Hygr.
			Inches.			Inches.
1830	29·480	54·47	...	30·030	51·12	1·20
1831	29·794	56·38	1·80	29·499	53·31	3·02
1832	29·895	55·23	2·45	29·766	49·95	3·24
1833	29·785	57·50	0·74	29·630	52·57	1·23
1834	29·960	55·85	2·71	29·770	48·87	3·96
1835	29·470	52·89	3 94	29·590	44·95	2·48

Years.	November.			December.		
	Bar.	Ther.	Hygr.	Bar.	Ther.	Hygr.
			Inches.			Inches.
1830	29·480	42·95	4·02	29·567	36-46	1·87
1831	29·604	39·97	4·10	29·497	42·62	3·19
1832	29·630	39·50	1·34	29·630	38·25	3·36
1833	29·530	44·50	3·82	29·240	40·45	5·98
1834	29·775	43·10	5·37	30·080	43·17	2·87
1835	29·740	41·33	2·17	29·980	36·27	2·57

Years.	Mean of Years.		Mean of Months.			
	Bar.	Ther.		Hygr.		Hygr.
1830	29·701	50·80	Jan.	1·83	July	2·63
1831	29·712	49·657	Feb.	2·47	Aug.	1·40
1832	29·795	48·570	March	2·92	Sept.	2·32
1833	29·703	48·524	April	1·57	Oct.	2·52
1834	29·855	50·494	May	1·65	Nov.	3·47
1835	29·757	47·150	June	2·35	Dec.	3·04

The introduction of steam-navigation has already begun to improve Ross and Cromarty, not only by making them more easily accessible, but by the opening which it has created for the export of cattle and sheep to London. The change in this respect may be readily conceived, when we consider the immense land-journey which the animals had to undergo before they could be brought to the London market. They were driven off in a lean state, and were fed in southern pastures before they could there be produced. Now, a Ross-shire farmer has it in his power to send them direct to the London market, so fed as to be in a condition for immediate slaughter; and thus he is placed on an equality, with regard to expense of transport, with any English farmer who may not be fifty or sixty miles from London. The effect of this in raising the value of property in these and other northern counties may easily be imagined.

The importance of the fisheries to Ross and Cromarty may be estimated from the following table, furnished by Mr Dunsmure, the secretary of the Board of Commissioners for the Herring Fishery.

Account of the quantity of White Herrings and Cod, Ling, or Hake, cured at the stations of Cromarty, Loch Broom, Loch Carron, Loch Shildag, and Stornoway, in the ten years ending 5th April 1839.

Year ending 5th April.	Herrings Cured.	Cod, Ling, or Hake, Cured.		Number of Boats.	Number of Persons.
	Barrels.	Cured Dried. Cwts.	Cured in Pickle. Barrels.		
CROMARTY.					
1830	11,404	9¾	270½	304	5052
1831	3,819	187½	35½	302	5287
1832	4,149½	20	47	277	4821
1833	642½	...	194½	299	5332
1834	10,318	192½	18½	297	5309
1835	1,903	418¼	114	285	5261
1836	6,140	...	238½	294	5310
1837	7,656	262¾	241	282	5291
1838	9,461	83½	426	284	5344
1839	10,737½	607½	320	300	5479
LOCH BROOM.					
1830	2480	376¾	...	468	2303
1831	2605	221	...	474	2092
1832	3836¾	156	...	476	2325
1833	2571	527¾	...	472	2333
1834	1054	407½	...	402	1779
1835	413	161	...	402	1682
1836	199	412¼	...	427	1716
1837	449½	310¼	...	432	1795
1838	1855	515	...	410	1759
1839	624	615¼	...	451	1918
LOCH CARRON.					
1830	798	438¼	...	581	5212
1831	593	548¼	...	598	5381
1832	939	1008¾	...	880	6790
1833	946	1057½	...	903	6991
1834	953½	409¾	...	909	7116
1835	1011	244¼	...	918	7199
1836	506½	556½	...	916	7272
1837	422	690	...	909	7159
1838	837	616	...	839	6738
1839	298	975¼	...	775	6486
LOCH SHILDAG					
1830	849	923¾	...	233	1105
1831	388	658½	...	182	1016
1832	1020	121¾	...	189	870
1833	433	...	...	203	875
1834	1124	...	...	201	846
1835	464	83½	...	199	827
1836	333½	82½	...	194	863
1837	588	97	...	202	940
1838	452	198	...	193	805
1839	377½	60	95	186	805
STORNOWAY.					
1830	1538½	5,734¾	30	430	3159
1831	217	5,829½	...	430	3220
1832	2077½	5,294½	...	433	3118
1833	1082	7,034	...	437	3148
1834	398	7,420½	...	444	3186
1835	158	4,355¼	...	447	3207
1836	195	4,148¾	...	438	3318
1837	238	8,612¾	...	459	3455
1838	881	8,852¾	...	484	3649
1839	46	12,353¾	...	579	4244

In the above table, it must be observed that the column of persons employed comprehends not only the fishermen, but the coopers, labourers, gutters, packers, and those engaged in cleaning and drying the fish. It is also to be noticed, that the Loch Carron fishery district includes the Isle of Skye in Inverness-shire. The official brand applied by the officers of the board to the casks of herrings cured and packed, strictly according to the acts of parliament by which the commissioners are guided, is so highly estimated as to give a confidence and a ready sale, and a superiority of price, in all foreign markets, which no herrings can obtain without it. It is therefore becoming every day more and more highly appreciated both by fish-curers and merchants. Every kind of fish that frequents the northern seas may be taken on the coasts of Ross and Cromarty, particularly on those of the island of Lewis. The Broad Bay flounder of Stornoway is the finest in the world. The saithe is much more delicate than the whiting. The haddock is remarkably good. In Lewis, in the parish of Lochs alone, above 100,000 lobsters are sent annually to the London market. Whales, porpuses, and grampuses, are often driven on shore in Lewis in numbers amounting to a hundred and fifty or more, and varying from five to thirty feet in length.

The manufacture of kelp is still extensively practised, especially on the western coast and in Lewis; but the price is now so low and fluctuating, and the time and trouble bestowed in making it so great, that it is believed the sea-weed employed would be much more profitably used as manure.

The burghs of Cromarty, Dingwall, and Tain, along with Dornoch, Wick, and Kirkwall, return a member to parliament. Fortrose and Rosemarkie, two small adjacent towns included in one burgh, return a member along with Inverness, Nairn, and Forres. Besides these burghs, the united county has several villages or small towns in it, such as Contin, Shildag, Dornie, Plocktown, and Ullapool, which last has 500 or 600 inhabitants. Stornoway, in Lewis, is a thriving burgh of barony, with some good streets of houses, and a considerable quantity of shipping, and, with its suburbs and environs, it contains nearly 3000 inhabitants. Sheriff and commissary courts, bailie, excise, and justice of peace courts, are regularly held in it.

In Ross and Cromarty there are many ancient and curious remains. In the parish of Nigg, the site of the castle of Dunskeath, built by William the Lion in the year 1174, is still to be distinguished. At Shandwick is the *Clach-a-Charridh*, or the Stone of the Burial-place. On one side of it a large cross is still to be traced, wrought with an intricate maze of runic knotting. On the sides of the shaft are two animals resembling an elephant and a lion, above each of which there is a figure that appears to lean forward from a cross. On the reverse side of the obelisk there are processions, hunting scenes, and combats. The ground surrounding the spot where it stands was for centuries used as a place of interment. There is a similar though smaller stone in the church-yard of Nigg. It originally stood near the gate, but it was thrown down by the fall of a belfrey in 1725, and it is now fixed to the eastern gable. The top is of a triangular shape, and it has on one side of it two priest-like figures attired in long garments, each furnished with a book, and inclining forward as if intent on reading and devotion. Between them is a small circular table or altar; and a dove seems to descend from above with a circular cake in its bill. Under the table there are two large dogs. Lower down on the stone there is a cross, and the spaces above and below the arms of it are divided into rectangular compartments of mathematical exactness. The hieroglyphics of the opposite side are in lower relief; and in the centre appears the chief figure, that of a man attired in long garments, caressing a fawn, with a lamb and harp directly fronting him. In the space beneath there is a man clashing a pair of cymbals, and a man on horseback surrounded by animals of the chase; while on the upper part of the stone there are dogs, deer, and armed huntsmen, with an eagle or raven surmounting the whole. These obelisks or crosses are supposed to be of Scandinavian origin. Craig-chenichan, or the Rock of Lamentation, in the parish of Kincardine, is memorable for being the place where the Marquis of Montrose was defeated by Colonel Strachan, after which he swam across the Kyle, and lay concealed in Assint, until apprehended and sent prisoner to Inverness. On the summit of Ormondy Hill, 200 feet above the level of the sea, near Castletown Point, in the parish of Avoch, are the foundations of a large and very ancient castle, to which tradition has given the name of Douglas. On a large plain to the westward of the church of Eddertown there are indications of an encampment, where a battle is said to have been fought with the Danes. In its vicinity there is an extensive circle of earth, about two feet higher than the circumjacent ground, flat on the top, with an obelisk in the centre ten feet in height, on which a number of rude figures may still be traced. This is regarded as the tomb of some Danish prince. The abbey and castle of Lochlin, in the parish of Fearn, are remarkable. The former measured ninety-nine by twenty-five feet within the walls. It was used for divine service till October 1742, when the roof fell in and killed thirty-six people. The castle of Lochlin is supposed to be more than five centuries old. It stands on an eminence about six miles to the eastward of Tain. Its plan is that of two squares united at the angles, in which there is a staircase leading to the top of it, which is sixty feet high. The castle of Cadboll, of which little remains, is supposed to be yet more ancient than that of Lochlin. There is a tradition that no one ever died in it; and that about a century and a half ago, a certain Lady May, whose lingering diseases made her long for death, was removed from it at her own request that she might die, and her wish is said to have been gratified immediately after her removal. In the parish of Kirkmichael, and close on the edge of a precipice rising from the shore of Cromarty Frith, is *Tigh-na-Craig*, or the House of the Rock. It is a very curious old building, fifty feet in height, of great antiquity, having been erected by the Urquharts, barons of Cromarty. In Loch Carron are the ruins of Strome Castle; and at Langanduin there is one of those buildings called *Duin*, which are so frequent on the west coast. The castle of Eilean Donnan, on an insulated point between Lochs Ling and Duich, in Kintail, though greatly dilapidated, is still a fine picturesque ruin. It is supposed to have been built in the time of Alexander the Third. It was long the baronial strength of the lords of Kintail; but after the battle of Glensheil in 1719, it was demolished by a ship of war. Some of the cannon-balls fired against it have been found nearly a mile above the castle. Near Ob-Inag, in the parish of Glensheil, is to be found a fine specimen of what has been called the Pictish Tower. At Dingwall are the remains of the ancient castle of the earls of Ross. The hill of Knockfarril, in the parish of Fodderty, is crowned with one of those curious and puzzling morsels of antiquity, usually known by the name of vitrified forts. The walls enclose nearly an acre of level ground, from which Craig Phadric near Inverness, and Dunskaith on the northern Sutor of Cromarty, are distinctly visible, and so it is connected with a chain of these signal-posts. It is probable that the early inhabitants of the country burned their beltane fires on these signal-hills; and these we know were so immense that they might very well account for the vitrification of the circular walls of dry stone which were erected to prevent the fuel from being blown about and dispersed. There are many ancient single stones, and circles of stones, and cairns, in different parts of Ross and Cromarty. In Lewis are to be found the following ruins of religious houses: St Collums in Ui, St Cowstans in Garrabost, and St Aula in Gress. On the Flannel Isles, called by Buchanan *Insulæ Sacræ*, the ruins of religious houses are still extant. At Mealister and Pabay are the remains of nunneries; and there is a similar ruin on the island of St Colme, in the entrance to Loch Erisort. At Carloway there is a fine specimen of those towers already mentioned, perfectly circular, and thirty feet high; and there are three or four more in Barras parish. In the year 1831, a considerable number of little figures, carved in ivory, were found in the sands at the head of the Bay of Uig. We saw them in Edinburgh, and they appeared to us very much to resemble the kings and pieces at chess.

There are many curious caves both on the east and west coasts of Ross and Cromarty; but the most remarkable is the Seal Cave, in the parish of Stornoway, in Lewis, which is considered to be only secondary in grandeur, and in the splendour of its stalactitic formations, to the famous cave in Skye.

The principal clans in Ross and Cromarty are the Mackenzies, Rosses, Frasers, Mackays, Macraes, and Munroes. Gaelic is universally spoken, though it is less used on the eastern than on the western side of the county. In Lewis it is the chief language. The Highland dress is now seldom worn, except on occasions of ceremony or festivity.

The following table contains an abstract of the population of Ross and Cromarty at three different periods.

YEARS.	HOUSES.				OCCUPATIONS.			PERSONS.		
	Inhabited.	Families.	Building.	Uninhabited.	Families chiefly employed in Agriculture.	Families chiefly employed in Trade, Manufactures, and Handicraft.	All other Families not comprised in the two preceding classes.	Males.	Females.	Total of Persons.
1811	12,829	13,574	159	292	7,490	2,499	3,585	27,640	33,213	60,853
1821	13,638	14,506	146	345	7,947	3,356	3,203	32,324	36,504	68,828
1831	15,039	16,187	131	352	8,498	2,611	5,078	34,927	39,893	74,820

(B. P.)

ROSTAK, a city of Arabia, in the district of Ommon. It is the residence of the imaum; but Muskat is the chief town through which the intercourse with the Europeans is carried on. It is situated near Jebel Akdar, the largest and highest mountain in Ommon, and is celebrated for its fine grapes. It is seventy miles west from Muskat.

ROSTOCK, a city of the grand duchy of Mecklenburg-Schwerin, which was formerly the capital of the two duchies of Mecklenburg, but since 1695 it has become the sole possession of the present branch. It is situated on the navigable river Wornow, about eight miles from the Baltic Sea. It is strongly fortified, and contains a citadel, seven churches, 2180 houses of an antique style of building, and about 16,000 inhabitants. It is the place at which the assembly of the states, and the courts of law, are held; and it contains a university founded in 1419, which has a due number of professors, and about a hundred students, to which are attached an observatory, an anatomical theatre, and a library of thirty thousand volumes. It is the most considerable trading place in the German part of the Baltic, and the export of wheat is greater than from any other German port. It has a variety of manufactures for brandy, vinegar, beer, cloths, glass, leather, iron ware, soap, sugar, and linen, and 140 ships belonging to the port. This place gave birth to Prince Blucher, to whom a statue has been erected in the square. Long. 12. 32. E. Lat. 54. 10. N.

ROSTOW, a city of Russia, in the province of Jaroslow, the capital of a circle of its own name, situated on the lake of Nero or Rostow. It contains twenty-four churches, six hospitals, 1016 houses, and 6500 inhabitants; and has extensive trade in corn, hemp, linen, tallow, leather, honey, and wax, and some in salt. It is 530 miles from St Petersburg. Long. 39. 35. E. Lat. 58. 57. N.

ROSTRA, a part of the Roman forum, in which orations, pleadings, and funeral harangues, were delivered. It derived its name from the circumstance of its exhibiting the beaks of ships taken from the Antiates.

ROSTRUM literally denotes the beak or bill of a bird; and hence it has been figuratively applied to the beak or head of a ship.

ROT, a very fatal disease incident to sheep, arising from wet seasons, and too moist pasture. It is very difficult of cure, and is attended with the singular circumstance of a kind of animals being found in the blood-vessels.

ROTA, a city of Spain, in the province of Seville, and the district of St Lucar. It stands on the bay of Cadiz, and being strongly fortified, forms one of the means of defence to that important estuary. It is situated on an elevation, and, like most Spanish towns, has a beautiful appearance when viewed at a distance. It contains some very fine buildings, and about 6500 inhabitants, who partly follow the occupation of fishing, whilst others deal in wine, as this place supplies the kind of red wine known in England by the name of Tent, which is produced on the banks of the river Tinto.

ROTA, the name of an ecclesiastical court of Rome, composed of twelve prelates, of whom one must be a German, another a Frenchman, and two Spaniards; the other eight are Italians, three of whom must be Romans, and the other five a Bolognese, a Ferraran, a Milanese, a Venetian, and a Tuscan. This is one of the most august tribunals in Rome, which takes cognizance, by appeal, of all suits in the territory of the church, and also of all matters, beneficiary and patrimonial.

ROTA ARISTOTELICA, or *Aristotle's Wheel*, denotes a celebrated problem in mechanics, concerning the motion or rotation of a wheel about its axis, so called because Aristotle was the first who took notice of it. The difficulty of it may be represented in the following manner. While the circle makes one revolution on its centre, advancing at the same time in a right line along a plane, it describes on that plane a right line which is equal to its circumference. Now, if this circle carry with it another smaller circle, concentric with it, like the nave of a coach-wheel, then this smaller circle or nave will describe a line in the time of the revolution which shall be equal to that of the large wheel or circumference itself, because its centre advances in a right line as fast as that of the wheel does, being in reality the same with it. Aristotle attempted to solve this problem; but his solution can only be regarded as a good account of the difficulty. It was next attempted by Galileo, who had recourse to an infinite number of infinitely small vacuities in the right line described by the two circles, and imagined that the little circle never applies its circumference to those vacuities, but in reality only applies it to a line equal to its own circumference, though it appears to have applied it to a much larger. This, however, is nothing to the purpose. According to Tacquet, the little circle making its rotation more slowly than the great one, does, on that account, describe a line longer than its own circumference, yet without applying any point of its circumference to more than one point of its base. This is not more satisfactory than the former. After the fruitless endeavours of many great men, M. Dortous de Meyran, a French gentleman, had the good fortune to hit upon a solution which, after being fully examined by a committee of the Academy of Sciences, was declared to be satisfactory. The following is his solution. The wheel of a coach is only acted on or drawn in a right line; its rotation or circular motion arises purely from the resistance of the ground. Now this resistance is equal to the force which draws the wheel in a right line, as it defeats that direction, and therefore the causes of the two motions are equal. The wheel therefore describes a right line on the ground equal to its circumference. On the contrary, the nave is drawn in a right line by the same force as the wheel, but it only turns round because the wheel does so, and can only turn in the same time with it. Hence its circular velocity is less than that of the wheel, in the ratio of the two circumferences, and therefore its circular motion is less than the rectilinear one. Since it must describe a right line equal to that of the wheel, it can only do it by partly sliding and partly revolving, the sliding part being more or less as the nave itself is smaller or greater.

ROTATION.

Rotation, in mechanical philosophy, denotes the motion of the different parts of a solid body about an axis, in contradistinction to the progressive motion of the body in a straight line, or in an orbit about a distant centre, of which the rotation is absolutely independent, although both motions may take place simultaneously. Thus the planets have a progressive motion, or a motion of translation, in the orbits which they describe about the sun, while at the same time each revolves about an axis which passes through its centre of gravity.

In consequence of this double motion of the planetary bodies, the two great problems in physical astronomy are, first, to determine the orbit described in space by each body under the influence of the sun's attraction, but disturbed by the attraction of every other body in the system; and, secondly, to determine the circumstances of the rotation of each body under the influence of the same disturbing forces. This last problem is not of less importance or difficulty than the first. In the case of the earth it includes the determination of the precession of the equinoxes and the nutation of the axis under the disturbing action of the sun and moon; and its analysis has led to the discovery of two important facts connected with the physical constitution of the universe, namely, the invariability of the length of the day, and the permanence of the poles of rotation on the earth's surface.

But the problem of determining the rotation of a solid body is not merely interesting in consequence of its forming a principal part of physical astronomy; it is also one of the highest importance in practical mechanics; for the principles to which we are led in considering the general theory of rotatory motion, enable us to determine the effect or performance of machines, and the proper relations and most advantageous disposition of their several parts, in order to accomplish the object in view with the smallest waste of force, and the least strain or injury to the machine itself.

In treating the subject, we shall first endeavour to demonstrate the fundamental propositions of rotatory motion in as elementary a manner as possible; secondly, we shall show the methods of computing the inertia of bodies of different forms, and the properties of principal axes; thirdly, we shall consider the motion of a body which revolves about a fixed axis, and the properties of the centres of gyration, percussion, and oscillation; and, lastly, we shall give the general equations which determine the rotation of a body acted upon by any number of forces, and which is at liberty to move in any direction.

General principles.

1. When a solid body, or system of material particles, so connected that their mutual distances remain invariable, turns round an axis, every particle describes a circle having its centre in the axis, and its plane perpendicular to the axis; and at every instant of the motion the particle is in the direction of a tangent to the circle, or in a straight line perpendicular to its radius vector. In order, therefore, to ascertain the direction of the motion of any particle of the system, we have only to draw a straight line from the particle perpendicular to the axis of rotation. This line will lie in the plane of the circle, and be its radius vector; and the perpendicular to the radius vector at its extremity gives the direction of the motion of the particle.

2. Since the system is supposed to be invariable in form, every particle describes the circumference of a circle in precisely the same instant of time; and as this is also true of any given portion of the circumference, it follows that the absolute velocities of the different particles are proportional to their distances from the axis of rotation. Hence, if w denote the velocity of the particle whose radius vector or distance from the axis $= 1$, then rw is the velocity of the particle whose distance from the axis $= r$. The velocity denoted by w is called the *angular velocity* of the body; and the rotations of different bodies are compared in respect of velocity by comparing their angular velocities.

3. The nature of the forces which connect the different particles or atoms of a solid body, and render it impossible for any single particle to change its position without a corresponding change in the positions of all the other particles, is very obscurely known; but whatever their nature may be, there is one general fact or law, established by unexcepted experience, which affords a sufficient foundation for a dynamical theory, namely, that the forces by which the particles of a body act reciprocally on each other are equal. An immediate consequence of this law is, that when a solid body is in equilibrium between two external forces A and B, these forces are equal and opposite; for the force A being in immediate equilibrium with the opposite forces exerted by that particle of the solid body to which it is applied, must therefore be equal and opposite to the force resulting from the combination of all the forces which connect that particle with the series of particles immediately adjoining. In like manner, the compound force by which this first series of particles acts on that to which the external force A is applied, is equal and opposite to the compound force which connects this first series with the next series, and so on until we come to the particle to which the external force B is immediately applied. And this particle being in equilibrium, the external force applied to it must be equal and opposite to the compound force exerted on it by the series of contiguous particles on that side; therefore the two forces A and B are equal and opposite.

Hence it follows, that when any number of external forces are applied to a solid body, and it is in equilibrium between them, the forces are such as would be in equilibrium if they were all applied at one point.

4. If a body is maintained in equilibrium by the action of three forces, these forces lie in the same plane, and are either parallel, or meet in the same point. This follows immediately from the composition of forces; for the forces being in equilibrium, any one of the three must be equal and opposite to the equivalent, or *resultant*, as it is termed, of the other two; and this resultant is the diagonal of a parallelogram of which the other two *component* forces are the sides. But the diagonal and sides of a parallelogram are in the same plane, therefore the third force is in the plane of the other two; and, further, since it is equal and opposite to the resultant of the other two, it must be in the same straight line, and consequently pass through their point of concourse. These simple propositions are the foundation of the theory of statics.

5. In applying these propositions to explain the motion of rotation, we must recollect a fundamental theorem in dynamics, that the force which produces any motion is equal and opposite to the force which would prevent it, if applied at the same point, and in the same straight line, or which would extinguish the motion in the same time in which we suppose it to be produced. The force therefore which, acting on any particle, causes the body to revolve about an axis with a given angular velocity, is equal to the force which, if applied at the same point in the opposite direction, would reduce the body to a state of rest in the same time as was necessary to produce the given velocity.

6. The only distinct notion we can form of the intensity of any moving force, is the quantity of motion which

it can produce by acting uniformly during a given time. This will be ascertained when we know the velocity impressed upon a body containing a given quantity of matter. Thus we know that terrestrial gravity acting on a body for a second, will cause it to fall sixteen feet with an uniformly accelerated motion, and will leave it in a state such that it would move on for ever at the rate of thirty-two feet per second. The force of gravity is therefore such as to communicate a velocity of thirty-two feet per second; and in this case the mass of the body is not considered, for gravity acts equally on every particle of which it is composed. In the same manner, the best way of acquiring a distinct conception of the rotatory effect of a moving force, is to determine the quantity of rotatory motion which it can generate by acting uniformly during some known time.

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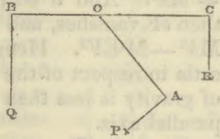
7. If a solid body, or rigid system of invariable form, admit of a rotatory motion about an axis, and if at any point of the body a force P be applied, which acts in a plane perpendicular to the axis of rotation, and tends to turn the body in one direction; and to any other point in the same plane a force Q be applied, tending to turn the body in the opposite direction; then, if the two forces be to each other inversely as the distances of the lines of their directions respectively from the axis, the body will remain at rest, or the two forces will be in equilibrium.

For let O (fig. 1) be the axis of rotation, and suppose the force P to be applied at the point P in the direction PA, and tending to turn the solid body about the axis O perpendicular to the plane of the paper, and let the force Q act in the direction QB, and consequently tend to turn the body in the opposite direction, and draw OA perpendicular to PA, and OB perpendicular to QB. Then, in order that there may be equilibrium, we must have, by the principle of the lever, P : Q : : OB : OA, whence P · OA = Q · OB.

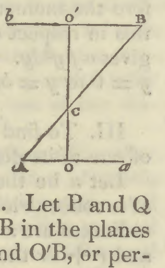
Fig. 1.



8. It is obviously indifferent at what point of the plane the force is applied, provided its distance from the axis remains the same. Let BO therefore be produced, and take OC equal to OA, and draw CR perpendicular to BC, or parallel to BQ. We may now suppose the force P to be replaced by an equal force R, acting in the direction RC; then, since R · OC = P · OA, we have R · OR = Q · OB, and, consequently, the axis being supposed fixed, the body will remain in equilibrium between the two forces Q and R. These forces are therefore equivalent to a single force applied at O, equal to their sum, and acting in a parallel direction. Hence the resultant of two parallel forces applied to a straight line is a force parallel to the component forces, equal to their sum, and whose line of direction divides the straight line into parts reciprocally proportional to the forces themselves.

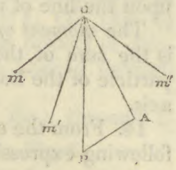
9. If two forces, which are inversely as the distances of their respective directions from the axis of rotation, be applied to a body, the equilibrium will still be maintained, although the two forces are not in the same plane. Let OO′ be two points in the axis of rotation, through which let there be drawn two planes A*a* and B*b* at right angles to the axis. Suppose also these planes to be intersected by another plane (here supposed to be the plane of the figure) passing through the axis, and let OA, O′B be the intersections, and let the straight line which joins A and B intersect the axis in C. Let P and Q be two forces applied respectively at A and B in the planes AO*a* and BO′*b*, and at right angles to OA and O′B, or perpendicular to the plane of the paper, then these two forces are parallel; and because by hypothesis P : Q : : O′B : OA, we have P : Q : : CB : CA; therefore (8) the two forces P and Q are equivalent to a single parallel force passing through C. But a force passing through the axis has no tendency to turn the body round the axis; consequently the body remains at rest.

Fig. 2.



10. Let m, m', m'', &c. (fig. 3) be a system of bodies immoveable in respect of each other, and suppose them to revolve about an axis passing through O; also let m, m', m'', &c. denote the quantities of matter in the bodies respectively, and let r, r', r'', &c. denote their distances from the axis of rotation. Let the angular velocity of the system be w; then (2) the absolute velocities of the bodies are respectively wr, wr', wr'', &c. Now let us suppose the system to be put in motion by an external force F applied at the point P, in the direction PA, which is contained in a plane perpendicular to the axis of rotation; then the relation between the force F and the velocity w may be found as follows. Considering, first, the body m; since its velocity $= wr$, and its quantity of matter $= m$, its quantity of motion $= wrm$. But it is a principle in dynamics, that the quantity of motion of a moving body is proportional to the impressed force, and may be taken as a measure of that force; whence wrm is the measure of a force which, if applied at m, in a direction perpendicular to Om, would cause m to begin to move with the actual velocity wr. Let f be the force which, if applied at P in the direction PA, would make equilibrium with the force wrm at m; draw OA perpendicular to PA, and make OA $= h$. We have then (7)

Fig. 3.



$$f : wrm :: \mathrm{O}m : \mathrm{OA} :: r : h,$$

whence $fh = wr^2m$. In like manner, the quantities of motion in the bodies m', m'', &c. are $wr'm', wr''m''$, &c.; and if we denote by f', f'', &c. the forces which, if applied at P in the direction PA, would respectively make equilibrium with the forces $wr'm', wr''m''$, &c. we shall have $f'h = wr'^2m'$, $f''h = wr''^2m''$, &c.; therefore, if we assume

$$\mathrm{F} = f + f' + f'' +, \&c.$$

we shall have the equation

$$\mathrm{F} \cdot h = w\,(r^2m + r'^2m' + r''^2m'' +, \&c.).$$

If we suppose $m = m' = m'' =$, &c. and take r to denote the distance of any particle from the axis of rotation, the equation becomes $\mathrm{F} \cdot h = w\Sigma\,(r^2m)$; the summation denoted by Σ extending to every particle in the system.

11. When the direction of the external force F is not in a plane parallel to the circles of rotation, it must be resolved into two forces, one of which lies in that plane, and the other is parallel to the axis. It is only the first of these forces which in the present case is regarded as the moving force; the second merely tends to push the body in the direction of the axis, and does not influence the rotation. When we come to consider the rotation of a body perfectly free, it will be necessary to attend particularly to this circumstance.

12. A solid body may be regarded as composed of molecules of a very small but finite magnitude, connected so as to form an invariable system; and although a solid, according to his view of the constitution of body, is formed of discrete elements, the sums relative to the molecules may be changed into definite integrals without sensible error; that is to say, for the sums Σr^2m we may substitute the definite integrals $\int r^2dm$, where dm is the element of the mass, and the integrals extend to the whole mass. We have then $\mathrm{F} \cdot h = w\int r^2dm$.

Moment of a force, and of inertia.

13. The energy of a force applied to a lever, or its power of producing motion round the fulcrum, is expressed by the product of the force into the perpendicular drawn from the fulcrum upon the line of its direction. This product (denoted above by $\mathrm{F} \cdot h$) is called the *moment*, or momentum, or rotatory effort, of the force F. And because $\int r^2dm$ is

Rotation.

the sum of the moments of all the particles of the body in actual motion, this integral expresses the energy or effort of all the resistances made to the rotation by the inertia of the particles, and is therefore called the *moment of inertia* of the moving body with respect to the axis from which the distances r are reckoned. We have therefore these definitions:

The *moment of a force* in respect of a given axis, is the product of the force into the perpendicular from the axis upon the line of its direction.

The *moment of inertia* of a body in respect of any axis is the sum of the products obtained by multiplying each particle of the body into the square of its distance from the axis.

14. From the equation $F \cdot h = w\int r^2dm$ (12), we have the following expression for the angular velocity, namely,

$$w = \frac{F \cdot h}{\int r^2dm};$$

that is to say, the angular velocity about any axis is equal to the moment of the external or applied force divided by the moment of inertia. This fraction expresses a number; for the force F may be represented by the product of a mass M into a certain velocity $= v$, so that $F = Mv$; and therefore, since v represents a line, the numerator and denominator have both the same dimension. The fraction also expresses the part of the radius which is equal to the arc measuring the angle; and since the radius is equal to the arc of 57°·2958, if we make the radius $= 1$, we have only to multiply the fraction by 57·2958 in order to obtain the value of w in degrees.

15. Since the relation between the angular velocity and the external impelling force is expressed in terms of the moment of inertia, it is evident that this moment is an important element in the theory of rotation. We shall therefore now proceed to consider the subject under a more general view, and point out the method by which it is computed for bodies of any form revolving about given axes.

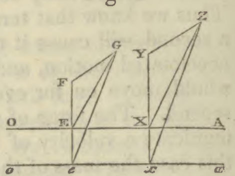
Let the different points of a solid body be referred to three rectangular co-ordinates x, y, z, and let dm be the differential element of the mass; then the distance of any particle from the axis x is $\sqrt{(y^2 + z^2)}$, and, by the definition, the moment of inertia relative to the axis x, is $\int(y^2 + z^2)\,dm$, the integral extending to the whole mass of the body. In like manner, the moments of inertia relative to the axes y and z are respectively $\int(x^2 + z^2)\,dm$ and $\int(y^2 + z^2)\,dm$. It is thus evident that the determination of the moments of inertia, with respect to any body whatever, consists in forming the analytical expression of the product of the differential element of the body into the square of its distance from the axis, and integrating for the whole extent of the body. The integration may always be effected by the method of quadratures.

16. Since the same body may be referred to an infinite number of different axes, in respect of all of which the moments of inertia will have different values, it follows that the moment cannot be absolutely defined unless it be referred to a determinate axis. But when it is required to investigate the moments of inertia of a body in respect of several axes successively, it is not always necessary to compute the formula $\int r^2dm$ for each case. For example, when the moment of inertia has been determined in respect of any one axis, we may find its value in respect of any other parallel axis without further calculation, if we know the mass of the body and the distances of both axes from the centre of gravity.

17. The moment of inertia of any body in respect of an axis AO (fig. 4) being given, to find the moment of inertia in respect of another axis oa parallel to OA.

Let the origin of the rectangular co-ordinates be at O, and let x be taken on the axis OA, and y in the plane of OA and oa. Also let Z be the place of an element dm, and Y the projection of Z on the plane xy; and from Y draw YX perpendicular to OA, meeting OA in X and oa in x; then $OX = x$, $XY = y$, $YZ = z$. The moment of inertia in respect of the axis OA is $\int r^2dm = \int(y^2 + z^2)dm$. But by hypothesis this is given; suppose it $= Mh^2$ (M being the mass of the body), and we have $\int(y^2 + z^2)dm = Mh^2$. In like manner, if we assume the distance of oa from OA to be k, we have $ox = x$, $xY = k + y$, $YZ = z$, and the moment of inertia in respect of oa is $\int\{(k + y)^2 + z^2\}\,dm = k^2\int dm + 2k\int ydm + \int(y^2 + z^2)dm$. But $\int k^2dm = Mk^2$, and $\int(y^2 + z^2)dm = Mh^2$; therefore the moment in respect of the new axis is $Mh^2 + Mk^2 + 2k\int ydm$. Suppose the centre of gravity of the body to be at G; let GF be perpendicular to the plane xy, and draw FE perpendicular to the axes, meeting OA in E and oa in e. From the nature of the centre of gravity $\int ydm = M \cdot EF$; therefore the moment in respect of oa becomes $Mh^2 + Mk^2 + 2k{\cdot}M{\cdot}EF$. But $k = eE$, and $2M{\cdot}k{\cdot}EF = 2M{\cdot}eE{\cdot}EF = M(eF^2 - k^2 - EF^2)$; whence we have finally for the moment of inertia in respect of the new axis oa,

Fig. 4.



$$Mh^2 + M \cdot eF^2 - M \cdot EF^2.$$

Corollary 1. If the original axis OA passes through the centre of gravity G, then EF vanishes, and the moment in respect of the new axis oa becomes $Mh^2 + M{\cdot}eF^2$, or $Mh^2 + Mk^2$. And if oa passes through the centre of gravity, then eF vanishes, and the moment in respect of oa becomes $Mh^2 - M{\cdot}EF^2$. Hence we infer that the moment of inertia in respect of the axis which passes through the centre of gravity is less than the moment in respect of any other parallel axis.

Corol. 2. The moment of inertia is the same in respect of every axis parallel to that which passes through the centre of gravity, and is at the same distance from it; or the same in respect of every straight line which lies in the surface of a cylinder having the centre of gravity in its axis.

Example
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18. We shall now give a few examples of the application of the preceding formulæ.

I. Let it be proposed to find the moment of inertia of a very slender rod (the breadth and thickness of which may be neglected), in respect of an axis passing through its extremity and perpendicular to its length.

Let $a =$ the length of the rod, and $x =$ the distance of any point from the axis, then the element of the body is dx, and the moment of inertia $= \int x^2dx$, the limits of the integral being $x = 0$ and $x = a$. For those limits we have $\int x^2dx = \frac{1}{3}a^3$, which therefore is the moment of inertia.

II. To find the moment of inertia of a very thin rectangle, the thickness of which may be neglected, in respect of an axis coinciding with one of its sides.

Let the side which coincides with the axis $= a$, and the other side $= b$, and let x be taken in the axis. The co-ordinates of any point in the rectangle being x, y, the element of the body is $dxdy$, and the distance from the axis $= y$, therefore the moment of inertia is $\int\int y^2dxdy$. The integral of this in respect of x is $\int xy^2dy$, which from $x = 0$ to $x = a$ gives $a\int y^2dy$. A second integration gives $\frac{1}{3}ay^3$, which from $y = 0$ to $y = b$, becomes $\frac{1}{3}ab^3$; therefore, since $M = ab$,

$$\int\int y^2dxdy = \tfrac{1}{3}ab^3 = \tfrac{1}{3}M \cdot b^2.$$

III. To find the moment of inertia of a circle in respect of one of its diameters.

Let a be the radius of the given circle, $r =$ the radius of a concentric circle passing through a point P whose co-ordinates are x and y, x being taken on the axis of rotation, and $r + dr$ the radius of a second concentric circle, very near the other. If we now assume $dz = \sqrt{(dx^2 + dy^2)}$, then $dz \cdot dr$ is the area of the elementary surface included between the circumferences of the two circles whose radii are respectively r and $r + dr$, and two straight lines drawn from the centre to the extremities of a very small arc at P; that is to say, we have $dm = dzdr$. But the distance of this element from the axis is y; therefore the moment of inertia is $\int\int y^2dzdr$. Now, by the nature of the circle, $dz : dx :: r : y$, whence $ydz = rdx$, and the double integral becomes $\int ydx \times \int rdr$. Now, on the supposition that r is constant, the integral $\int ydx = \pi r^2 =$ area of the circle whose radius is r; therefore the integration in respect of dx gives $\pi \int r^3dr$; and on integrating this from $r = 0$ to $r = a$, we get ultimately $\frac{1}{4}\pi a^4$ for the moment of the circle whose radius is a.

Since in this case the mass $M = \pi a^2 =$ the area, we have $\frac{1}{4}\pi a^4 = \frac{1}{4}Ma^2$, which is another expression for the moment of inertia of a circle in respect of one of its diameters.

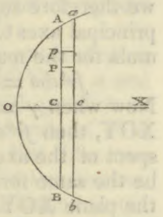
IV. To find the moment of inertia of a circle in respect of an axis perpendicular to its plane, and passing through its centre.

Supposing, as in the last proposition, the surface to be composed of elementary rings, we have $dm = dzdr$, whence $\int r^2dm = \int r^2dr \times \int dz = 2\pi \int r^3dr$ (since $\int dz = 2\pi r$), the integral of which, from $r = 0$ to $r = a$, gives $\int r^2dm = \frac{1}{2}\pi a^4 = \frac{1}{2}Ma^2$.

V. To find the moment of inertia of a solid body generated by the revolution of a curve line in respect of the axis of rotation.

Let AB (fig. 5) be a section perpendicular to the axis of rotation OX, and meeting it in C, and make $OC = x$. Suppose the solid to be divided into thin slices by planes parallel to AB, and let ab be the section next to AB, so that $Cc = dx$. Let P be a point in the plane AB, and make $CP = r$, $Cp = r + dr$. The length of the circumference described by P in one revolution is $2\pi r$, therefore the mass of the ring comprised between AB and ab, and traced by the revolution of the points P and p, is $2\pi rdrdx$; and its distance from the axis is r, therefore the moment of inertia of the ring is $2\pi r^3drdx$. Integrating this in respect of r from $r = 0$ to $r = CA = y$, we get $\frac{1}{2}\pi y^4dx$ for the moment of the slice comprised between the two sections of the solid, whose distances from O are x and $x + dx$. Hence the moment of inertia of all the slices, or of the solid body, is $\frac{1}{2}\pi\int y^4dx$.

Fig. 5.



Applying this formula to a sphere whose radius $= a$, we get from the equation $y^2 = 2ax - x^2$, $y^4 = 4a^2x^2 - 4ax^3 + x^4$, on substituting which, and integrating, we have $\frac{1}{2}\pi\int y^4dx = \frac{2}{3}\pi a^2x^3 - \frac{1}{2}\pi ax^4 + \frac{1}{10}\pi x^5$, which from $x = 0$ to $x = a$ gives $\frac{1}{2}\pi\int y^4dx = \frac{4}{15}\pi a^5$ for the hemisphere, and consequently the moment of inertia of the whole sphere $= \frac{8}{15}\pi a^5 = \frac{2}{5}M \cdot a^2$, since $M = \frac{4}{3}\pi a^3$.

The moment of inertia of a spheroid revolving about its shorter axis is $\frac{1}{5}M(a^2 + b^2)$. See the calculation of $\int x^2dm$ and $\int y^2dm$ in this case in the article PRECESSION, vol. xviii. p. 508.

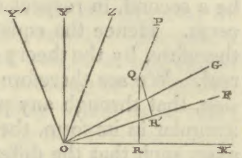
In all the preceding examples, the density of the body has been supposed uniform, and $= 1$. For bodies of different densities the formulæ must be multiplied in each case by the density. Thus, in the last example, the moment of inertia of a sphere whose radius $= a$, and density $= \varrho$, the moment of inertia in respect of one of the diameters is $\frac{8}{15}\pi\varrho a^5$.

19. The examples which have now been given will suffice to illustrate the method of computing the moments of inertia of bodies of any form in respect of particular axes; and they render it obvious that the computation will in general be greatly facilitated when the mass is symmetrically disposed about the axis for which the inertia is to be computed. It is likewise evident that the amount of rotatory inertia depends on the position of the axis of rotation. Hence, for every point of a mass there must exist at least one axis in respect of which the inertia is less, or greater, than in respect of any other axis passing through that point. The axes for which the moments of inertia are the greatest or least possible are called *principal axes;* and they possess some very remarkable properties of great importance in the theory of rotation. We now proceed to investigate the position and properties of the principal axes.

20. The moments of inertia of a mass M being given in respect of three rectangular axes OX, OY, OZ (fig. 6) passing through O, to find the moment in respect of another axis OG given in position, and also passing through the origin O.

Let P be the position of a particle dm; through P draw PQ parallel to the axis OZ, meeting the plane XOY in Q, and draw QR parallel to OY, meeting OX in R; then $OR = x$, $RQ = y$, $QP = z$. Also suppose the plane which passes through OG, and is perpendicular to XOY, to meet the plane XOY in OF, and let the angle $XOF = \varphi$, and the angle $FOG = \psi$. The axis OG is entirely determined by these two angles, and consequently, when OG is given in position, φ and ψ are also given. In order to compute the moment of inertia in respect of the axis OG, it is convenient to refer the different points of the mass, as P, to a new system of rectangular axes, of which one is OG. To effect this, in the first place let OY be drawn perpendicular to OF in the plane XOY, and let P be referred to the axes OF, OY′, OZ, and draw QR′ perpendicular to OF. We have then $OR' = x'$, $R'Q = y'$, $QP = z$, and the new co-ordinates expressed in terms of the former, and the angles φ and ψ are

Fig. 6.



$x' = x \cos. \varphi + y \sin. \varphi$, $y' = y \cos. \varphi - x \sin. \varphi$, $z' = z$.

In the second place, we may pass in like manner from these to a third system of co-ordinates x'', y'', z'', of which x'' is in the line OG, y'' remains parallel to OY′, and z'' is perpendicular to OG in the plane FOG. We have, then, similarly,

$x'' = x' \cos. \psi + z' \sin. \psi$, $y'' = y'$, $z'' = z' \cos. \psi - x \sin. \psi$.

Substituting in these last equations the values of x', y', and z', given by the three former, we have

$$x'' = x \cos. \varphi \cos. \psi + y \sin. \varphi \cos. \psi + z \sin. \psi,$$
$$y'' = y \cos. \varphi - x \sin. \varphi,$$
$$z'' = z \cos. \psi - x \cos. \varphi \sin. \psi - y \sin. \varphi \sin. \psi.$$

If we now assume the distance of P from the axis OG to be r, we shall have $r^2 = y''^2 + z''^2$; whence, on forming from the two last equations the expression for $\int r^2dm = \int (y''^2 + z''^2)\, dm$, and, for the sake of abridging, putting

$$\int x^2dm = A, \int y^2dm = B, \int z^2dm = C,$$
$$\int xydm = D, \int xzdm = E, \int yzdm = F,$$

the expression for the moment of inertia in respect of the axis OG becomes

$$\begin{aligned} \int r^2dm = {} & A (\sin.^2 \varphi + \cos.^2 \varphi \sin.^2 \psi) \\ & + B (\cos.^2 \varphi + \sin.^2 \varphi \sin.^2 \psi) + C \cos.^2 \psi \\ & - 2 D \cos. \varphi \sin. \varphi \cos.^2 \psi - 2 E \cos. \varphi \cos. \psi \sin. \psi \\ & - 2 F \sin. \varphi \cos. \psi \sin. \psi. \end{aligned}$$

This expression for the moment of inertia in respect of the axis OG is given by Euler (*Theoria Motus Corporum Solidorum*, p. 169).

21. The values of the angles φ and ψ, which give the position of the axis for which the moment $\int r^2dm$ is a maximum or minimum, may be deduced from the above equation in the usual manner, that is to say, by differentiating successively for each of the variables, and making the differential co-efficient $= 0$. The differentiation in respect of φ (supposing ψ constant) gives the equation

$$\tan. \psi = \frac{-(A - B) \sin. \varphi \cos. \varphi + D (\cos.^2 \varphi - \sin.^2 \varphi)}{E \sin. \varphi - F \cos. \varphi},$$

and the differentiation in respect of ψ (supposing φ constant) gives

$$\tan. 2\psi = \frac{2 \tan. \psi}{1 - \tan.^2 \psi}$$

$$= \frac{2 \text{E} \cos. \varphi + 2 \text{F} \sin. \varphi}{\text{A} \cos.^2 \varphi + \text{B} \sin.^2 \varphi - \text{C} + 2 \text{D} \cos. \varphi \sin. \varphi}.$$

On eliminating ψ from these two equations, there results an equation of the following form, in which $u = \tan. \varphi$, and e, f, g, h, are co-efficients depending upon the quantities A, B, C, D, E, F, viz.

$$0 = e + fu + gu^2 + hu^3.$$

This being a cubic equation, must have at least one real root. But it is easy to see, from the nature of the thing, that all the roots are real; for if there be one axis for which the moment of inertia is a *maximum*, there must evidently be a second, in respect of which it is a *minimum*, and *vice versa*. Hence the equation must have two real roots, and therefore, by the theory of cubic equations, all the roots are real. We are therefore led to this very important conclusion, that through any point of every solid body, however irregular in its form, there may be drawn a system of three axes, such that the differential co-efficient of the moment of inertia in respect of each of them is nothing. In respect of one of these, the moment is a maximum, in respect of another, it is a minimum, and though, in respect of the third it is neither a maximum nor a minimum, it is still such that its value is not altered by a small change in the position of the axis. According to the definition in (19), these are the *principal axes* of the body.

Properties of principal axes.

22. It would be difficult, in general, to determine the position of the principal axes from the cubic equation found above; but they possess certain properties, by means of which they may be readily found in almost every case of practical application. On comparing the two equations for $\tan. \psi$ and $\tan. 2\psi$ (21), with the expressions for x', y'', z'' (20), it will be seen that the first is identical with $2 \cos. \psi \int x''y''dm$, and the second with $-2\int x''z''dm$; whence $\int x''y''dm = 0$, and $\int x''z''dm = 0$; and it follows, that if x be taken in one of the principal axes, we have, in respect of that axis, $\int xydm = 0$, $\int xzdm = 0$, or the quantities denoted by D and E respectively vanish.

23. From this it follows, that if all the matter in a body of uniform density be symmetrically disposed about any line, that line is one of the principal axes of rotation (for if x be taken in the axis of symmetry, then to every element whose co-ordinates are x, y, there corresponds another element whose co-ordinates are x, $-y$, whence $\int xydm = 0$); therefore, in the case of symmetrical figures, the position of one of the principal axes is known, and the positions of the other two are thence readily determined by means of the two equations (21). On making $\text{D} = 0$, $\text{E} = 0$, the first of these equations gives

$$(\text{A} - \text{B}) \sin. \varphi \cos. \varphi - \text{F} \cos. \varphi \tan. \psi = 0,$$

whence $\cos. \varphi = 0$, and $\sin. \varphi = 1$; or $\varphi = 90°$. Substituting this value of φ in the second of the equations (21), and making at the same time $\text{D} = 0$, $\text{E} = 0$, we get $\tan. 2\psi = 2\text{F} \div (\text{B} - \text{C})$; or 2ψ is the angle which has $2\text{F} \div (\text{B} - \text{C})$ for its tangent. Hence the angle ψ has a double value, one corresponding to FOG, and the other to FOG + 90°.

24. Hence also it appears, that when one principal axis OX is determined, two others may be found having the same property of maximum or minimum, and, by reason of $\varphi = 90°$, these axes are both in a plane perpendicular to OX. As this conclusion holds good with respect to each of the three axes, it follows that the three principal axes are at right angles to each other, and also, since $\int xydm = 0$, and $\int xzdm = 0$, that $\int yzdm = 0$. We have therefore, in respect of the principal axes, the three equations

$$\text{D} = \int xydm = 0, \ \text{E} = \int xzdm = 0, \ \text{F} = \int yzdm = 0.$$

If the origin of the co-ordinates is placed at the centre of gravity, we have likewise

$$\int xdm = 0, \int ydm = 0, \int zdm = 0,$$

by the well-known property of the centre of gravity.

25. By means of these equations, the proposition in (20) is considerably simplified when the three axes for which the momenta are respectively given are principal axes. Let OX, OY, OZ (fig. 6) be the three principal axes passing through O, then $\text{D} = 0$, $\text{E} = 0$, $\text{F} = 0$, and the equation (20) for the moment, in respect of the axis OG, becomes

$$\int r^2dm = \text{A} (\sin.^2 \varphi + \cos.^2 \varphi \sin.^2 \psi)$$
$$+ \text{B} (\cos.^2 \varphi + \sin.^2 \varphi \sin.^2 \psi) + \text{C} \cos.^2 \psi.$$

Suppose the given moments in respect of the principal axes to be respectively $\text{M}{\cdot}a^2$, $\text{M}{\cdot}b^2$, $\text{M}{\cdot}c^2$; then, from the values of A, B, C (20) we have $\text{M}{\cdot}a^2 = \text{B} + \text{C}$, $\text{M}{\cdot}b^2 = \text{A} + \text{C}$, $\text{M}{\cdot}c^2 = \text{A} + \text{B}$, whence

$$\text{A} = \tfrac{1}{2} \text{M} (b^2 + c^2 - a^2), \ \text{B} = \tfrac{1}{2} \text{M} (a^2 + b^2 - c^2),$$
$$\text{C} = \tfrac{1}{2} (a^2 + c^2 - b^2),$$

on substituting which in the above equation, we get

$$\int r^2dm = \text{M} (a^2 \cos.^2 \varphi \cos.^2 \psi + b^2 \sin.^2 \varphi \cos.^2 \psi + c^2 \sin.^2 \psi).$$

If we now refer the new axis OG to the co-ordinates OX, OY, OZ, and make the angle $\text{XOG} = \alpha$, $\text{YOG} = \beta$, $\text{ZOG} = \gamma$, and observe that because the two planes XOF and FOG are at right angles, $\cos. \alpha = \cos. \varphi \cos. \psi$, $\cos. \beta = \sin. \varphi \cos. \psi$, $\cos. \gamma = \sin. \psi$, the equation becomes

$$\int r^2dm = \text{M} (a^2 \cos.^2 \alpha + b^2 \cos.^2 \beta + c^2 \cos.^2 \gamma).$$

It is to be remarked, that as the co-ordinates are rectangular, $\cos.^2 \alpha + \cos.^2 \beta + \cos.^2 \gamma = 1$, so that the position of OG is determined by any two of these angles. If we therefore suppose the moments in respect of two of the principal axes to be equal, for example, if $a^2 = b^2$, the formula for the moment in respect of OG becomes

$$\int r^2dm = \text{M}{\cdot}a^2 (1 - \cos.^2 \gamma) + \text{M}{\cdot}c^2 \cos.^2 \gamma.$$

Now when $\gamma = 90°$, that is, when OG lies in the plane XOY, then $\int r^2dm = \text{M}{\cdot}a^2$. Hence, if the moments in respect of the axes OX and OY be equal, the moment will be the same for every axis passing through O, contained in the plane XOY.

When the moments in respect of the three principal axes are equal, that is, when $a^2 = b^2 = c^2$, then

$$\int r^2dm = \text{M}{\cdot}a^2 (\cos.^2 \alpha + \cos.^2 \beta + \cos.^2 \gamma) = \text{M}{\cdot}a^2,$$

so that the moment is the same in respect of any axis whatever which passes through O. Thus it appears, that for every point of a solid body there are either three principal axes of rotation only, or else an infinite number.

26. These conclusions are obviously true in the case of some simple figures. Thus, in the spheroid of revolution, the moments are equal in respect of every diameter which lies in the plane of the equator; and in the sphere they are the same in respect of any diameter whatever, the bodies being always supposed homogeneous. The existence of three principal axes in every body was first noticed by Segner in 1755, but demonstrated for the first time by Albert Euler, in a memoir which received the prize of the Academy of Sciences of Paris in 1760.

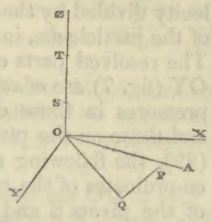
Rotation about a fixed axis.

27. Having established these general propositions respecting the moments of inertia and principal axes of bodies endowed with a rotatory motion, we now proceed to consider more particularly the rotation of a solid body about a fixed axis.

When a force is impressed on a body which can only move round a fixed axis, the difference between the motion which actually takes place, and that which would take place if the body were free, is evidently owing to the connexion which its parts have with the axis, and to the action of the points of support upon the axis. This action must be viewed in the light of another external force, such that, if combined with the force impressed on the body, it would produce in the body unconnected with any fixed points the motion which actually takes place.

28. In order to determine the strain on the axis, let OY (fig. 7) be the axis of rotation, retained in a fixed position by the two pivots S, T, and suppose a force = F applied to the body at P, in the direction PQ, which is supposed to lie in a plane perpendicular to OZ. In the plane perpendicular to the axis, and containing PQ, let the rectangular axes OX, OY be drawn, and let x, y, z be the co-ordinates of a particle dm, the projection of which on the plane XY is at A, and let r denote its distance from the axis of rotation, so that $r = \mathrm{OA} = \sqrt{(x^2 + y^2)}$; also let $\varphi =$ the angle which OA makes with OX. If we now suppose w to be the angular velocity communicated to the body, then rw is the velocity with which the point A revolves, and the direction of this velocity is in the perpendicular to OA, and from OX towards OY, whence the velocity of A in the direction OX is $- wr \sin. \varphi$, and $wr \cos. \varphi$ in the direction OY. But $r \sin. \varphi = y$, and $r \cos. \varphi = x$; therefore the velocity of A in the direction OX is $-wy$, and in the direction OY it is $+ wx$. The quantities of motion in these directions are therefore respectively $- wydm$ and $+ wxdm$; and the integrals of those expressions extended to the whole mass of the moving body give the whole quantities of motion in those directions, namely, $- w\int ydm$, and $+ w\int xdm$. On denoting the mass by M, and the co-ordinates of its centre of gravity by x_1 and y_1, we have (from the well-known expressions for these co-ordinates) $\int ydm = \mathrm{M}y_1$, and $\int xdm = \mathrm{M}x_1$, therefore $- w\int ydm = - w\mathrm{M}y_1$, and $+ w\int xdm = + w\mathrm{M}x_1$.

Fig. 7.



29. Now, since the body is supposed to be put in motion by a force F acting in a plane parallel to XOY, let α and β be the angles which its direction makes with parallels to OX and OY respectively; then the components of F in those directions are $\mathrm{F} \cos. \alpha$ and $\mathrm{F} \cos. \beta$. But these two forces are evidently equal respectively to the two former, together with the pressures on the pivots estimated in the same directions; therefore, calling p and q the pressures sustained by the point S in the directions OX and OY, and p', q' the pressures sustained by T in the same directions, we shall have

$$p + p' = \mathrm{F} \cos. \alpha + w\mathrm{M}y_1,\ q + q' = \mathrm{F} \cos. \beta - w\mathrm{M}x_1.$$

In order to determine p, p', q, q', it is still necessary to find two other equations. These will be obtained by considering, that in respect of the plane XOY, the moments of the forces acting on the two pivots, resolved in the directions x and y, must be equal to the moments of the resultants of all the forces or quantities of motion due to the rotation estimated in the same directions. Let $k = \mathrm{OS}$, and $k' = \mathrm{OT}$, the moments of the resolved forces which act on the pivots in the directions parallel to OX and OY are $pk + p'k'$ and $qk + q'k'$; and the resultants of the quantities of motion in the same two directions being $- w\int ydm$ and $+ w\int xdm$, their moments in respect of the plane OXY are respectively $- w\int yzdm$ and $+ w\int xzdm$; therefore

$$pk + p'k' = - w\int yzdm,\ qk + q'k' = + w\int xzdm.$$

Combining these with the preceding two equations, p, p', q, y' are obtained in terms of known quantities.

30. If the axis of rotation OZ be one of the principal axes of the system which intersect at O, then, by (24), $\int yzdm = 0$ and $\int xzdm = 0$, whence $pk + p'k' = 0$, and $qk + q'k' = 0$, and consequently k and k' both vanish, and the percussions sustained by the axis pass through the origin O. Let R represent the single force or shock which the axis supports in this case, and φ the angle which its direction makes with the axis OX; then, by (29),

$$\mathrm{R} \cos. \varphi = \mathrm{F} \cos. \alpha + w\mathrm{M}y_1,\ \mathrm{R} \sin. \varphi = \mathrm{F} \cos. \beta - w\mathrm{M}x_1,$$

from which two equations R and φ are both determined.

Application to machines.

31. It would be a desirable thing in machines which derive their efficacy from a rotatory motion, to apply the pressures arising from the power and from the resistance opposed by the work in such a manner as to annihilate or diminish this pressure on the supports of the axis of motion. Attention to this theorem will point out what may be done; and it is at all times proper, nay necessary, to know what are the pressures in the points of support. If we are ignorant of this, we shall run the risk of our machine failing in those parts; and our anxiety to prevent this will make us load it with needless and ill-disposed strength. In the ordinary theories of machines, deduced entirely from the principles of equilibrium, the pressure on the points of support (exclusive of what proceeds from the weight of the machine itself) is stated to be the same as if the moving and resisting forces were applied immediately to these points in their own directions. But this is in all cases erroneous; and, in cases of swift motions, it is greatly so. We may be convinced of this by a very simple instance. Suppose a line laid over a pulley, and a pound weight at one end of it, and ten pounds at the other; the pressure of the axis on its support is eleven pounds, according to the usual rule; whereas we shall find it only $3\frac{7}{11}$. For the direction of the pressure R being in this case parallel to the axis y, and the force F also acting in the same direction, we have $\cos. \varphi = 0 \cos. \alpha = 0$, $\sin. \varphi = 1$, $\cos. \beta = 1$, $y_1 = 0$, and the two equations of (30) give the single equation

$$\mathrm{R} = \mathrm{F} - w\mathrm{M}x_1.$$

If we now call the radius of the pulley 1, the moment of the moving force is $10 \times 1 - 1 \times 1 = 9$; and the moment of inertia (13) is $10 \times 1^2 + 1 \times 1^2 = 11$; therefore (14) the angular velocity $w = \frac{9}{11}$. But the distance of the centre of gravity from the axis of motion is also $\frac{9}{11}$, because the two weights may be supposed in contact with the circumference of the pulley; therefore, since $\mathrm{M} = 11$, $w\mathrm{M}x_1 = \frac{9}{11} \times \frac{11}{1} \times \frac{9}{11} = \frac{81}{11}$. Now $\mathrm{F} = 10 + 1 = 11$, therefore $\mathrm{R} = 11 - \frac{81}{11} = \frac{40}{11} = 3\frac{7}{11}$ pounds, which is the pressure sustained by the axis.

32. If we suppose $\mathrm{R} = 0$, the two equations (30) will express the conditions that must be fulfilled in order that the axis may receive no shock from the action of the impressed force F. This supposition gives the equations

$$\mathrm{F} \cos. \alpha = - w\mathrm{M}y_1,\ \mathrm{F} \cos. \beta = w\mathrm{M}x_1,$$

from which, since $\cos. \beta = \sin. \alpha$, we deduce

$$- y_1 \sin. \alpha = x_1 \cos. \alpha, \text{ or } - y_1 \tan. \alpha = x_1.$$

Now, if a plane be conceived to pass through the axis OZ and the centre of gravity of the body, and if we denote by ψ the angle which it makes with the plane XOZ, we shall have $x_1 = y_1 \tan. \psi$; and therefore, since $x_1 = - y_1 \tan. \alpha$, $\tan. \psi = - \tan. \alpha$. From this equation it follows that the direction PQ of the impressed force is perpendicular to the plane which passes through the axis and the centre of gravity. It now remains only to find the distance of the point of impulse P from the axis. Let $h =$ this distance, and $r_1 =$ distance of centre of gravity from the axis; the above equations give $\mathrm{F}^2 \cos.^2 \alpha = w^2\mathrm{M}^2y_1{}^2$, $\mathrm{F}^2 \sin.^2 \alpha = w^2\mathrm{M}^2x_1{}^2$, whence $\mathrm{F}^2 = w^2\mathrm{M}^2(x_1{}^2 + y_1{}^2) = w^2\mathrm{M}^2r_1{}^2$, and $\mathrm{F} = w\mathrm{M}r_1$. But (14) $w = \mathrm{F}{\cdot}h \div \int r^2dm$; therefore, by substitution,

$$\mathrm{F} = \mathrm{F}{\cdot}h\mathrm{M}r_1 \div \int r^2dm, \text{ and consequently } h = \frac{\int r^2dm}{\mathrm{M}r_1}.$$

33. Hence it appears that the conditions which must be fulfilled in order that the axis may receive no shock when the body is struck, are, 1*st*, that the direction of the force be in the plane of the two axes which make with the axis of rotation a system of principal axes; 2*d*, that its direction be perpendicular to the plane which passes through the axis and the centre of gravity; and, 3*d*, that the distance of the point of its application from the axis be $\int r^2dm \div \mathrm{M}r_1$.

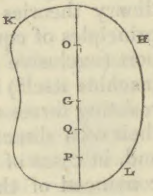
Centre of percussion.

34. The point determined by these conditions is called the *centre of percussion* of the system. The centre of per-

cussion is therefore the point at which, if an obstacle were opposed sufficient to resist the rotation of the system, no motion would be communicated to the axis; or, which is the same thing, if the axis were not fixed, the system would acquire from the shock no tendency to turn, the effect being the same as if the whole rotatory effort had been accumulated at that point.

Let HKL (fig. 8) be a section of the body perpendicular to the axis, and containing the centre of gravity G. Let O be the axis, and in the line OG take $OP = h = \int r^2dm \div M{\cdot}OG$, then P is the centre of percussion, and a force applied at P, in the plane HKL, and in the direction perpendicular to OP, will produce the same initial velocity of the centre of gravity G as if the body were free; for as the force exerts no pressure on the axis or points of support, the initial velocity will be the same as if they were not there.

Fig. 8.



35. The distance of the centre of percussion from the axis is always greater than the distance of the centre of gravity from the axis; for the moment of inertia in respect of the axis passing through O being $\int r^2dm$, by (17) the moment of inertia in respect of the parallel axis passing through G is $\int r^2dm - M{\cdot}OG^2$; therefore, since the moment of inertia is necessarily positive, $\int r^2dm \geq M{\cdot}OG^2$. But by the definition $\int r^2dm = M{\cdot}OG{\cdot}OP$, therefore $M{\cdot}OG{\cdot}GP \geq M{\cdot}OG^2$, or $OP \geq OG$.

36. The property of the centre of percussion, that a force applied there produces no strain on the axis, may be rendered sensible by a simple experiment. If a straight line, or rod of uniform thickness, be suspended from one extremity, the centre of percussion is at the distance of two thirds of its length from the axis; for the centre of gravity being at the middle of the line, $OG = \frac{1}{2}$, so that if we call its mass $M = 1$, the formula $OP = \int r^2dm \div M{\cdot}OG$ becomes $OP = 2\int x^2dx$, which, on taking the integral from $x = 0$ to $x = l$, gives $GP = \frac{2}{3}l$. Now if the rod be held in the hand, and we give it a motion round the joint of the wrist only, and strike smartly against an obstacle with a point considerably nearer or more remote than two thirds of its length, we feel a painful shock or wrench in the hand; but if we strike with that point which is exactly at two thirds of its length, we feel no such disagreeable strain.

37. It is sometimes said that the point P, considered as the centre of percussion, is that with which the most violent blow is struck. But this is by no means true. P is that point of a body turning round O which gives a blow precisely equal to the progressive motion of the body, and in the same direction. As we have already said, it is the point where we may suppose the whole rotatory momentum of the body accumulated. Every particle of the body is moving in a particular direction, with a velocity proportional to its distance from the axis of rotation; and if the body were stopped in any point, each particle tending to continue its motion endeavours to drag the rest along with it. Whatever point we call the centre of percussion should have this property, that when it is stopped by a sufficient force, the whole motion and tendency to motion of every kind should be stopped; so that if at that instant the supports of the axis were annihilated, the body would remain in absolute rest.

38. The expressions in (29) for the stress on the axis have reference only to the initial movement of the body, and the forces which they represent are soon destroyed by the resistance of the axis. But when a body is in permanent rotation about a fixed axis, there is a strain exerted on the axis which depends only upon the centrifugal force of rotation, and which therefore continues as long as the rotation continues. This constant pressure is determined as follows: Since w is the angular velocity, and r the distance of a particle dm from the axis, the velocity of the particle $= rw$; and, by mechanics, the centrifugal force of a body moving in a circle is proportional to the square of the velocity divided by the radius; therefore the centrifugal force of the particle dm, in the direction of the radius r, is w^2rdm. The resolved parts of this force in the directions OX and OY (fig. 7) are w^2xdm and w^2ydm; therefore, denoting the pressures in those directions on the pivot S by p and q, and those on the pivot T by p' and q', we shall have, as in (29), the following equations (in which x_1 and y_1 are the co-ordinates of the centre of gravity, and k, k' the distances of the pivots S and T respectively from O) to determine p, p', q, q', viz.

$$p + p' = w^2\int xdm = w^2Mx_1,\ q + q' = w^2\int ydm = w^2My_1,$$
$$pk + p'k' = w^2\int xzdm,\ qk + q'k' = w^2\int yzdm.$$

If we suppose OZ to be one of the three principal axes passing through O, then (22) $\int xzdm = 0$ and $\int yzdm = 0$; whence $pk + p'k' = 0$, $qk + q'k' = 0$. If, therefore, we further suppose $k = 0$, or that the origin of the co-ordinates is placed at S, we shall also have $p' = 0$, $q' = 0$, whence the pivot T sustains no pressure, the whole being exerted on S.

If OZ, besides being a principal axis, also passes through the centre of gravity, then $x_1 = 0$, $y_1 = 0$, whence $p + p' = 0$, $q + q' = 0$; and since p' and q' vanish when OZ is a principal axis, therefore $p = 0$, $q = 0$, so that no pressure is exerted on either of the pivots; and if they were removed, the body would still continue to revolve about the same axis.

The forces thus determined are in some sort the inverse of those arising from the percussions found in (29), the values of $p + p'$ being in this case expressed in terms of x, and in the former in terms of y; and the value of $q + q'$, which in the case of the percussions was expressed in terms of x, is here given in terms of y.

Centre
gyratio

39. In computing the effect of machines, it is often convenient to determine the situation of a point in which the whole mass of the machine might be concentrated without altering the rotatory effort. In the straight line OG (fig. 8) suppose a point Q to be taken, such that $OQ^2 = \int r^2dm =$ moment of inertia in respect of the axis O; then, if the whole matter in the body were collected at Q, a force applied at any point P in the line OG, would produce exactly the same angular velocity as if applied to the same point of the body having its natural form. For if the whole mass M were concentrated at Q, the moment of inertia would become $M{\cdot}OQ^2$ (13), and the moment of the force F applied at P is $F{\cdot}OP$; therefore the angular velocity (14) would be $\frac{F{\cdot}OP}{M{\cdot}OQ^2}$. But the angular velocity produced by the force F applied at P, the body having its natural form, is $\frac{F{\cdot}OP}{\int r^2dm}$; therefore, since $M{\cdot}OQ^2 = \int r^2dm$, the two expressions are equal, and the angular velocity is not altered by supposing the whole mass concentrated at Q.

40. The point Q is called the *centre of gyration* of the revolving mass; and since $OQ = \sqrt{\int r^2dm \div M}$, its distance from the axis O is found by extracting the square root of the quotient which is obtained by dividing the moment of inertia by the mass of the body. It is also connected with the centres of gravity and percussion by a simple relation. Suppose P to be the centre of percussion, then (34) $OP = \int r^2dm \div M \cdot OG$, therefore $OG \cdot OP = \int r^2dm \div M = OQ^2$; whence the distance of the centre of gyration from the axis of rotation is a mean proportional between the distances of the centre of gravity and percussion from the axis.

In a straight line or slender rod, as a working beam, or the spoke of a wheel in a machine, OQ is $\sqrt{\frac{1}{3}}$ of its length; for in this case $\int r^2dm = \int r^2dr = \frac{1}{3}r^2$; and r being the whole length, $M = r$; therefore $\sqrt{\int r^2dm \div M} = r\sqrt{\frac{1}{3}}$.

In a circle or cylinder turning about its axis, $\mathrm{OQ} = \sqrt{\frac{1}{2}}$ the radius; for by (18) we have in this case $\int r^2 dm = \frac{1}{2}\mathrm{M}r^2$; therefore $\sqrt{\int r^2 dm} \div \mathrm{M} = r\sqrt{\frac{1}{2}}$. But if the circle turns round one of its diameters, then $\mathrm{OQ} = \frac{1}{2}$ the radius; for in this case $\int r^2 dm = \frac{1}{4}\mathrm{M}\,r^2$; therefore $\sqrt{\int r^2 dm \div \mathrm{M}} = \frac{1}{2}r$.

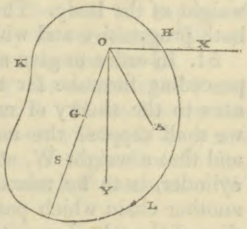
In the periphery of a circle, or rim of a wheel, turning about a diameter perpendicular to its plane, $\mathrm{OQ} =$ radius; for $\int r^2 dm = r^2 \times 2\pi r = 2\pi r^3$, and $\mathrm{M} = 2\pi r$; therefore $\sqrt{\int r^2 dm \div \mathrm{M}} = r$.

A solid sphere turning round a diameter has $\mathrm{OQ} = r\sqrt{\frac{2}{5}}$ for (18) the moment of inertia of the sphere is $\frac{8}{15}\pi r^5$; and the mass $\mathrm{M} = \frac{4}{3}\pi r^3$; therefore $\mathrm{OQ} = \sqrt{\frac{6}{15}r^2} = r\sqrt{\frac{2}{5}}$.

Fo ulæ for ccele- rat for s.

41. In what precedes, we have supposed that the force applied to a rigid system produces its effect by instantaneous impact, and then ceases to act, so that the motion communicated to the system is uniform. But if the action of the external force continues after the first impact, like the force of gravity on a falling body, the motion of the system will be accelerated. In the case of uniform velocity, it has been shown (14) that the angular velocity is equal to the moment of the applied force divided by the moment of inertia; that is, assuming F to denote the force, and P the perpendicular from the axis on the line of its direction, $w = p\cdot\mathrm{F} \div \int r^2 dm$. Suppose now the body to be subjected to the action of an accelerating force, and let dw be the increment of the angular velocity in the very small time dt. The increment of the actual velocity of the particle dm, the distance of which from the axis is r, is then rdw, and its accelerating force (the ratio of the increment of the velocity to the increment of the time) is $r\frac{dw}{dt}$. Its moving force is consequently $\frac{dw}{dt}\cdot rdm$; and since the direction of this force is perpendicular to r, its moment $= \frac{dw}{dt}\cdot r^2 dm$. But the sum of all these moments, in respect of every particle dm, must be equal to the moment of the impressed force, continuing to act during the same instant of time, therefore $\frac{dw}{dt}\int r^2 dm = p\cdot\mathrm{F}$, whence $\frac{dw}{dt} = \frac{p\cdot\mathrm{F}}{\int r^2 dm}$.

Fig. 9.



42. In the case of a heavy body oscillating about an axis by the force of gravity, let HKL be a section of the body passing through the centre of gravity G, and let the axis of suspension be at O, and perpendicular to the plane HKL. Also, let OX be horizontal, and OY vertical. Then the accelerating force being denoted by g ($g = 32$ feet in a second of time), the moving force in respect of a particle dm at A is gdm; and the direction of this force being parallel to OY, the distance of its direction from the axis is x; therefore its moment $= gxdm$. The sum of all these moments is the moment of the whole gravitating force of the body, that is, $g\int xdm = p\cdot\mathrm{F}$, and we have consequently, since $\int xdm = \mathrm{M}x_1$,

$$\frac{dw}{dt}\int r^2 dm = g\,\mathrm{M}x_1,\ \text{whence}\ \frac{dw}{dt} = \frac{g\mathrm{M}x_1}{\int r^2 dm}.$$

When the centre of gravity is in the straight line OY, or in the vertical passing through the axis, then $x_1 = 0$, and the angular velocity is uniform, and the body, if it rest in that position, would have no tendency to turn. But suppose the centre of gravity to be drawn aside from the vertical, and let $\mathrm{OG} = k$, and the angle $\mathrm{GOY} = \theta$, then $x_1 = k \sin.\theta$, and we have

$$\frac{dw}{dt} = \frac{g\mathrm{M}k\sin.\theta}{\int r^2 dm.},$$

whence the acceleration of the angular velocity is proportional to the sine of the angle which the line OG makes with the vertical.

43. Suppose the whole mass of the body to be concentrated at a point S in the straight line OG; we shall then have $r = \mathrm{OS}$, $\int r^2 dm = \mathrm{M}\cdot\mathrm{OS}^2$, and the formula will become $\frac{dw}{dt} = \frac{g\sin.\theta}{\mathrm{OS}}$. Now, if the point S be chosen such that $\mathrm{OS} = \int r^2 dm \div \mathrm{M}\cdot k$, then the two formulæ will be identical, and the solid body will oscillate exactly in the same time as if all its matter were united at the point S, and connected with the axis by an inflexible rod without weight, that is, in the same time as a simple pendulum, of which the length is OS.

Since $r^2 = x^2 + y^2$, and $\mathrm{M}\cdot k = \int xdm$, this expression for OS may be put under the following form, in which it is usually exhibited, namely,

$$\mathrm{OS} = \frac{\int(x^2 + y^2)\,dm}{\int xdm}.$$

Centre of oscillation.

44. The point S is called the *centre of oscillation.* On comparing the expression for OS with that for OP in (34), it will be seen that it is at the same distance from the axis as the centre of percussion. But the centre of oscillation is not, strictly speaking, limited to a single point; for it through S a line be drawn perpendicular to the plane HKL, or parallel to the axis of rotation, every point in this line will move with the same angular velocity as if it were entirely unconnected with the other points of the oscillating body, and the line itself is denominated the *axis of oscillation.* It is usual, however, to understand by the term *centre of oscillation*, the point S which is situated in the straight line, perpendicular to the axis, which contains the centre of gravity.

45. If we denote the moment of inertia of the body in respect of the axis which passes through G the centre of gravity, perpendicular to the plane HKL, by $\mathrm{M}\cdot h^2$, then h is a given line; and if we also make $\mathrm{OG} = k$, then (17) the moment of inertia in respect of the axis passing through O is $\mathrm{M}(h^2 + k^2)$. Hence we find $\mathrm{OS} = \frac{\mathrm{M}(h^2 + k^2)}{\mathrm{M}\cdot k} = k + \frac{h^2}{k}$; and consequently $\mathrm{GS} = \frac{h^2}{k}$. This formula gives the distance of the centre of oscillation below the centre of gravity.

46. The point S possesses several very remarkable properties, one of which is, that as S is the centre of oscillation of the body turning about O, so O is the centre of oscillation of the body turning about the parallel axis passing through S; in other words, the centres of oscillation and suspension are convertible. For it has been shown (45) that $\mathrm{GS} = \frac{h^2}{k} = \frac{h^2}{\mathrm{OG}}$; therefore $\mathrm{OG} = \frac{h^2}{\mathrm{GS}}$, that is to say, if the body oscillates about the axis passing through S, then O is the centre of oscillation. This curious property, which was first demonstrated by Huygens in his *Horologium Oscillatorium*, was ingeniously applied by Captain Kater as a practical means of determining the length of the seconds pendulum. Two axes being assumed in a bar or rod of metal, the bar is adjusted by filing away one of its ends until the oscillations about each axis are performed exactly in the same time; and when this equality has been established, the distance between the axes is the length of the synchronous simple pendulum. See PENDULUM.

47. We shall now determine the centre of oscillation in a few particular cases.

Computation of centres of oscillation.

If the body is a heavy straight line suspended by one extremity, the OS $= \frac{2}{3}$ of its length; for making $a =$ the length of the rod, we have (18) $\int r^2 dm = \frac{1}{3} a^3$, and in this case the mass $M = a$, and the centre of gravity is at the middle of the line, or $k = \frac{1}{2}a$, whence $Mk = \frac{1}{2}a^2$, and OS $= \int r^2 dm \div Mk = \frac{1}{3}a^3 \div \frac{1}{2}a^2 = \frac{2}{3}a$.

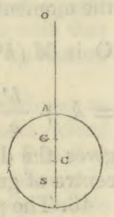
This is nearly the case of a slender rod of a cylindrical or prismatic shape, and it would be accurately so if all the points of a transverse section were equally distant from the axis of suspension.

If the oscillating body is an isosceles triangle suspended by its apex, and vibrating perpendicularly to its plane, O $= \frac{3}{4}$ of its height. For let $a =$ the height, $na =$ the base, $y =$ a section parallel to the base, then $y = nx$, $r = x$, and $dm = ydx$; whence $\int r^2 dm = n\int x^3 dx = \frac{1}{4}na^4$ (when $x = a$), But in this case $M =$ area $= \frac{1}{2} a \times na = \frac{1}{2} na^2$; and the distance of the centre of gravity from the vertex being two thirds of the height, we have $k = \frac{2}{3}a$, whence $Mk = \frac{1}{3} na^3$, and consequently OS $= \int r^2 dm \div Mk = \frac{3}{4}a$.

48. The problem to find the centre of oscillation of a sphere suspended by a thread or an inflexible rod, is important on account of its application to the measurement of the seconds pendulum. Let us first suppose that the weight of the thread is insensible in comparison of that of the ball. Let $r =$ radius of ball, $l =$ length of thread from the point of suspension to the ball, and $a = l + r =$ distance from the point of suspension to the centre of the ball. The moment of inertia of the sphere in respect of an axis passing through its centre (18) is $\frac{2}{5}Mr^2$; therefore (17) the moment in respect of a parallel axis at the distance a is $M(a^2 + \frac{2}{5}r^2)$; and on dividing this by $Mk (= Ma)$, we get the distance from the point of suspension to the centre of oscillation $= a + \frac{2r^2}{5a}$, or the centre of oscillation is below the centre of gravity by the distance $\frac{2}{5}r^2 \div a$.

49. Let us now suppose the weight of the thread or rod to be taken into account. Let C (fig. 10) be the centre of the ball, G the centre of gravity of the ball and rod OA, S the centre of oscillation; also let $b =$ weight of ball, and $b' =$ weight of rod. The moment of the sphere, oscillating about O, supposing the weight of the rod insensible, is found above $= M(a^2 + \frac{2}{5}r^2)$; and (18) the moment of the rod alone is $\frac{1}{3}OA^3 = \frac{1}{3}l^3 = \frac{1}{3}M'l^2$ (putting $M' =$ mass of the rod); therefore, substituting the weights for the masses, that is, making $M = b$, and $M' = b'$, the moment of the compound body is $b(a^2 + \frac{2}{5}r^2) + \frac{1}{3}b'l^2$. Now, to find the position of G the centre of gravity, we have this theorem in statics, that the product of the whole mass multiplied into the distance of its centre of gravity from the axis, is equal to the sum of the products of the masses of the several parts into the respective distances of their centres of gravity; that is, putting OG $= k$, we have $(M + M')k = ba + \frac{1}{2}b'l$, and consequently (45),

Fig. 10.



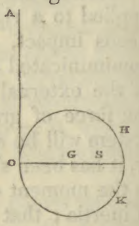
$$OS = \frac{b(a^2 + \frac{2}{5}r^2) + \frac{1}{3}b'l^2}{ba + \frac{1}{2}b'l}.$$

Rotation on inclined planes.

50. Hitherto we have supposed the axes of rotation to be absolutely fixed; but the rotation may be performed about axes which are themselves in motion, as in the case of a ball or cylinder rolling down an inclined plane. When a ball rolls down an inclined plane, the point of the ball which rests on the plane is hindered from sliding down by friction; and therefore the ball tumbles, as it were, over this point of contact, and is instantly caught by another point of contact, over which it tumbles in the same manner. A cylinder rolls down in the very same way; and its motion is nearly the same as if a fine thread had been lapped round it, and one end of it made fast at the head of the inclined plane. The cylinder rolls down by unwinding this thread.

The mechanism of all such motions (and some of them are important) may be understood by considering them as follows: Let a body of any shape be connected with a cylinder HOK (fig. 11), whose axis passes through G, the centre of gravity of the body. Suppose the body suspended from a fixed point A by a thread wound round the cylinder. The body will descend by the action of gravity, and it will also turn round, unwinding the thread. Draw the horizontal line SGO; this will pass through the point of contact O of the thread and cylinder, and O is the point round which the cylinder *begins* to turn in descending. Let S be its centre of oscillation corresponding to the momentary centre of rotation O. The body will begin to descend in the same manner as if all its matter were collected in S; for it may be considered, in this instant, as a pendulum suspended at O. But in this case S will descend in the same manner as if the body were falling freely. Therefore the velocity of G (that is, the velocity of descent) will be to the velocity with which a heavy body would fall as OG to OS. Now since the points O, G, S, are always in a horizontal line, and the radius OG is given, as also OS (43), the velocity of a body falling freely, and of the body unwinding from this thread, will always be in the same proportion of OS to OG, and so will the spaces described in any given time. And thus we can compare their motions in every case when we know the place of the centre of oscillation.

Fig. 11.



It follows from this that the weight of the descending body will be to the tension of the thread as OS to GS; for the tension of the thread is the difference between the moment of the rolling body and that of the body falling freely. It is to be remarked, that this proportion between the weight of the body and the tension of the thread will be always the same; for it has been demonstrated (46), that if O be in the circumference of a circle whose centre is G, S will be in the circumference of another circle round the same centre, and therefore the ratio of OG to OS is constant.

If a circular body HOK roll down an inclined plane by unfolding a thread, or by friction which prevents all sliding, the space described will be to that which the body would describe freely as OG to OS; for the tendency down the inclined plane is a determined proportion of the weight of the body. The motion of rotation in these cases, both progressive and whirling, is uniformly accelerated.

Inertia of machines.

51. In order to give an example of the application of the preceding formulæ for the rotation of bodies about fixed axes to the theory of machines actually performing work, we shall suppose the machine to be the wheel and axle, and that a weight W, attached to a chain passing over the cylinder, is to be raised by means of a power acting on another chain which passes over the wheel. Let the radius of the wheel $= a$, the radius of the cylinder $= b$, and suppose the moving power to be another weight P, or a mass of matter descending by the accelerating force of gravity.

Since the machine is in this case impelled by an accelerating force, the angular velocity w is obtained from the equation (41), namely,

$$\frac{dw}{dt} = \frac{\text{moment of impelling force}}{\text{moment of inertia}}.$$

Now, because the weight P acts in a straight line whose distance from the axis $= a$, the moment of its force is Pa; and in like manner the moment of the force exerted by W is Wb. But this last moment retards the motion, and must be taken as negative; therefore the moment of the impelling force is $Pa - Wb$. Again, the moment of inertia is made up of three parts: first, the moment of inertia of the machine, which depends on the quantity of dead matter contained in the wheel and cylinder, and which we may denote by K; second, the moment of inertia of the weight P, which may be considered as attached to the extremity of the radius of the wheel; third, the moment of inertia of the weight W, which may be considered as attached to the extremity of the radius of the cylinder. Let M and M′ be the masses of the bodies whose weights are P and W, then the moments of inertia are respectively Ma^2 and $M'b^2$. Let also $g =$ the acceleration of gravity, then the weight of a body being the product of its mass into the force of gravity, we have $P = gM$, $W = gM'$, whence the whole moment of inertia is

$$K + \frac{Pa^2}{g} + \frac{Wb^2}{g},$$

and we have consequently

$$\frac{dw}{dt} = \frac{g\,(Pa - Wb)}{gK + Pa^2 + Wb^2}.$$

For the sake of abridging, let us assume $U = \frac{Pa - Wb}{gK + Pa^2 + Wb^2}$, and the angular velocity will be given by the equation $w = g\int U dt$. Also let $v =$ the velocity of the *impelled point* of the machine, or the velocity with which P descends, and $u =$ the velocity of the *working point*, or velocity with which W is raised; then $v = aw$, and $u = bw$, at the end of the time t; and if we denote the respective accelerating forces by φ and ψ, we shall have

$$\varphi = \frac{dv}{dt} = agU,\ \psi = \frac{du}{dt} = bgU.$$

52. To find the proportion of the velocities of the impelled and working points which give the greatest performance when the weight and power are both given, we may treat the formula which expresses the work, that is, the accelerating force, or W, as a fluxionary quantity, and find its maximum. Thus, to find the radius of the wheel by which the weight will be raised with the greatest velocity, we have to differentiate the quantity denoted by U, on the supposition that a is variable, and make the result equal to zero. This will give an equation from which a will be obtained in terms of P, W, and b; and it will be observed, that as K varies with a, the value of K in terms of a must be substituted in the value of U before the differentiation.

53. The friction may be taken account of by considering it as a quantity to be added to the weight W. Let $f =$ the co-efficient of friction, and $c =$ radius of the pivots supporting the machine, then the friction will be expressed by $fc\,(P + W)$, and we have only to substitute $Wb + fc\,(P + W)$ for Wb in the above expression for U.

54. In the case of the fixed pulley, the velocities of P and W are equal, and we have also $a = b$. If we denote the weight of the pulley by Q, then its mass will be $Q \div g$, and (18) its moment of inertia $= \frac{1}{2}\,Qa^2 \div g$; therefore the formula for the accelerating force with which P descends or W rises will be

$$\varphi = g \cdot \frac{P - W}{\frac{1}{2}\,Q + P + W}.$$

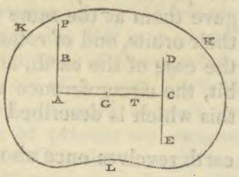
Mot of a solid ody enti y free.

55. We now proceed to consider the motion of a solid body which is entirely free.

When a solid body or rigid system is impressed at a single point by a force of which the direction does not pass through the centre of gravity, the body, if free to move in every direction, acquires two motions, one progressive, and equal to that which would have resulted if the direction of the force had passed through the centre of gravity, and the other rotatory, and equal to that which would have resulted if the body had been only at liberty to move round a fixed axis passing through the centre of gravity, and perpendicular to the plane which contains that centre, and the line of the direction of the impelling force.

56. In order to demonstrate this proposition, let HKL (fig. 12) be a section of the body passing through G the centre of gravity, and containing the line in which the force is directed; let P be the point at which the given force F is applied, and PA its direction; through G draw GA perpendicular to PA, and let PA represent the intensity of the force F. Bisect AP in B, produce AG until $GC = AG$, and through C draw CD, CE perpendicular to AC, and make each equal to AB. If we now conceive a force represented by DC to be applied at D in the direction DC, and another force represented by EC to be applied at E in the direction EC, these two forces being equal, and acting in opposite directions, will destroy each other, or produce no movement in the body, and the motion which actually takes place in consequence of the application of the force PA at P, will be the same as would result from the application of the four forces PB, BA, DC, EC. Now it is evident, that if the two forces BA and DC acted alone, they would produce no rotatory motion about the axis passing through G, for their moments $BA \cdot AG$ and $DC \cdot CG$ are equal, and they tend to turn the body in opposite directions. But the same two forces both tend to give the body a progressive motion; and as the resultant of two equal and parallel forces is a force equal to their sum, and acting at the point which bisects the distance between their directions, the initial progressive motion of the body in consequence of the forces BA and DC will be the same as if the force $PA = F$ were applied at the point G in the direction parallel to PA. We have now to consider the two remaining forces PB and EC. As these two forces act on the line AC in opposite directions, their resultant is nothing, or their separate tendencies to produce a progressive motion in the centre of gravity of the body, are counteracted by their joint effort. But they conspire in tending to produce a rotatory motion in the same direction about the axis passing through G; and the moment of the first in respect of that axis being $PB \cdot AG$, and that of the second $EC \cdot CG$, the sum of their moments is $(PB + EC)\,AG$ or $PA \cdot AG$. The whole effect of these two forces is therefore to produce the same initial angular velocity about the axis through G, perpendicular to HKL, as would be produced by the single force PA applied at the point A; and it has been shown, that the whole effect of the forces BA and DC is to produce the same progressive movement of the centre of gravity as if the single force PA were applied at that point, consequently the proposition is demonstrated, and it appears that the two motions produced by the application of a force which is not directed towards the centre of gravity may be considered independently of each other.

Fig. 12.



57. Let $V =$ the progressive velocity of the centre of gravity in the direction parallel to PA; then the mass of the body being M, we have the force $F = MV$, and consequently $V = F \div M$. Again, if we make $AG = l$, the angular velocity produced by the force F applied at A is $w = F \cdot l \div \int r^2 dm$ (14), therefore $V : w :: \int r^2 dm : Ml$. Now, since $\int r^2 dm$ and M are both known from the nature of the body, it follows, that when the distance l is given, the ratio of the progressive motion of the centre of gravity to the velocity of angular rotation can be found; and, conversely, when the ratio of the two velocities is given, the distance l can be found. For example, let s be the space described by the centre of gravity while the body makes one revolution about its axis, then 2π is the space described, in consequence of the rotatory motion, by a point of the body whose distance from the axis $= 1$, and the above proportion gives $l = \frac{2\pi}{s} \cdot \frac{\int r^2 dm}{M}$.

58. As it is not necessary that the progressive motion of the centre of gravity be in a straight line, this formula enables us to determine the distances from the centre at which the planets may have received the single impulses which gave them at the same time their motions of revolution in their orbits, and of rotation round their axes. Thus, taking the case of the earth, and making R = the radius of its orbit, the circumference of the orbit is $2\pi R$, and the part of this which is described by the centre of gravity, while the earth revolves once about its axis, is $\frac{2\pi R}{365} = s$; and by (18) $\int r^2 dm \div M = \frac{2}{5} r^2$; therefore $l = \frac{365 \times 2r^2}{5R}$. If we assume $r = 4000$ miles, and $R = 95{,}000{,}000$ miles, this formula gives $l = 24\frac{1}{2}$ miles nearly.

Centre of spontaneous rotation.

59. The direction of the force being PA (fig. 12), if a point be taken in the line AG between A and G, the motion of the point arising from the rotation of the body about the axis is in the first instant of time parallel to the direction of the progressive motion, and if r be its distance from G, the velocity due to both motions will be $V + rw$. But if the point be taken on the other side of G, the direction of the rotatory motion will be opposite to that of the progressive motion, and the velocity of the point will be $V - rw$. If therefore the point T be taken such that making $GT = r$, we have the equation $V = rw$; then, for a single instant, every point in the straight line passing through T perpendicular to HKL is at rest, or is carried as far back by the rotatory motion in the first instant of time, as it is carried forward by the progressive motion; and, for a single instant, the double motion of the body may be regarded as a simple rotatory motion about that straight line. This point T is called the *centre of spontaneous rotation*, and the straight line passing through T, perpendicular to the plane HKL, is called the *axis of spontaneous rotation*.

Progressive motion of centre of gravity.

60. The preceding formulæ enable us to determine completely the two motions of translation and rotation when a force is applied to a single point of the free body; we have now to determine what the effect will be when any number of forces given in magnitude and direction are applied to different points of the body; and as it appears from what precedes, that during the first instant the two motions take place independently of each other, we shall first give the equations which fix the position of the centre of gravity of the moving body, and then those which define the rotatory motion, or determine the position of any point of the body with reference to its centre of gravity.

Let G be the centre of gravity of the body, M its mass, and let the motion be referred to three rectangular axes OX, OY, OZ. Let us now suppose forces given in magnitude and direction to be applied at the points A, A′, A″, &c. of the body, and that each of them is resolved into three others respectively parallel to the directions of the axis, and let p, q, r, be the resolved forces applied at A; p', q', r', the resolved forces applied at A′, and so on; also let $P = p + p' + p'' +$, &c., $Q = q + q' + q'' +$, &c., $R = r + r' + r'' +$, &c.; then, since the moving force is equal to the product of the mass into the velocity, and since by (56) the progressive motion resulting from the force applied at A is the same as if it had been applied to the centre of gravity, the velocity of the centre of gravity from the joint action of all the forces, in the directions OX, OY, OZ, will be respectively $\frac{P}{M}$, $\frac{Q}{M}$, $\frac{R}{M}$. But the resulting velocity is the diagonal of the parallelopiped of which these component velocities are the sides; therefore, denoting it by V, we have

$$V = \frac{1}{M}\sqrt{(P^2 + Q^2 + R^2)}.$$

To determine the direction of this velocity, let α, β, γ, be the angles which its direction makes with the axis x, y, z; then, since the forces P, Q, R meet in a point (the centre of gravity), we have

$$\cos.\ \alpha = \frac{P}{MV},\ \cos.\ \beta = \frac{Q}{MV},\ \cos.\ \gamma = \frac{R}{MV}.$$

These equations give the direction of the velocity; hence, since V has already been found, the initial velocity of the centre of gravity and its direction are both completely determined.

61. When the forces applied to the body are simply percussions, which cease to act after the first impact, and there is no resistance, no change will take place in the velocity or its direction during the second and succeeding instants, and the centre of gravity will describe a straight line with a uniform motion; but if the forces continue to act after the motion has commenced, we must have recourse to the formulæ given by the principles of dynamics, which express the varied motion of a body subjected to the action of accelerating forces. At the end of the time t, reckoned from the commencement of the motion, let x, y, z be the co-ordinates of the element of the body dm, referred to the rectangular axes OX, OY, OZ; then the velocity at that instant being expressed by the differential of the space described divided by the element of the time, the components of the velocity at the same instant will be $\frac{dx}{dt}$, $\frac{dy}{dt}$, $\frac{dz}{dt}$. Now the forces acting on the body, whatever be their nature, may always be decomposed into others parallel to the three axes; suppose therefore P, Q, R to be the components of the accelerating forces in those directions acting on the point dm, then the increment of velocity being equal to the force into the element of the time, if the particle dm were entirely free, the velocities $\frac{dx}{dt}$, $\frac{dy}{dt}$, $\frac{dz}{dt}$ would acquire the increments Pdt, Qdt, Rdt in the instant dt. But the increments of velocity actually acquired in the instant dt are the differentials of the velocities, or $d \cdot \frac{dx}{dt}$, $d \cdot \frac{dy}{dt}$, $d \cdot \frac{dz}{dt}$, and therefore the velocities lost in consequence of the mutual connection of the particles are respectively

$$Pdt - d \cdot \frac{dx}{dt},\ Qdt - d \cdot \frac{dy}{dt},\ Rdt - d \cdot \frac{dz}{dt}.$$

Multiplying each of these expressions by dm, we get the quantities of motion due to the respective velocities. Now, according to a well-known principle of dynamics, the discovery of which is due to D'Alembert, the infinitely small quantities of motion lost in every instant by all the particles in consequence of their mutual connection must make equilibrium; the integrals of the preceding expressions multiplied by dm must therefore be severally equal to zero, and we have accordingly (on effecting the operations indicated, and dividing by dt) the three equations

$$\int P dm = \int \frac{d^2x}{dt^2} dm,\ \int Q dm = \int \frac{d^2y}{dt^2} dm,\ \int R dm = \int \frac{d^2z}{dt^2} dm.$$

62. In order to find the place of the centre of gravity at the end of the time t, let its co-ordinates at that instant be x_1, y_1, z_1; then from the property of the centre of gravity we have

$$Mx_1 = \int x dm,\ My_1 = \int y dm,\ Mz_1 = \int z dm.$$

Regarding the variables as functions of the time t, differentiating twice, and dividing each time by dt, we obtain

$$M\frac{d^2x_1}{dt^2} = \int \frac{d^2x}{dt} dm,\ M\frac{d^2y_1}{dt^2} = \int \frac{d^2y}{dt^2} dm,$$

$$M\frac{d^2z_1}{dt^2} = \int \frac{d^2z}{dt^2} dm.$$

Comparing these with the above equations, we have

$$\mathrm{M}\frac{d^2x_1}{dt^2}=\int \mathrm{P}dm,\ \mathrm{M}\frac{d^2y_1}{dt^2}=\int \mathrm{Q}dm,\ \mathrm{M}\frac{d^2z_1}{dt^2}=\int \mathrm{R}dm.$$

Now, the first members of these equations denote respectively the quantities of motion in the direction of the axes x, y, z, of a material point whose mass $=$ M, and the integrals $\int \mathrm{P}dm$, $\int \mathrm{Q}dm$, $\int \mathrm{R}dm$ denote the quantities of motion of the body or rigid system under consideration, subjected to the accelerating forces P, Q, R; it follows, therefore, that during the whole continuance of the motion the centre of gravity moves as if the whole of the matter of the body were concentrated there, and the forces which act on the body were all applied at that point.

63. Having thus given the equations which enable us to determine the motion of the centre of gravity of a free system under the action of given forces, we now proceed to consider the rotatory movement of the system, and to investigate the position of any point of it with respect to the centre of gravity at the end of any given interval of time. The investigation of this problem is greatly facilitated by means of the following elegant theorem respecting the composition of rotatory motion, discovered by Frisi.

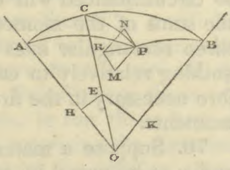
Composition of rotatory motion.

Proposition. If a solid body revolve round an axis OA (fig. 13) passing through its centre of gravity with an angular velocity $= w$, and if a force be impressed upon it which alone would cause it to revolve about an axis OB also passing through its centre of gravity with an angular velocity $= w'$, then the body will not revolve about either OA or OB, but about a third axis OC lying in the plane of the other two, and inclined to each of the former axes in angles whose sines are inversely as the angular velocities round those axes, or so that sin. AOC : sin. BOC :: $w' : w$; and the angular velocity u round the new axis is to that round one of the primitive axes as the sine of inclination of the two primitive axes is to the sine of the inclination of the new axis to the other primitive axis, that is, $u : w$ :: sin. AOB : sin. COB, or $u : w'$ :: sin. AOB : sin. AOC.

64. In order to prove this proposition, it is necessary to show, 1st, that any point in the line OC is at rest while the two motions are taking place; 2d, that every particle of the body not situated in AC revolves about the axis AC; and 3d, to assign the velocity of rotation.

(1.) Let the angular motion about the axis OA be supposed to be in the direction by which every point in the angle AOB would be raised above the plane of the paper, and that about OB to be in the direction by which every point within the same angle would be depressed below the plane of the paper, and take any point E in OC, and draw EH and EK respectively perpendicular to OA and OB. The absolute velocity with which the point E moves in consequence of the rotation about OA is HE $\cdot w$, and the absolute velocity with which it moves about OB is KE $\cdot w'$. But HF $=$ OE sin. AOC, and KE $=$ OE sin. BOC; and by hypothesis $w' : w$ :: sin. AOC : sin. BOC, whence w' sin. BOC $= w$ sin. AOC, therefore the two velocities HE $\cdot w$ and KE $\cdot w'$ are equal; and they are in opposite directions, consequently the point E remains at rest. In the same manner, it is shown that every other point in OC remains at rest.

Fig. 13.



(2.) Let P be the place of any particle of the body, and conceive the surface of a sphere to pass through P, intersecting the axes in A and B, and join PA and PB by arcs of great circles. Draw PM perpendicular to AP, and make PM $= w \cdot$ sin. AP $=$ absolute velocity of the particle P about the axis OA in 1″ of time; also draw PN perpendicular to BP, and make PN $= w' \cdot$ sin. BP $=$ absolute velocity of P about OB in 1″ (the radius being unity), and complete the parallelogram PMRN.

Since the particle dm, in virtue of the rotation about OA, has a motion which would cause it to describe the line PM in a second, and in virtue of the rotation about OB has also a motion which would cause it to describe PN in a second, the particle will describe PR the diagonal of the parallelogram PMRN. Through P let an arc of a great circle be described perpendicular to PR, and produced to meet the plane AOB in the point C, which at present we suppose indeterminate, and join OC; then OC is the straight line in which a plane passing through P, perpendicular to PR, intersects the plane AOB.

Because APM and CPR are equal, being right angles, take from each the common angle APR, and there remains RPM $=$ APC; and because BPN and CPR are right angles, add to each NPC, and we have RPN $=$ BPC. Now PM $= w$ sin. AP, and PN $=$ RM $= w' \cdot$ sin. BP, therefore

PM : RM :: w sin. AP : w' sin. BP;

but PM : RM :: sin. MRP ($=$ sin. RPN) : sin. RPM,

or PM : RM :: sin. BPC : sin. APC;

therefore sin. BPC : sin. APC :: w sin. AP : w' sin. BP,

whence w' sin. BP $\cdot$ sin. BPC $= w$ sin. AP $\cdot$ sin. APC.

Now in the spherical triangles BPC and APC we have sin BP $\cdot$ sin. BPC $=$ sin. CB $\cdot$ sin. PCB, and sin. AP $\cdot$ sin. APC $=$ sin. AC $\cdot$ sin. ACP; therefore

w' sin. CB $\cdot$ PCB $= w$ sin. AC $\cdot$ sin. ACP.

But sin. PCB $=$ sin. ACP (the one angle being the supplement of the other); also sin. CB $=$ sin. BOC, sin. AC $=$ sin. AOC, therefore w' sin. BOC $= w$ sin. AOC, and consequently

$w : w'$ :: sin. BOC : sin. AOC.

From this it follows that OC divides the angle AOB into parts having a given ratio, and is therefore given in position; and as it may be shown in like manner that the plane passing through every other particle of the body perpendicular to the direction of the motion of that point intersects the plane AOB in OC, OC is therefore the axis of rotation.

(3.) To find u, the angular velocity about OC. In the triangle RPM we have RP : PM :: sin. RMP : sin. MRP; but sin. RMP $=$ sin. MPN $=$ sin. APB, and sin. MRP $=$ sin. RPN $=$ sin. CPB, therefore RP : PM :: sin. APB : sin. CPD. Now RP $= u$ sin. CP $=$ absolute velocity about OC in 1″, and PM $= w$ sin. AP $=$ absolute velocity about OA in 1″. Substituting these expressions therefore in the last proportion, and multiplying extremes and means, we get

u sin. CP $\cdot$ sin. CPB $= w$ sin. AP $\cdot$ sin. APB.

But the spherical triangles CPB and APB give sin. CP sin. CPB $=$ sin. CB sin. CBP, and sin. AP sin. APB $=$ sin. AB sin. ABP. Therefore, substituting, and leaving out the common term, we have u sin. CB $= w$ sin. AB, or u sin. COB $= w$ sin. AOB, that is,

$u : w$ :: sin. AOB : sin. COB.

In like manner, it may be shown that

$u : w'$ :: sin. AOB : sin. AOC,

whence the proposition is demonstrated.

65. When the two primitive axes OA and OB are at right angles, sin. AOB $= 1$, sin. COB $=$ cos. AOC, and the above two proportions give $u : w :: 1 :$ cos. AOC, $u : w' :: 1 :$ sin. AOC, whence u cos. AOC $= w$, and u sin. AOC $= w'$, and consequently $u^2 = w^2 + w'^2$, or $u = \sqrt{(w^2 + w'^2)}$.

66. Suppose a third axis OD at right angles to OA and OB, and that a force is impressed on the body, which alone would cause it to revolve about OD with an angular velocity $= w''$; then, as the body is revolving about OC with the velocity u, the effect of this new force will be to cause it to revolve about an axis in the plane DOC; and if we make $\psi =$ the angle which this new axis makes with the line OC, and W $=$ the velocity about the new axis, we

shall have from the preceding formulæ W cos. $\psi = u$, and W sin. $\psi = w''$, whence $W = \sqrt{(u^2 + w''^2)}$, or, substituting for u its value found above, $W = \sqrt{(w^2 + w'^2 + w''^2)}$. The position of the new axis is, however, more conveniently defined by the angles which it makes with the three primitive axes. Let α, β, γ be the angles which it makes respectively with the primitive axes OA, OB, OD, then the three spherical triangles which it forms with the three axes give cos. α = cos. AOC cos. ψ, cos. β = cos. BOC cos. ψ, cos. γ = sin. ψ. Now, from the preceding equations (65), we have

$$\text{cos. AOC} = \frac{w}{u}, \text{cos. BOC} = \text{sin. AOC} = \frac{w'}{u}, \text{cos.}\,\psi = \frac{u}{W},$$

$$\text{sin.}\,\psi = \frac{w''}{W}.$$ Therefore, substituting and writing for W its value $\sqrt{(w^2 + w'^2 + w''^2)}$, we obtain

$$\text{cos.}\,\alpha = \frac{w}{\sqrt{(w^2 + w'^2 + w''^2)}}, \text{cos.}\,\beta = \frac{w'}{\sqrt{(w + w'^2 + w''^2)}},$$

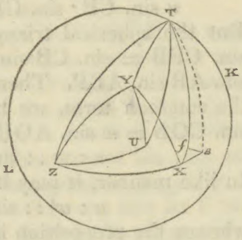
$$\text{cos.}\,\gamma = \frac{w''}{\sqrt{(w + w'^2 + w''^2)}}.$$

Hence it follows that the change of position of any point in consequence of the rotation W*dt*, in the element of time *dt*, is equivalent to the change that would be effected by three simultaneous and independent rotations W*dt* cos. α, W*dt* cos. β, W*dt* cos. γ, about three rectangular axes, with which the axis corresponding to the velocity W makes respectively the angles α, β, γ.

67. In determining the rotation of a body about a fixed centre, it is most convenient to refer every point of the body to a system of three principal axes passing through the centre of gravity; there are therefore two distinct steps in the investigation, the first being to find the situation of the principal axes in respect of absolute space at the end of any given time, and the second to find the position of any point of the body referred to these axes, whose positions have been determined. To accomplish the first of these, the following proposition is required.

68. If at the end of any time *t* the position of the axis about which the body is revolving be known in respect of the three principal axes supposed to be fixed in the system, together with the angular velocity of rotation; to determine the change of situation of the principal axes in respect of absolute space, in the element of time *dt*.

Fig. 14.



Imagine a sphere, whose radius = 1, to be described about O the centre of gravity of the body; let KTL (fig. 14) be a great circle, and in KTL assume a point T as that to which the position of the principal axes is to be referred. At the end of the time *t*, let X, Y, Z be the points in which the three principal axes passing through O meet the surface of the sphere; then, on joining these points by arcs of great circles, the three arcs XY, YZ, ZX will be quadrantal arcs, since the principal axes are at right angles to each other. Join also X, Y, Z with T by arcs of great circles, and assume

$$\text{TX} = l,\ \text{TY} = m,\ \text{TZ} = n,$$
$$\text{KTX} = \lambda,\ \text{KTY} = \mu,\ \text{KTZ} = \nu.$$

Let U be the point in which the axis about which the body is revolving at the end of the time *t* meets the surface of the sphere, and let U be joined by arcs of great circles with X, Y, Z. Put W = angular velocity of rotation about OU (which we suppose to be in the direction XYZ), and let α, β, γ be the angles which OU makes with the principal axes, namely, α = UX, β = UY, γ = UZ.

To investigate the motion of the point X, let X*e* be the small arc described by X in the instant *dt*; then this arc being perpendicular to UX, we have the angle YX*e* = UXZ, and sin. YX*e* = cos. YXU; also, since YXZ is a right angle, sin. TXY = cos. TXZ. Hence the formulæ of spherical trigonometry give the following equations,

$$\text{sin. YX}e = \frac{\text{cos.}\,\beta}{\text{sin.}\,\alpha}, \text{cos. YX}e = \frac{\text{cos.}\,\gamma}{\text{sin.}\,\alpha},$$

$$\text{cos. TXY} = \frac{\text{cos.}\,m}{\text{sin.}\,l}, \text{sin. TXY} = \frac{-\text{cos.}\,n}{\text{sin.}\,l};$$

from which, since TX*e* = YX*e* — TXY, we deduce

$$\text{sin. TX}e = \frac{\text{cos.}\,\beta\,\text{cos.}\,m + \text{cos.}\,\gamma\,\text{cos.}\,n}{\text{sin.}\,\alpha\,\text{sin.}\,l},$$

$$\text{cos. TX}e = \frac{\text{cos.}\,\gamma\,\text{cos.}\,m - \text{cos.}\,\beta\,\text{cos.}\,n}{\text{sin.}\,\alpha\,\text{sin.}\,l}.$$

Draw *ef* perpendicular to TX; then, because X*e* = W*dt* sin. α, we have X*f* = W*dt* sin. α cos. TX*e*, *ef* = W*dt* sin. α sin. TX*e*. But X*f* = — *dl*, *ef* = — sin. *ld* λ; therefore, by reason of the above values of sin. TX*e* and cos. TX*e*, and because W cos. $\beta = w'$, W cos. $\gamma = w''$, we have

$$\text{sin.}\,l\,dl = dt\,(w'\,\text{cos.}\,n - w''\,\text{cos.}\,m),$$
$$\text{sin.}^2\,l\,d\lambda = -\,dt\,(w'\,\text{cos.}\,m + w''\,\text{cos.}\,n).$$

It is evident that the consideration of the motion of each of the other two points Y and Z will lead to expressions entirely similar, and which may be concluded from analogy: we have therefore the following six equations to determine l, m, n, λ, μ, ν, namely,

$$\text{sin.}\,l\,dl = dt\,(w'\,\text{cos.}\,n - w''\,\text{cos.}\,m),$$
$$\text{sin.}\,m\,dm = dt\,(w''\,\text{cos.}\,l - w\,\text{cos.}\,n),$$
$$\text{sin.}\,n\,dn = dt\,(w\,\text{cos.}\,m - w'\,\text{cos.}\,l),$$
$$\text{sin.}^2\,l\,d\lambda = -\,dt\,(w'\,\text{cos.}\,m + w''\,\text{cos.}\,n),$$
$$\text{sin.}^2\,m\,d\mu = -\,dt\,(w''\,\text{cos.}\,n + w\,\text{cos.}\,l),$$
$$\text{sin.}^2\,n\,d\nu = -\,dt\,(w\,\text{cos.}\,l + w'\,\text{cos.}\,m).$$

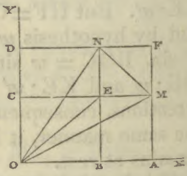
Because $\text{cos.}^2\,l + \text{cos.}^2\,m + \text{cos.}^2\,n = 1$, it is only necessary to solve two of the first three equations, in order to find the arcs l, m, n; and when the values of l, m, n have been obtained, it is only necessary to compute one of the three angles λ, μ, ν, in order to have the other two; for when one is known, the others are obtained from the equations cos. $(\mu - \lambda)$ = — cot. l cot. m, cos. $(\nu - \mu)$ = — cot. m cot. n, given by the triangles TYX and TYZ, of which the sides XY and YZ are arcs of 90°.

Rotation about a fixed point.

69. By means of the preceding propositions, we are enabled to determine the motion of a body which is at liberty only to turn about a fixed point. The statical principle on which the determination must be made is, that a body so circumstanced will be in a state of equilibrium, when the sums of the moments of the forces with reference to three rectangular axes drawn through the fixed point are nothing relatively to each of the three axes. It is therefore necessary in the first place to find expressions for these moments.

70. Suppose a material point whose co-ordinates are x and y to be urged by two forces, namely, a force = X, in the direction OX (fig. 15), and another force = Y in the direction OY, perpendicular to OX; then the efficacy of the two forces to turn the particle about the axis OZ perpendicular to the plane XOY, in the direction from X towards Y, is equal to Yx—Xy. For let M be the situation of the particle, and take MN to represent the intensity and direction of the single force into which X and Y may be compounded; through M and N draw MA, NB perpendicular to OX and MC, ND perpendicular to OY; let E be the point in which MC and NB intersect; join OM, ON, OE, and complete the parallelogram OF. Now the force represented by MN is compounded of the two forces represented by ME and EN; we have therefore, by construction,

Fig. 15.



$$\text{ME} = -\text{X} = \text{force in direction} - \text{OX},$$
$$\text{EN} = +\text{Y} = \text{force in direction OY}.$$

But the moment of the force MN in respect of the axis OZ is equal to MN multiplied into the line drawn from O perpendicular to MN, that is, equal to twice the triangle OMN, or to twice the sum of the triangles MOE, EON, MEN, or to the parallelograms MB, NC, EF, or to MB and CF. Now $\text{MB} = \text{AM} \cdot \text{ME} = -\text{X}y$, and $\text{CF} = \text{CD} \cdot \text{CM} = \text{Y}x$; therefore, the moment of the force MN, or of the two forces X and Y, is expressed by $\text{Y}x - \text{X}y$.

71. If we put Z = a force acting in the direction OZ perpendicular to the plane XOY, we shall evidently obtain similar expressions for the moments in respect of the other axes OX and OY; so that if we suppose the motion about OX to be in the direction from Z towards Y, and that about OY to be from X towards Z, and that about OZ to be from Y towards X, we shall have the three expressions,

$$\text{moment about OX} = \text{Y}z - \text{Z}y,$$
$$\text{about OY} = \text{Z}x - \text{X}z,$$
$$\text{about OZ} = \text{X}y - \text{Y}x.$$

72. If we now suppose P, Q, R to be the accelerating forces acting on a particle dm, in the directions of the three axes respectively, then (61) the quantities of motion lost by the particle at each instant, in consequence of the connexion of the parts of the system, or the differences between the impressed and effective forces, are

$$dm\left(\text{P}dt - \frac{ddx}{dt}\right),\ dm\left(\text{Q}dt - \frac{ddy}{dt}\right),\ dm\left(\text{R}dt - \frac{ddz}{dt}\right).$$

Substituting these differences for X, Y, Z respectively in the above expressions (71) for the moments of rotation, and forming the integrals in respect of dm, we shall get the sums of the moments in respect of all the particles about each of the three axes. But by the principle of D'Alembert (61), these sums must be severally = 0; therefore, if for brevity we put

$$\text{F} = \int(\text{Q}z - \text{R}y)\,dm,\ \text{G} = \int(\text{R}x - \text{P}z)\,dm,$$
$$\text{H} = \int(\text{P}y - \text{Q}x)\,dm,$$

there will result the three equations

$$\text{F}dt = \int ydm\,\frac{ddz}{dt} - \int zdm\,\frac{ddy}{dt}$$
$$\text{G}dt = \int zdm\,\frac{ddx}{dt} - \int xdm\,\frac{ddz}{dt},$$
$$\text{H}dt = \int xdm\,\frac{ddy}{dt} - \int ydm\,\frac{ddx}{dt}.$$

73. We have now to express these formulæ in terms of the angular velocities about the axes. Referring to fig. 14, let $x = \cos. l$, $y = \cos. m$, $z = \cos. n$, then x, y, z will be the co-ordinates of the point T referred to the rectangular axes OX, OY, OZ; and we shall have $dx = -\sin. ldl$, $dy = -\sin. mdm$, $dz = -\sin. ndn$. Substituting these values of x, y, z, and their differentials, in the three first of the system of equations in (68), and supposing the direction of the motion to be changed (namely, the rotation about OX to be in the direction from Z towards Y, and so with the other as in (71)), those three equations will become

$$dx = dt\,(w'z - w''y),$$
$$dy = dt\,(w''x - wz), \qquad \text{(A)}$$
$$dz = dt\,(wy - w'x).$$

If we now observe that OX, OY, OZ are principal axes, and consequently that $\int xydm = 0$, $\int xzdm = 0$, $\int yzdm = 0$, we shall find, on forming the expressions for ddz, ddy, and substituting always for dx, dy, dz their values as given by these equations,

$$\int ydm\,\frac{ddz}{dt} = \int y^2dm \cdot dw + w'w''\int y^2dm \cdot dt,$$
$$\int zdm\,\frac{ddy}{dt} = -\int z^2dm \cdot dw + w'w''\int z^2dm \cdot dt,$$

and consequently

$$\text{F}dt = \int(y^2 + z^2)\,dm \cdot dw + w'w''\int(y^2 - z^2)\,dm \cdot dt.$$

Similar expressions are obtained in the same manner for Gdt and Hdt. Now it is to be observed that $\int(y^2+z^2)\,dm$ is the moment of inertia with respect to the axis OX; if therefore we assume A, B, C to denote the moments of inertia in respect of the three axes respectively, that is, if we put

$$\text{A} = \int(y^2+z^2)\,dm,\ \text{B} = \int(x^2+z^2)\,dm,\ \text{C} = \int(x^2+y^2)\,dm,$$

the three equations of the last number will be transformed into the following:

$$\text{F}dt = \text{A}dw + (\text{C} - \text{B})\,w'w''dt,$$
$$\text{G}dt = \text{B}dw' + (\text{A} - \text{C})\,ww''dt, \qquad \text{(B)}$$
$$\text{H}dt = \text{C}dw'' + (\text{B} - \text{A})\,ww'dt.$$

74. These three equations enable us to determine the angular velocities of rotation about each of the principal axes when the forces F, G, H are known, and consequently suffice, when joined to the equations of (68) and the equations (A), for the determination of any point of the revolving body at any given instant of time reckoned from the commencement of the motion; for the values of w, w', w'' being supposed to be found in terms of t, and substituted in the two sets of equations of (68), the integrals of these equations will give the situation of the three principal axes at that instant, and the situation of the instantaneous axis of rotation, in respect of the principal axes, will be found by integrating the equations (A) after substituting in them the same values of w, w', w''.

75. When the body is subject to no accelerating forces, or the origin of the co-ordinates is placed at the centre of gravity, the integrations indicated in the last paragraph are obtained without difficulty; for in this case the quantities denoted by F, G, H, respectively vanish, and the equations (B) become

$$0 = \text{A}dw + (\text{C} - \text{B})\,w'w''dt,$$
$$0 = \text{B}dw' + (\text{A} - \text{C})\,ww''dt, \qquad (a)$$
$$0 = \text{C}dw'' + (\text{B} - \text{A})\,ww'dt.$$

Now if we multiply the first of these by w, the second by w', and the third by w'', and add the products, we shall have

$$0 = \text{A}wdw + \text{B}w'dw' + \text{C}w''dw'',$$

the integral of which is

$$\text{K} = \text{A}w^2 + \text{B}w'^2 + \text{C}w''^2, \qquad (b)$$

K being an arbitrary constant, and always positive. Again, let the same equations (a) be multiplied respectively by Aw, Bw', Cw'', and the products added and integrated; we shall then have, in like manner,

$$\text{L}^2 = \text{A}^2w^2 + \text{B}^2w'^2 + \text{C}^2w''^2, \qquad (c)$$

L² being another arbitrary constant, and always positive. From these two last equations we deduce

$$w'^2 = \frac{\text{CK} - \text{L}^2 + \text{A}\,(\text{A} - \text{C})\,w^2}{\text{B}\,(\text{C} - \text{B})},$$
$$w''^2 = \frac{\text{L}^2 - \text{BK} - \text{A}\,(\text{A} - \text{B})\,w^2}{\text{C}\,(\text{C} - \text{B})};$$

and on substituting the values of w' and w'' thus found in the first of the equations (a), and resolving the equations in respect of dt, we get

$$dt = \frac{\pm\sqrt{(\text{BC})}\cdot\text{A}dw}{\sqrt{\{\text{CK} - \text{L}^2 + \text{A}(\text{A} - \text{C})w^2\}\cdot\{\text{L}^2 - \text{BK} - \text{A}(\text{A} - \text{B})w^2\}}},$$

an equation of which the integral will be obtained in a finite form when any two of the three quantities A, B, C are equal (as in the case of a solid of revolution), or when L² is equal to any one of the three quantities AK, BK, CK. In any case, the relation between t and w is expressed by a single differential equation of the first order, the integral of which gives the value of w in terms of t, whence the values of w' and w'' are also given by the preceding formulæ.

Mechanical properties of the principal axes of rotation.

76. From the two equations (b) and (c) of last paragraph, a conclusion is deduced of considerable interest in the physical theory of the universe respecting the *stability* of the rotation about the axes of greatest and least

moment. Let the first of those equations be multiplied by C, and subtracted from the second; we shall have, on making $L^2 - CK = D$,

$$D = A(A - C)w^2 + B(B - C)w'^2.$$

Now, if we suppose the axis of instantaneous rotation to be situated at the commencement of the motion, very near the axis OZ, the angular velocity about which $= w''$, then the angle γ which it makes with that axis being very small, and since (66) $\sin.\gamma = \frac{\sqrt{(w^2 + w'^2)}}{\sqrt{(w^2 + w'^2 + w''^2)}}$, it follows that the angular velocities w and w' will be very small in comparison of w'', and consequently D must be a very small quantity. Now D is constant; and therefore if the two differences $A - C$ and $B - C$ have the same sign, which will be the case when the value of B is intermediate between A and C, the two velocities w and w' must always be very small; and hence (64) the instantaneous axis will never deviate much from OZ when this is the axis of greatest or of least moment. But if $A - C$ and $B - C$ have opposite signs, as will be the case when the value of C lies between the values of A and B, then D may be a very small quantity, and the equation still be satisfied, although the values of w and w' be large; and hence, although the axis of instantaneous rotation may have been very near the axis C at the commencement of the motion, it may deviate to any extent from that axis during the motion. Hence we infer that the rotation about the axes, both of greatest and least moment, is permanent, but that the rotation about the intermediate axis is not permanent.

77. The same conclusions may also be obtained by the direct integration of the equations (a) of (75), if we neglect, as insensible, the squares and products of the small velocities w and w'. Restricting the calculus to this approximation, the third equation (a) becomes $dw'' = 0$, whence $w'' = k$, k being an assured arbitrary constant. Substituting this value of w'' in the first two equations (a) we get

$$\left.\begin{aligned} 0 &= A\,dw + (C - B)\,kw'dt, \\ 0 &= B\,dw' + (A - C)\,kw\,dt. \end{aligned}\right\} \quad (d)$$

In order to integrate these, assume

$$w = \beta \sin.(qt + i),\ w' = \gamma \cos.(qt + i), \qquad (e)$$

the quantities β, γ, q, i being indeterminate constants. We have then

$$dw = q\beta \cos.(qt + i),\ dw' = -q\gamma \sin.(qt + i).$$

On substituting these values of w, w', dw, dw', and rejecting the common factors, the equations (d) become

$$0 = Aq\beta - (B - C)k\gamma,$$
$$0 = Bq\gamma - (A - C)k\beta,$$

from which we deduce $q = k\sqrt{(A - C)(B - C)} \div \sqrt{AB}$; and also, on assuming another indeterminate constant α, $\beta = \alpha\sqrt{B(B - C)}$, $\gamma = \alpha\sqrt{A(A - C)}$. Put $\lambda = \sqrt{(A - C)(B - C)} \div \sqrt{AB}$, then $q = \lambda k$; and the substitution of these values of q, β, γ in the equations (e) gives

$$w = \alpha\sqrt{B(B - C)} \sin.(\lambda kt + i),$$
$$w' = \alpha\sqrt{A(A - C)} \cos.(\lambda kt + i),$$

which are the complete integrals of the equations (d).

If in these expressions the quantity denoted by λ is real, which will be the case when C is the least or the greatest of the three moments, the values of w and w' must always continue small, because they are proportional to the sines and cosines of a real angle; but if C be intermediate between A and B, the λ will be an impossible quantity, and the sine and cosine of the arc $\lambda kt + i$ will be changed into exponentials which increase continually with the time t, whence the velocities w and w' will also increase indefinitely; and consequently, by Frisi's theorem, the deviation of the instantaneous axis of rotation from the original axis will increase indefinitely.

If we suppose that at the commencement of the motion the axis of instantaneous rotation coincided accurately with the principal axis OZ, we should have $w = 0$, $w' = 0$, when $t = 0$; and as in this case we have also $\alpha = 0$, w and w' will always be zero, or the body will continue for ever to revolve uniformly about OZ. We have therefore, from what precedes, these mechanical properties relative to the rotation of solid bodies: 1. If a body begins to revolve about any one of the three principal axes, and is affected by no external force, it will continue always to revolve about that axis; 2. If it begins to revolve about an axis which is very near the axis of the greatest or least moment, then, although the motion is disturbed a little by the action of an extraneous force, the instantaneous axis of rotation will continue very near the original axis; 3. If the rotation commences about the axis of the mean moment of inertia, then, if the smallest disturbance takes place, the effect will increase indefinitely with the time, and the poles of rotation will entirely change their position on the surface of the body. These properties establish an essential difference between the three principal axes.

Conclusion.

78. Our limits will not permit us to enter further into the discussion of this subject, nor is it within the scope of the present article to apply the formulæ to the rotation of the planets, an example of which application has already been given in the article Precession of the Equinoxes. It has now been shown that every circumstance relative to the motion of a solid body, acted upon by any number of forces, is expressed by means of two systems of equations (each containing three differential equations of the first order), the first system (62) defining the motion in space of the centre of gravity, and the second (73) the rotation about that centre. At the commencement of the motion these two systems are independent of each other; but it is important to remark, that this independence does not necessarily continue during the motion. If we suppose the moving forces to act upon different points of the body, and to be functions of the co-ordinates of those points, that is, to vary with their distance from the origin, then the coordinates enter at the same time into both systems of equations, which therefore cannot be integrated separately, the two motions affecting each other. The integrals can then only be obtained by approximation. There are, however, two important cases in which the two motions continue to be permanently independent of each other. The first is that of a projectile which, during its motion, is acted upon by no other force than gravity; for in this case the equations (62) will be those of an isolated material point, and the weight of the body, acting as a single force applied to the centre of gravity, will have no influence on the rotation, which will be the same as if the centre of gravity were fixed. The second is the case of a sphere, either homogeneous or composed of concentric strata of different densities, the density of each stratum being constant; for in this case the resultant of all the attractive forces, as was shown by Newton, passes through the centre of gravity, which will therefore move as an isolated point, and the motion of rotation will be the same as if the centre of gravity were fixed.

The theory of the rotation of solid bodies forming an important branch of mechanics, is treated more or less in every systematic work on that science. As the more important works in which it is especially considered, we may refer the reader to Euler's *Theoria Motus Corporum Solidorum*, 1765; D'Alembert, *Opuscula*, tom. v. and vii.; Vince *On the Principles of Progressive and Rotatory Motion*, Phil. Trans. 1780; Frisii *Opera*, tom. ii. 1783; Atwood's *Treatise on the Rectilinear Motion and Rotation of Bodies*, 1784; Landen's *Mathematical Memoirs*, vol. ii. 1789; Laplace, *Mécanique Céleste*, tom. i.; Lagrange, *Mécanique Analytique*; Poisson, *Traité de Mécanique*; Venturoli's *Mechanics*, translated by Cresswell; &c. (s.)

ROTHBURY, a small market-town in the county of Northumberland, pleasantly situated on the northern side of the river Coquet, over which there is a handsome stone bridge. The town consists of three wide and airy streets; and as the situation, from being screened by lofty hills from the north and east winds, is favourable to invalids, and the Coquet is well adapted for trout-fishing, many persons resort thither during the summer months, for health and amusement. The rectory is one of the richest livings in the county. The church is an ancient structure. The population in 1831 amounted to 1014.

ROTHENBURG, a city of the kingdom of Bavaria, and the capital of the bailiwick of the same name, in the circle of the Rezat. It is situated on the river Tauber, and is surrounded by ancient walls and thirty-three towers. It is built in the antique German style, comprehends a fine council-house, with eight churches, and contains 1160 houses, with 6400 inhabitants. Its chief trade is in the productions of its vicinity. Long. 11. 43. E. Lat. 49. 30. N.

Rothenburg, a city of the kingdom of Wirtemburg, in the circle of the Black Forest, and the capital of a bailiwick of its own name. It is situated on the river Neckar, which divides it into two parts, of which that on the left bank was formerly a distinct city called Ehingen. It is the seat of the Catholic hierarchy of the whole kingdom, with six churches of that sect, and contains 620 houses, with 5450 inhabitants. It has some trade in paper, leather, and breweries.

ROTHENFELS, a town of the kingdom of Bavaria, in the circle of the Lower Maine, and in a patrimonial bailiwick of the mediatized prince Lowenstein. It extends over eighty-four square miles, inhabited by 8500 persons. The town is situated on the river Maine, and contains 240 houses, with 1520 inhabitants, who are chiefly occupied in the cultivation of vines, and in making wine.

ROTHERHAM, a market-town of the west riding of the county of York, in the wapentake of Stratforth and Tickhill, 158 miles from London, and six from Sheffield. It is situated at the conflux of the rivers Rother and Don, which are navigable to Hull. There is a good market, which is held on Thursday. It is a considerable place for iron manufactures of the heavier kind. The population of the town amounted in 1801 to 3070, in 1811 to 2950, in 1821 to 3548, and in 1831 to 4083; but the parish contains eight other townships or hamlets, and the whole inhabitants amounted in 1831 to 10,417.

ROTHSAY, a town in the island and county of Bute, in Scotland. See Bute.

ROTHWELL, or sometimes called Rowell, a town of the county of Northampton, in the hundred of the same name, seventy-nine miles from London. It has lost its market. The population amounted in 1801 to 1409, in 1811 to 1451, in 1821 to 1742, and in 1831 to 1875.

ROTONDO, or Rotundo, in *Architecture*, an appellation given to any building that is round both within and without, whether it be a church, a saloon, or the like. The most celebrated rotundo of the ancients is the Pantheon at Rome.

ROTTERDAM, a city of the kingdom of Holland, and the capital of the circle of its own name. It is situated on the right bank of the river Maese, which here receives the waters of the river Rotte. It is a well-built city, in an antique style, with abundance of fine and large houses, many of them five or six stories in height. The Boomjee, a row of houses facing the river, with a broad quay between, planted with trees, is perhaps one of the finest promenades in Europe. The city is intersected with canals, and by means of them the goods from ships are brought to the warehouses of the merchants, which are at the backs of their houses; and by the same means the productions intended for exportation are brought to the several places of deposit. The markets also are supplied from the country by means of these canals; and on the market-days, instead of the roads being filled with carts and waggons, the canals are crowded with country barges. These barges are drawn more by men than horses, and indeed horses are rarely seen in the streets. Many of the public buildings are of a magnificent appearance. Amongst these, that of the defunct East India Company, now added to the customhouse, may be viewed with admiration. The house of the assembly of the ancient states of Zealand was built at an early period of the establishment of the independence of the United States. It is spacious, being in the most sumptuous style of the architecture of that age; and when Bonaparte assumed the sovereignty of the country, it was decorated and furnished for his residence at the expense of the city. The ancient stadthouse has been appropriated to other than its original purpose; and a new modern building has been erected, whose portico, although massive, is elegant, as far as regards the pillars that support it. The ecclesiastical buildings belonging to the Calvinists are the most ancient and the largest, particularly the church of St Lawrence. It has an organ, lately erected, of the greatest power of any in existence, and said to contain eight hundred pipes more than the celebrated organ of Harlem. The Lutheran church is a large and fine building. There are three churches where the service is in English; one for the Episcopalian, one for the Kirk of Scotland, and one for Independents, in the latter of which the celebrated Hugh Peters once officiated.

The trade of Rotterdam is very extensive. That to the West Indies has declined of late years, but that to the East Indies, chiefly to Batavia, has been recently very beneficial; and its commerce for the last fifteen years has increased more rapidly than that of any town in the kingdom. The fishery is an extensive source of employment and wealth. The trade with the Baltic employs much shipping, and affords moderate-priced corn for the distillers of gin. The business of ship-building employs many persons, both in the government arsenal and in the private docks; and the vessels now built are admirably constructed and equipped. The supply of colonial produce to the interior of Germany by the Rhine is very beneficial. The population of the city amounted in 1832 to 72,294. Long. 4. 29. 14. E. Lat. 51. 55. 9. N.

ROTTINGDEAN, a village of the county of Sussex, in the hundred of Youngsmere, and rape of Lewes, fifty-six miles from London, and four from Brighton. It is situated on the sea-shore, between two cliffs, and is much resorted to in the summer season by bathing visitors who wish for retirement. The population amounted in 1801 to 543, in 1811 to 559, in 1821 to 772, and in 1831 to 880.

ROUBAIX, a large market-town of France, in the department of the North, and the arrondissement of Lisle. It is a place of extensive manufactories, formerly of woollens, but of late years almost exclusively of cottons. There are several mills for spinning; and a great quantity of quiltings, dimities, nankeens, and other cotton articles, are made, and of good quality. The town, in 1836, contained 18,187 inhabitants.

ROUEN, an arrondissement of the department of the Lower Seine, in France. It extends over 456 square miles, and comprehends fifteen cantons, divided into 155 communes, which, in 1836, contained 238,805 inhabitants. The capital is the city of the same name, situated in a valley on the banks of the Seine, over which there is a bridge of boats leading to the suburb St Sever. The river Robec passes through a part of the city, and falls into the Seine, and in its progress gives power to several mills and other machinery. It is not a well-built town, having many large but antique houses, and others of wood, with narrow and crooked streets. It is the see of an archbishop, whose cathedral, as well as the church of St Ouen, are noble specimens of Gothic architecture. There is an academy of arts and sciences, with a library of seventy thousand volumes, and institutions for various branches of education. It is the chief seat of the cotton manufacture, and hence has vastly increased since the peace in population and in wealth. There are many other goods made here, such as various kinds of thin stuffs, and other woollens, linen of all qualities, combs, vitriol, aquafortis, tin wares, and porcelain, besides refined sugar. The neighbourhood is celebrated for its apples and pears. It contains above 11,500 houses, and in 1836 the inhabitants amounted to 92,083. Long. 1. 0. 39. E. Lat. 49. 26. 27. N.

ROUNDA, a town of Hindustan, in the Mahratta territories, and the province of Kandeish. It is situated on the east side of the Ghirah river, forty-six miles south-west from Burhampoor. Long. 75. 47. E. Lat. 20. 54. N.

ROUNDELAY, or Rondo, a sort of ancient poem, deriving its name, according to Ménage, from its form, and because it still turns back again to the first verse, and thus goes round. The common roundelay consists of thirteen verses, eight of which are in one rhyme and five in another. It is divided into couplets, at the end of the second and third of which the beginning of the roundelay is repeated, and that, if possible, in an equivocal or a punning sense. The roundelay is a popular poem in France, but is little known amongst us. Marrot and Voiture have succeeded the best in it. Rapin remarks, that if the roundelay be not very exquisite, it is intolerably bad. In all the ancient ones, observes Ménage, the verse preceding has a less complete sense, and yet joins agreeably with that of the close, without depending necessarily thereon. This rule, well observed, makes the roundelay more ingenious, and is one of the artifices of the poem. Some of the ancient writers speak of the roundelay or roundel as a kind of air appropriated to dancing; and in this sense the term seems to indicate little more than dancing in a circle with the hands joined.

ROUND-HOUSE, a kind of prison for the nightly watch in London, to secure disorderly persons till they can be carried before a magistrate.

ROUNDS, in military matters, a detachment from the main-guard, of an officer or a non-commissioned officer and six men, who go round the rampart of a garrison, to listen if any thing be stirring without the place, and to see that the sentinels be diligent upon their duty, and all in order. In strict garrisons the rounds go every half-hour. The sentinels have orders to challenge at a distance, and to rest their arms as the round passes. All guards turn out, challenge, exchange the parole, and rest their arms.

ROUSSEAU, James, an eminent French painter, was born at Paris in the year 1630. He studied first under Swanevelt, who had married one of his relations; after which he improved himself by travelling into Italy, practising solely perspective, architecture, and landscape. On his return home, he was employed at Marly. He distinguished himself very much in painting buildings, and by his knowledge of, and his attention to, the principles of perspective. Louis XIV. employed him to decorate his hall of devices at St Germaine-en-Laie, where he represented the operas of Lulli; but being a Protestant, he quitted France on the persecution of his brethren, and retired to Switzerland. Louis invited him back. He refused, but sent his designs, and recommended a proper person to execute them. After a short stay in Switzerland, he went to Holland, whence he was invited to England by Ralph duke of Montague, to adorn his new house in Bloomsbury. Here he painted a great deal. Some of his pictures, both in landscape and architecture, are over doors at Hampton Court; and he etched several of his own designs. His perspectives, having been most commonly applied to decorate courts or gardens, have suffered much from the weather. Such of them as remain are monuments of an excellent genius. The colours are bright and durable, and the choice of them most judicious. He died in Soho Square about the year 1694, at the age of sixty-four.

Rousseau, *John Baptist*, a celebrated French poet, was born at Paris in April 1669. His father, who was a shoemaker in good circumstances, made him study in the best colleges of Paris, where he distinguished himself by his abilities. He at length applied entirely to poetry, and soon made himself known by several short pieces, that were filled with lively and agreeable images, which made him sought for by persons of the first rank, and men of the brightest genius. He was admitted, in quality of pupil, into the Academy of Inscriptions and Belles Lettres in 1701, and almost all the rest of his life he attached himself to some great men. He attended Marshal Tallard into England in quality of secretary, and there contracted a friendship with St Evremond. At his return to Paris, he was admitted into the politest company, lived amongst the courtiers, and seemed perfectly satisfied with his situation; when, in 1708, he was prosecuted for being the author of some couplets, in which the characters of several persons of wit and merit were blackened by the most atrocious calumnies. This prosecution made much noise; and Rousseau was in 1712, by a decree of the parliament of Paris, banished out of the kingdom, to which he was never more to return. However, he always steadily denied, even on his death-bed, his being the author of these couplets. From the date of this sentence he lived in foreign countries, where he found illustrious protectors. The Count de Luc, ambassador of France, in Switzerland, took him into his family, and studied to render his life agreeable. He carried him to the treaty of Baden in 1714, where he was one of the plenipotentiaries, and presented him to Prince Eugene, who, entertaining a particular esteem for him, took him to Vienna, and introduced him to the emperor's court. Rousseau lived about three years with Prince Eugene; but having lost his favour by satirizing one of his mistresses, he retired to Brussels, where he afterwards usually resided. It was there that he commenced his disputes with Voltaire, with whom he had become acquainted at the college of Louis the Great, and who then much admired his turn for poetry. Rousseau, from the period of their dispute, always represented Voltaire as a buffoon, and as a writer possessing neither taste nor judgment, who owed all his success to a particular mode which he pursued. As a poet he considered him as inferior to Lucan, and little superior to Pradon. Voltaire treated him still worse. Rousseau, according to him, was nothing better than a plagiarist, who had nothing but the talent of arranging words. He came over, in 1721, to London, where he printed a Collection of his Works, in two volumes 12mo. This edition, published in 1723, brought him near ten thousand crowns, the whole of which he placed in the hands of the Ostend Company. The affairs of this company, however, soon getting into confusion, those who had any money in their hands lost the whole of it; by which unfortunate event Rousseau, when arrived at that age when he stood most in need of the comforts of fortune, had nothing to depend upon but the generosity of some friends. He died at Brussels in February 1740. A very beautiful edition of his works was published in 1743, at Paris, in three volumes 4to, and in four volumes 12mo, containing nothing but what was acknowledged by the author as his own. It contains, 1. Four Books of Odes, of which the first are sacred odes, taken from the Psalms; 2. Two Books of Epistles, in verse; 3. Cantatas, in which species of poetry he stands unrivalled; 4. Allegorics, the most of which are happy, but some of them appear forced; 5. Epigrams, after the manner of Martial and Marot; 6. A book of Poems on Various Subjects; 7. Four Comedies, in verse; 8. Three Comedies, in prose; and, 9. A Collection of Letters, in prose. A good edition of his Select Pieces appeared at Paris in 1741, in a small 12mo volume.

ROUSSEAU, *John-James*, one of the most renowned writers of modern times, was born at Geneva on the 28th of June 1712. His father was by profession a clock and watch maker. At his birth, which, he says, was the first of his misfortunes, he endangered the life of his mother; and he himself was for a long time afterwards in a very weak and languishing state of health. But as his bodily strength increased, his mental powers gradually opened, and afforded the happiest presages of future greatness. His father, a citizen of Geneva, was a well-informed tradesman; and in the place where he wrought he kept a Plutarch and a Tacitus, authors which of course soon became familiar to his son. A rash juvenile step, however, occasioned his leaving his father's house. "Finding himself a fugitive in a strange country, and without money or friends, he changed his religion, in order to procure a subsistence." Bornex, bishop of Anneci, from whom he sought an asylum, committed the care of his education to Madame de Warrens, a lady, who in 1726 had left part of her wealth, and the Protestant religion, in order to throw herself into the bosom of the Catholic church. This generous lady served in the triple capacity of a mother, a friend, and a lover, to the new proselyte, whom, in fact, she regarded as her son. The necessity of procuring for himself some settlement, however, or perhaps his unsettled disposition, obliged Rousseau often to take leave of this tender mother.

He possessed more than ordinary talents for music; and the Abbé Blanchard flattered his hopes of a place in the royal chapel, which he, however, failed in obtaining for him. He was therefore under the necessity of teaching music at Chamberi. He remained in this place till 1741, in which year he went to Paris, where he was long in very destitute circumstances. Writing to a friend in 1743, he thus expresses himself: "Every thing is dear here, especially bread." But he at length began to emerge from that obscurity in which he had hitherto been buried; and his friends placed him with M. de Montaigne, ambassador from France to Venice. According to his own confession, a proud misanthropy, and a peculiar contempt of the riches and pleasures of this world, constituted the chief traits in his character; and a misunderstanding soon took place between him and the ambassador. The place of depute, under M. Dupin, farmer-general, a man of considerable parts, gave him some temporary relief, and enabled him to be of some benefit to Madame de Warrens, his former benefactress. But the year 1750 proved the commencement of his literary career. The academy of Dijon had proposed the following question: "Whether the revival of the arts and sciences has contributed to the refinement of manners?" Rousseau at first inclined to support the affirmative. "Take the negative side of the question," said a philosopher, who was at that time his friend, "and I'll promise you the greatest success."

His discourse against the sciences having been found to be the best written, and replete with brilliant reasoning, was publicly crowned with the approbation of that learned body. Never was a paradox supported with greater eloquence. It was not however a new one; but he enriched it with all the advantages which either knowledge or genius could confer upon it. Immediately after its appearance, he met with several opponents of his tenets, which he defended; and, from one dispute to another, he found himself involved in a formidable train of correspondence, without having ever almost dreamed of such opposition. From that period he decreased in happiness as he increased in celebrity. His Discourse on the Causes of Inequality amongst Mankind, and on the Origin of Social Compacts, was written with a view to prove that mankind are equal; that they were born to live apart from each other; and that they have perverted the order of nature in forming societies. He bestows the highest praise on the State of Nature, and deprecates the idea of every social compact. By presenting this performance to the magistrates of Geneva, he was received again into his native country, and reinstated in all the privileges and rights of a citizen, after having with much difficulty prevailed on himself to abjure the Catholic religion. He soon returned to France, however, and lived for some time in Paris. He afterwards gave himself up to retirement, partly to escape the shafts of criticism, and partly to follow the regimen which the strangury, with which he was afflicted, necessarily required. This is an important epoch in the history of his life, as it was owing to this circumstance, perhaps, that we have the most elegant works that have proceeded from his pen. His Letter to M. d'Alembert on the design of erecting a theatre at Geneva, written in his retirement, and published in the year 1757, contains, along with some paradoxes, some very important and well-handled truths. This letter first drew down upon him the envy of Voltaire, and was the cause of those indignities with which that author never ceased to load him. Although so great an enemy to theatrical representations, he caused a comedy to be printed; and in 1752 he gave to the theatre a pastoral, called the Village Conjuror, of which he composed the poetry and the music, both of them abounding with sentiment and elegance, and full of innocent rural simplicity. His Dictionary of Music affords several excellent articles; some of them, however, are extremely inaccurate. "This work," says M. la Borde, in his Essay on Music, "has need to be written over again, to save much trouble to those who wish to study it, and prevent them from falling into errors, which it is difficult to avoid, from the engaging manner in which Rousseau drags along his readers." Soon after the rapid success of his Village Conjuror, he published a Letter on French Music, or rather against French Music, written with equal freedom and liveliness. The exasperated partisans of French comedy treated him with as much fury as if he had conspired against the state; and a crowd of enthusiasts spent their strength and outcries against him. He was insulted, menaced, and lampooned.

That interesting and tender style which is so conspicuous throughout the Village Conjuror, animates several letters in the *Nouvelle Heloise*, which was published in 1761 in 12mo. This epistolary romance, of which the plot is ill managed, and the arrangement bad, like most other works of genius, has its beauties as well as its faults. Some of the letters are indeed admirable, from the force and warmth of expression, from an effervescence of sentiment, and from the irregularity of ideas which always characterize a passion carried to its height. In the Heloise, Rousseau's unlucky talent of rendering every thing problematical appears very conspicuous. This is the case in his arguments in favour of and against duelling, which afford an apology for suicide, and a just condemnation of it; his facility in palliating the crime of adultery, and his strong reasons to make it abhorred; his declamations against social happiness, and transports in favour of humanity; his violent rhapsodies against philosophers, and his rage for adopting their opinions; the existence of God attacked by sophistry, and atheists confuted by the most irrefragable arguments; the Christian religion combated by the most specious objections, and celebrated by the most sublime eulogies.

His Emilius afterwards made more noise than the New Heloise. This moral romance, which was published in the year 1762, in four volumes 12mo, treats chiefly of education. Rousseau wished to follow nature in every thing; and though his system in several places differs from received ideas, it deserves in many respects to be put in practice, and with some necessary modifications it has been so. His precepts are expressed with the force and dignity of a mind full of the leading truths of morality. If he has not always been virtuous, nobody at least has felt it more, or made it appear to greater advantage. What is most to be lamented is, that in wishing to educate a young man as a Christian, he has filled a volume with objections against Christianity. It must be confessed that he has given a very sublime eulogium on the gospel, and an affecting portrait of its divine Author; but the miracles and the prophecies, which serve to establish his mission, he attacks without reserve. Admitting only natural religion, he weighs every thing in the balance of reason; and this reason being false, leads him into dilemmas which are very unfavourable to his own repose and happiness. The French parliament condemned this book in 1762, and entered into a criminal prosecution against the author, which forced him to make a precipitate retreat. He directed his steps towards his native country, but it shut its gates upon him. Proscribed in the place where he had first drawn breath, he sought an asylum in Switzerland, and found one in the principality of Neufchatel. But the protection of the king of Prussia, to whom the principality belonged, was not sufficient to rescue him from that obloquy which the minister of Moutiers-Travers, the village to which he had retired, had excited against him. He preached against Rousseau, and his sermons produced an uproar amongst the people. On the night between the 6th and the 7th of September 1765, some fanatics, inspired by wine and the declamations of their minister, threw stones at the windows of the Genevan philosopher, who, fearing new insults, in vain sought an asylum in the canton of Berne. As this canton was connected with the republic of Geneva, they did not think proper to allow him to remain in their city, who was proscribed by that republic. Neither his broken state of health, nor the approach of winter, could soften the hearts of these obdurate Switzers. To prevent them from the fear they had of the spreading of his opinions, he in vain beseeched them to shut him up in prison till the spring. But even this favour was denied him. Obliged to set out on a journey in the beginning of a most inclement season, he reached Strasbourg in a very destitute situation. He received from Marshal de Contades, who then commanded in that place, every accommodation which could be expected from generosity, humanity, and compassion. He waited there till the weather became milder, when he went to Paris, where Mr Hume then was. The English philosopher determined upon taking him with him to England. After having made some stay in Paris, Rousseau, in 1766, actually set out for London. Hume, much affected with his situation and his misfortunes, procured for him a very agreeable retreat in the country. The Genevan philosopher, however, did not long remain satisfied. He made less impression on the minds of the English than he had done on the French. His free disposition, and his obdurate melancholy temper, were deemed no singularity in England. He was there looked upon as an ordinary man, and the periodical prints were filled with satires against him. In particular, they published a forged letter from the king of Prussia, holding up to ridicule the principles and conduct of this new Diogenes. Rousseau, imagining there was a plot between Hume and some philosophers in France to destroy his glory and repose, sent a letter to him, filled with the most abusive expressions, and reproaching him for his conduct towards him. From this time he looked upon Hume as a wicked and perfidious person, who had brought him to England with no other view than to expose him to public ridicule; a foolish and chimerical idea, which was nourished by self-love and a restless disposition. He imagined that the English philosopher, amidst all his kindnesses, had something disagreeable in the manner of expressing them. The bad health of Rousseau, a strong and melancholy imagination, a too nice sensibility, a jealous disposition, joined with philosophical vanity, cherished by the false informations of his governess, who possessed an uncommon power over him; all these taken together might have tended to prepossess him with unfavourable sentiments of some innocent freedoms his benefactor might have taken with him, and might have rendered him ungrateful, which he thought himself incapable of becoming. Meanwhile these false conjectures and probabilities ought never to have had the weight with an honest mind to withdraw itself from its friend and benefactor. Proofs are always necessary in cases of this kind; and that which Rousseau had was by no means a certain demonstration. The Genevan philosopher, however, returned to France, spited with the world, and particularly offended with the English philosopher. On the 1st of July 1770, he appeared for the first time at the regency coffee-house, dressed in his ordinary clothing, having for some time previous to this worn an Armenian habit. He was loaded with praises by the surrounding multitude. "It is somewhat singular," says M. Sennebier, "to see a man so haughty as he returning to the very place from whence he had been banished so often. Nor is it one of the smallest inconsistencies of this extraordinary character, that he preferred a retreat in that place of which he had spoken so much ill." It is as singular that a person under sentence of imprisonment should wish to live in so public a manner in the very place where his sentence was in force against him. His friends, however, procured for him the liberty of staying, on condition that he should write neither on religion nor on politics; and he kept his word, for he wrote none at all. He was contented with living in a calm and philosophical manner, cultivating the society of a few tried friends, shunning the company of the great, appearing to give up all his whimsics, and affecting neither the character of a philosopher nor a wit. He died of an apoplexy, at Ermenonville, about ten leagues from Paris, on the 2d of July 1778, aged sixty-six years. Rousseau, during his stay in the environs of Lyons, married Mademoiselle le Vasseur, a woman who, without either beauty or talents, had gained over him a great ascendency, and waited on him both in health and in sickness. But, as if she had been jealous of possessing him alone, she drove from his mind, by the most perfidious insinuations, all those who came to entertain him; and when he did not dismiss them, she prevented their return by invariably refusing them admittance. By these means she the more easily led her husband into inconsistencies of conduct, which the originality of his character, as well as of his opinions, so much contributed to assist. He did not incline to associate with any person; and as this method of thinking and living was uncommon, it made him an object of curiosity, and procured him a name. Like Diogenes of old, he united simplicity of manners with pride of genius; and a very large stock of indolence, with an extreme sensibility, served to render his character still more uncommon. "An indolent mind," says he, "terrified at every application, a warm, bilious, and irritable temperament, sensible also in a high degree to every thing that can affect it, appear not possible to be united in the same person; and yet these two contrarieties compose the chief of mine. An active life has no charms for me. I would an hundred times rather consent to be idle than to do any thing against my will; and I have an hundred times thought that I would live not amiss in the Bastille, provided I had nothing to do but just continue there. In my younger days I made several attempts to get in there; but as they were only with the view of procuring a refuge and rest in my old age, and, like the exertions of an indolent person, only by fits and starts, they were never attended with the smallest success. When misfortunes came, they afforded me a pretext for giving myself up to my ruling passion."

His ideas about politics were almost as eccentric as his paradoxes about religion. Some reckon his Social Compact, which Voltaire calls the Unsocial Compact, the greatest effort of his genius; whilst others find it full of contradictions, errors, and cynical passages, obscure, ill arranged, and by no means worthy of his pen. There were found in his portfolio his Confessions, in twelve books; the first six of which were published. "His Confessions," says Sennebier, in his Literary History of Geneva, "appear to me to be a very dangerous book, and paint Rousseau in such colours as we would never have ventured to apply to him. The excellent analyses which we meet with of some sentiments, and the delicate anatomy which he makes of some actions, are not sufficient to counterbalance the detestable matter which is found in them, and the unceasing obloquies everywhere to be met with." Amongst his other posthumous pieces are the following. 1. The Reveries of a Solitary Wanderer, being a journal of the latter part of his life.[1] 2. Considerations upon the Government of Poland. 3. The Adventures of Lord Edward, a novel, being a kind of supplement to the new Heloisa. 4. Various Memoirs and Fugitive Pieces, with a great number of letters, containing some eloquent passages and deep thoughts. 5. Emilia and Sophia. 6. The Levite of Ephraim, a poem in prose, in four cantos, written in a style of ancient simplicity. 7. Letters to Sara. 8. An Opera and a Comedy. 9. Translations of the first book of Tacitus's History, of the Episode of Olinda and Sophronia, from Tasso, &c. Like all the other writings of Rousseau, we find in these posthumous pieces many admirable and some useful things; but they also abound with contradictions, paradoxes, and ideas very unfavourable to religion. In his letters, especially, we see a man chagrined at misfortunes which he never attributes to himself; suspicious of every body about him, calling and believing himself a lamb in the midst of wolves. Viewing him solely as a writer, his character is perhaps described with truth and accuracy in the following words of Mr Hume. "Though I see some tincture of extravagance in all his writings, I also think I see so much eloquence and force of imagination, such an energy of expression, and such a boldness of conception, as entitle him to a place amongst the first writers of his age." His works, in the best edition, published in 1788 and the following years, extend to thirty-seven volumes octavo.

ROUSSELAER, or Roulers, a city of Belgium, in the province of West Flanders, and the circle of Courtray. It is situated on the river Mandelbeke, and has a royal college, with eight professors. It contains 1100 houses, with 8840 inhabitants, who are occupied in making linen goods of various kinds, in refining salt, and in cultivating fine flax.

ROVEREDO, a city of the Austrian province of Tyrol, the capital of a circle of the same name, which extends over 748 square miles, and contains, in three cities and towns, and 355 villages, 95,600 inhabitants. It is an open place, situated on the river Etsch, is well built, and defended by a strong fortress, and contains more than 1000 houses, with about 12,000 inhabitants. It is a great place for the several branches of the silk trade, which affords occupation to two thirds of the population. The silk produced near it is very highly esteemed. Long. 10. 55. 5. E. Lat. 45. 55. 36. N.

ROVIGNO, a city of the Austrian government of Trieste, and the capital of a district of the same name, which extends over 399 square miles, and contains 26,900 inhabitants. It is situated on a promontory running into the sea, and is well built, containing ten churches, 1150 houses, and 10,650 inhabitants. It has two harbours, with good wharfs, several yards for ship-building, and extensive fisheries, especially for anchovies. Near to it the vine and the olive are extensively cultivated, and very productive. Long. 13. 43. 15. E. Lat. 45. 1. 30. N.

ROVIGO, a city of Austrian Italy, in the province of Milan, and the capital of the delegation of Polesina. It is situated on the river Adigetto, over which are four bridges, by which it is connected with its suburbs. It is fortified, and is the seat of the bishop of Adria, who has a palace and an ecclesiastical seminary, and twenty-six churches, under his care. It contains 1200 houses, with 6950 inhabitants, who are chiefly employed in making leather and in refining saltpetre. Long. 11. 42. 43. E. Lat. 45. 3. 57. N.

ROWE, Nicholas, was descended of an ancient family in Devonshire, and born in 1673. He acquired a complete taste for the classical authors under Dr Busby in Westminster school; but poetry was his early and darling study. His father, who was a lawyer, entered him a student in the Middle Temple, and he made remarkable advances in the study of the law; but the love of the belles lettres, and of poetry, stopped him in his career. His first tragedy, the Ambitious Stepmother, meeting with universal applause, he laid aside all thoughts of rising by the law, and afterwards composed several tragedies; but that which he valued himself most upon was his Tamerlane. The others were, the Fair Penitent, Ulysses, the Royal Convert, Jane Shore, and Lady Jane Grey. He also wrote a poem called the Biter, and several poems upon different subjects, which have been published under the title of Miscellaneous Works, in one volume, as his dramatic works have been in two. Rowe is chiefly to be considered in the light of a tragic writer and a translator. In his attempt at comedy, he failed so ignominiously that his Biter is not inserted in his works; and his occasional poems and short compositions are rarely worthy either of praise or censure, for they seem to be the casual sports of a mind seeking rather to amuse its leisure than to exercise its powers. In the construction of his dramas there is not much art; and he is not a nice observer of the unities. I know not, says Dr Johnson, that there can be found in his plays any deep search into nature, any accurate discrimination of kindred qualities, or nice display of passion in its progress. All is general and undefined. Nor does he much interest or affect the auditor, except in Jane Shore, who is always seen and heard with pity. Alicia is a character of empty noise, with no resemblance to real sorrow or to natural madness. Whence then has Rowe acquired his reputation? From the reasonableness and propriety of some of his scenes, from the elegance of his diction, and from the suavity of his verse. He seldom moves either pity or terror, but he often elevates the sentiment; he seldom pierces the breast, but he always delights the ear, and often improves the understanding. Being a great admirer of Shakspeare, he gave the public an edition of his plays, to which he prefixed an account of his life. But the most considerable of Mr Rowe's performances was a translation of Lucan's *Pharsalia*, which he just lived to finish, but not to publish; for it did not appear in print till 1728, ten years after his death.

In the meanwhile, the love of poetry and books did not make him unfit for business; for nobody applied closer to it when occasion required. The Duke of Queensberry, when secretary of state, made him secretary for public affairs. But after the duke's death, all avenues to his preferment were stopped; and during the remainder of Queen Anne's reign he passed his time with the Muses and his books. On the accession of George I., however, he was made poet-laureat, and one of the land-surveyors of the customs in the port of London. The Prince of Wales conferred on him the clerkship of his council; and the Lord Chancellor Parker made him his secretary for the presentations. But he did not enjoy these promotions long; for he died on the 6th of December 1718, being then in his forty-fifth year.

Mr Rowe, who was twice married, had a son by his first wife, and a daughter by his second. He was a very handsome man; and his mind was as amiable as his person. He lived beloved; and at his death he had the honour to be lamented by Pope, in an epitaph which is printed in Pope's works, although it was not affixed on Mr Rowe's monument in Westminster Abbey, where he was interred, in the poets' corner, opposite to Chaucer.

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[1] In this he confesses that he liked better to send his children into hospitals destined for orphans, than to take upon himself the charge of their maintenance and education, and endeavours to palliate this offence, which nothing can exculpate.

Rowe, *Elizabeth*, an English lady, eminent for her writings both in prose and verse, was born at Ilchester, in Somersetshire, in 1674, being the daughter of worthy parents, Mr Walter Singer and Mrs Elizabeth Portnel. There being a great affinity between painting and poetry, this lady, who had a vein for the one, naturally had a taste for the other. She was also very fond of music, chiefly of the grave and solemn kind, as best suited the grandeur of her sentiments and the sublimity of her devotion. But poetry was her favourite employment, her distinguishing excellence; and so prevalent was her genius this way, that her prose is all poetical. In 1696, a collection of her poems was published at the desire of two friends. Her paraphrase on the thirty-eighth chapter of Job was written at the request of Bishop Ken. She had no other tutor for the French and Italian languages than Mr Thynne, who willingly took the trouble upon himself. Her shining merit, with the charms of her person and conversation, had procured her many admirers. Amongst others, it is said, the famous Mr Prior made his addresses to her; but Mr Thomas Rowe was destined to be the happy man. This gentleman was honourably descended; and his superior genius, and insatiable thirst after knowledge, were conspicuous in his earliest years. He had formed a design to compile the lives of all the illustrious persons in antiquity omitted by Plutarch; which, indeed, he partly executed, and eight lives were published after his decease. They were translated into French by the Abbé Bellenger in 1734. He spoke with ease and fluency, and had a frank and benevolent temper, an inexhaustible fund of wit, and a communicative disposition. Such was the man who, charmed with the person, character, and writings of our authoress, married her in 1710, and made it his study to repay the felicity with which she crowned his life. But too intense an application to study, beyond what the delicacy of his frame would bear, broke his health, and threw him into a consumption, which put a period to his life in May 1715, when he had but just passed the twenty-eighth year of his age. Mrs Rowe wrote a beautiful elegy on his death; and continued to the last moments of her life to express the highest veneration and affection for his memory. As soon after his decease as her affairs would permit, she indulged her inclination for solitude by retiring to Frome, in Somersetshire, in the neighbourhood of which place lay the greatest part of her estate. In this recess it was that she composed the most celebrated of her works, Friendship in Death, and the Letters Moral and Entertaining. In 1736, she published the History of Joseph, a poem which she had written in her younger years. But she did not long survive this publication; for she died of an apoplexy, as was supposed, on the 20th of February 1736-1737. In her cabinet were found letters to several of her friends, which she had ordered to be delivered immediately after her decease. Dr Isaac Watts, agreeably to her request, revised and published, in 1737, her devotions, under the title of Devout Exercises of the Heart in Meditation and Soliloquy, Praise and Prayer; and, in 1739, her Miscellaneous Works, in prose and verse, were published in two volumes 8vo, with an account of her life and writings prefixed.

ROWEL, amongst farriers, a kind of issue, answering to what in surgery is called a seton.

ROWLEY, a monk who is said to have flourished at Bristol in the fifteenth century. Of the poems attributed to him various opinions have been entertained, which we have noticed under the article on Chatterton.

Rowley, *William*, who stands in the third class of dramatic writers, lived in the reign of King Charles I. and received his education at the University of Cambridge; but whether he took any degree there, is not evident, there being but few particulars preserved in regard to him, except his close intimacy and connection with all the principal wits and poetical geniuses of that age, by whom he was well beloved, and with some of whom he joined in their writings. Wood styles him "the ornament, for wit and ingenuity, of Pembroke Hall in Cambridge." In a word, he was a very great benefactor to the English stage, having, exclusively of his aid lent to Middleton, Day, Heywood, Webster, and others, left us five plays of his own composition, and one in which even the immortal Shakspeare afforded him some assistance.

Rowley Regis, a town of the parish of Dudley, in Worcestershire, although within the hundred of Seisdon, in Staffordshire, and chiefly inhabited by nail-makers and other workers in iron. The population amounted in 1801 to 5027, in 1811 to 4974, in 1821 to 6062, and in 1831 to 7438.

ROWNING, John, an English mathematician and philosopher of considerable ingenuity, was fellow of Magdalen College, Cambridge, and afterwards rector of Anderby in Lincolnshire, in the gift of that society. He constantly attended the meetings of the Spalding Society, and was a man of an extraordinary philosophical habit of mind, whilst at the same time his dispositions were social and cheerful. His genius was peculiarly fitted for mechanical contrivances or inventions. He published a compendious system of Natural Philosophy at Cambridge, in the year 1738, in two volumes 8vo; a work of much ingenuity, which has gone through several editions. He likewise inserted two pieces in the Philosophical Transactions, namely, a description of a barometer, wherein the scale of variation may be increased at pleasure (vol. xxxviii. p. 39); and directions for making a machine for finding the roots of equations universally, together with the manner in which it should be used (vol. lx. p. 240). He died at his lodgings in Carey Street, near Lincoln's-Inn Fields, in the end of November 1771, in the seventy-second year of his age. Though a man both ingenious and pleasant, his external appearance was rather forbidding, being tall, and low in the shoulders, with his countenance down-looking and sallow.

ROXBURGHSHIRE, a county in Scotland, on its south-eastern extremity, where it joins England, situated between 55. 6. and 55. 43. north latitude, and between 2. 12. and 3. 7. west longitude from Greenwich. It is sometimes called Teviotdale, from its principal river the Teviot, but improperly, as it also includes a tract called Liddesdale on the south-west, which is unconnected with the Teviot. Its boundaries are Berwickshire, from which it is separated in part by the river Tweed on the north, Selkirkshire and Dumfriesshire on the west and south-west, and the English counties of Cumberland and Northumberland on the south-east and east. Between Berwickshire and Selkirkshire a small tract touches the county of Mid-Lothian; on the south, between Dumfriesshire and Cumberland, the county terminates almost in a point; on the west it in some places surrounds small portions of Selkirkshire, and in others projects into that county; and it has the Cheviot Hills on the east, the outline being exceedingly irregular on all sides. Its greatest length is nearly forty-one miles, and its greatest breadth about thirty miles. According to the latest authorities, its area is 715 square miles, or 457,600 English acres, containing twenty-nine entire parishes, and part of other four, which properly belong to the counties adjoining. In an agricultural view, it may be considered as divided into arable land and hilly pasture; the pasture land, estimated at about three fifths of the whole, occupying the eastern, southern, and western quarters, and surrounding, in a circular form, the arable, which lies on the north and north-east sides of the county. The arable, pasture, and meadow lands, are estimated at 300,000 acres. The wood planted may be calculated at 15,000 acres.

Except upon the banks of the streams, which are commonly of no great width, there is very little level or flat land in this district; and, compared with the high grounds in other parts of Scotland, hardly any part of it can be said to be mountainous. The cultivated districts are beautifully diversified with narrow valleys, each traversed by its own rivulet, often fringed with wood, and bounded by gentle acclivities; and the hills in pasture are, with few exceptions, clothed in verdure to their very summits. On the confines of Northumberland, the most elevated quarter, the hills seldom reach the height of 2000 feet, but there are many from that height down to 1000 or 800 feet. The most considerable are the Minto and the Eildon Hills, both in the arable division; and Dunion, Ruberslaw, Wisp, Hownam Law, Millenwood-Fell, Carter-Fell, and Chillhill, in the pastoral districts. Most of them having a conical form, insulated at their base by streamlets, and not rising in a continuous range, present very conspicuous objects, and at a distance seem higher than they are found to be when approached. The beauties of the natural scenery have been heightened and improved by the wealth and industry of its inhabitants; all this division abounding in gentlemen's seats, comfortable and even elegant farm-houses, the fields enclosed with hedges of thorn, and belts of wood, and many spots covered with young trees. On the skirts of the hills, too, cultivation has of late made considerable progress, as much, perhaps, as could be expected in the natural circumstances of the country; but the interior of the pastoral district is in general naked, without trees or fences, and very thinly inhabited.

The prevailing soil of the arable land, and over most of the hills, is what is called a sandy loam, though of different qualities, excellently adapted to the turnip culture. Tracts of a clayey or more heavy soil, however, occupy a considerable space, especially on the north-west. Clay is also found on the north, near the Tweed, where it is rich and fertile. Moss, marsh, and heath occur in the south-west, and occasionally in other quarters; but altogether they cover but a small proportion of the surface.

No district in Britain is better supplied with streams, though it has only two that deserve the name of rivers, the Tweed and the Teviot. The Tweed, which crosses the northern part of the county, and for part of its course forms the boundary with Berwickshire, enters it from Selkirkshire on the north-west, and leaves it below Redden on the north-east, carrying with it nearly all the waters that pass through or have their source in this district. Its banks, especially near Kelso, where it is crossed by an elegant bridge, built by Rennie between the years 1799 and 1803, are perhaps equal in richness and beauty to those of any river of the same extent in Britain. The Teviot more properly belongs to this county, rising and terminating within its bounds. It has its source in the south-west extremity, near the confines of Dumfriesshire, and flowing north-east almost through the middle of the district, joins the Tweed, in which its name is lost, a little above the town of Kelso. From Hawick downwards it is a considerable stream, and, like the Tweed, flows through a very fertile and well-cultivated country. The principal rivulets that fall into the Teviot from the south are Allen, Slittrick, Rule, Jed, Oxnam, and Kale; and from the north and west Borthwick and Ale. The Liddel and Hermitage, which run on the south-west, and whose united streams retain the name of Liddel, from which this tract is called Liddesdale, soon leave Roxburghshire, and after forming the boundary between Dumfriesshire and Cumberland, fall into the Esk above Longtown. The other streams are the Etterick, which joins the Tweed from the south-west as it enters this county; the Allen and the Leader, which fall into the same river from the north; and the Eden, which, after an easterly course, partly on the boundary with Berwickshire, enters the Tweed on the north-east, a little before it leaves the county. The Beaumont also rises here amongst the Cheviot Hills on the east, but after a short course passes by Kirk-Yetholm, and enters Northumberland. Of the smaller streams, the Ale, Jed, Rule, and Hermitage are distinguished for their natural scenery, to which we may add the Liddel, celebrated by the late Dr Armstrong, a native of Liddesdale. Tweed is the only river frequented by salmon, except at the time of spawning, when they are found in most of the other streams. Trout abounds in the Ale, Rule, Jed, and Kale; and there are a few small lakes which contain perch and pike.

Roxburghshire is by no means rich in minerals. The clay-slate or graywacke formation extends all along the western part, round by the top of Liddesdale, and then up through part of the parishes of Oxnam, Jedburgh, and Crailing. The coal series of rocks occupies nearly the whole district of Liddesdale. Trap-rock and porphyry constitute the formation of the eastern part, but they are also protruded in large masses through the clay-slate, coal, and sandstone formations, in all parts of the country. The old red sandstone extends along the confines of Berwickshire, down between the clay-slate and the trap-rock, to nearly the lower end of the parish of Hobkirk; a belt of it also intervenes between the coal series and the clay-slate. Two dikes of mountain limestone appear in Liddesdale; one a few miles above Castleton, and the other at Fanna Hill, at the top of the dale. At Carter-Fell a larger portion is found. Different kinds of agate, and sundry varieties of jasper, are also to be met with. Coal has been found at the Carter-Fell, in the southern extremity of Liddesdale, in the parishes of Bedrule and Linton, and in one or two other places; but the workings have been so expensive in comparison with the value of the coal, that they have been given up. Limestone, which abounds in various parts, is not wrought to any extent, owing to the want of coal. There are excellent sandstone quarries at Sprouston on the Tweed, and marl in several parishes, particularly at Eckford on the Teviot, Linton Loch, and Ednam near the Tweed. But the use of marl as a manure is confined to a narrow circle around the places where it is found; lime, of which a much smaller quantity answers the purpose, being most in request. The lime, like the coal, is procured from Northumberland and Mid-Lothian, being a distance of from twenty to thirty miles from many parts of the arable district. Coals could be procured nearer, at Tyne Head, and at a much cheaper rate for the west of the shire, if the Duke of Northumberland would allow a road to be made across the border, through his estate.

The valued rent of Roxburghshire is L.314,663. 6s. 4d. Scotch, being, next to Fife and Perth, the highest in Scotland; and the real rent of the lands, in 1811, was L.230,663. 9s. 9d. sterling, and of the houses L.11,508. 6s. 3d. The annual value of real property in 1815 amounted to L.254,180. It is one of the few counties where the rent in sterling falls below the valuation in Scotch money; a circumstance which is certainly not owing to the want of improvements to sustain rent, nor to the present rents being too low, but to the mistaken vanity of its land-owners, whose rent-rolls at the time of the valuation are understood to have been stated too high. Of this valuation, which in 1811 was divided amongst three hundred and forty-nine estates, but one third belongs to lands under entail, and more than two thirds to families of the name of Kerr, Scott, Elliot, and Douglas. The principal proprietors are the Dukes of Roxburghe and Buccleuch, the Marquis of Lothian, the Earl of Minto, and Douglas of Cavers; but there are thirty-three estates in all that have a valued rent of L.2000 each, and fifty-five more are from L.500 to L.2000. Yet moderate and small properties are very numerous, the remaining two hundred and sixty-one estates being under L.500 Scotch. Several of these, exceeding a valuation of L.400 Scotch, and held of the crown, have been acquired by professional farmers. Among the seats in the county, which are too numerous to be mentioned here, the most splendid is Fleurs, the mansion of the Duke of Roxburghe, beautifully situated at the confluence of the Tweed and Teviot, near Kelso. Abbotsford, the seat of the late Sir Walter Scott, is also situated in this county. It is placed on a bank overhanging the south side of the Tweed, and is about half-way between Melrose and Selkirk. The property attached to it is judiciously laid out with thriving plantations; and in improving his land, Sir Walter gave a stimulus that has had the happiest effects on the agriculture and appearance of this beautiful district.

Roxburghshire is divided, for the most part, into larger farms, if we except a few sheep-farms in the Highlands, than any other county in Scotland; many of them, consisting of land partly arable and partly pasture, being from 1000 to 3000 acres, and several of these, in some instances, being in the occupation of one tenant. Farms altogether arable, containing from 500 to 1000 acres, are not uncommon. The capital and knowledge required for conducting concerns so extensive entitle such men to suitable accommodations in their houses and farm-offices, many of which are accordingly laid out and constructed in a superior style. The average rent of arable land varies from 15s. to L.2. 10s. an acre, according to the quality of the soil and the distance from market. The rents of sheep-farms are calculated, not by the number of acres, but by the number of sheep that can be supported thereon. The grazing of an ox or cow, in various parts of the county, is from L.1. 10s. to L.7 a year; that of a sheep from 5s. to L.1, one of the Cheviot breed being charged about one half less than one of the Leicester breed. Farms are generally let on leases at fifteen and nineteen years. On some of the Buccleuch estates it is nine years, but the leases are usually renewed at the end of that period. On other estates the leases vary from five to eleven years.

Most of the farm-servants are married, and live in houses apart, set down together in some convenient quarter of the farm, each having a small garden attached. It is the practice here, as in other parts of the lowlands of Scotland, to pay most of their wages in the produce of the farm, and not in money, every married ploughman, or *hind*, getting a certain quantity of corn, a cow kept, and some land allowed for potatoes, and often also for flax; he is also commonly allowed to keep a pig and a few hens. The value of his income may be calculated to be between L.25 and L.28 a year. Whatever may be the fluctuation of the markets, these labourers are thus always provided with the necessaries of life; and the sale of the butter made from their cow, with its calf, and the eggs of their poultry, and, if the family be not large, a part of their corn, supplies them with the other articles they need; whilst they fatten their pigs, and work up the flax for the use of their families. No class of men of their rank are to be compared with these hinds for propriety of conduct and frugality; and few of the labouring classes any where are so comfortable and contented with their condition.

The wages of a shepherd are much higher than those of a hind. These, however, fluctuate with the value of stock. Shepherds are allowed in many instances thirty sheep, the right of keeping a cow, with one or two pigs, and have besides a certain quantity of potato-ground. With these advantages, shepherds realize considerable property, so that not a few are able in the course of years to take farms.

The system of farming is generally what is called the four and five year shift rotation of cropping. The five-year shift is that which is now most generally adopted, and is as follows: First year, fallow or turnip; second year, wheat, after plain fallow; third and fourth years, grass; fifth year, oats. There may be a variation after turnip in the second year, when barley or oats can be sown instead of the wheat, if the season is bad. Under a six years' course, the most profitable on rather weak soils, and in a district where there are no large towns to furnish manure, the rotation from pasture is oats, turnips, barley or wheat, clover and rye-grass, partly cut for hay the first year, but chiefly pastured with sheep, and then continued in pasture two years longer. Under this system the crops are almost always good, and the land, instead of being exhausted, is kept in a state of progressive improvement. Though little of the soil be naturally adapted to wheat, yet this grain is now raised to a great extent on all the better descriptions of sandy loam; generally after turnips, which are eaten on the ground by sheep, which, by their treading, give consistency to the soil, as well as leave it greatly enriched by their manure. Only a small part is under beans, and somewhat more under pease; barley has in many instances been superseded by wheat, so that wheat and oats are the principal crops of grain; whilst, whatever be the number of acres in corn, nearly half the quantity is allotted to turnips, and the other half to clover and rye-grass. Potatoes occupy but a very small part of every farm; and flax, where raised at all, is only in small patches for the use of the farm-servants. The turnip crop, however, has for a series of years been attacked with a disease which is popularly known by the name of *fingers and toes.* It converts the bulb of the turnip, when one has been allowed to form, into a shapeless and morbid mass, which no animal will eat; and becomes putrid, and disappears altogether on the first approach of frost. It often prevails over extensive fields, whilst others adjoining escape; and it seems to make no difference whether the land be fresh from pasture or has been long in tillage. Various conjectures have been formed as to the cause or causes of this evil; and the general opinion is, that it is owing to the constant repetition, within a given time, of a turnip crop. To abate the evil, lime, and a proper attention to the change of rotation, are necessary.

The pastoral district of this county is occupied with an excellent breed of sheep called the *Cheviot*, from the general name of the hills on which they feed; for an account of which breed we must refer to the article AGRICULTURE. On the arable farms, the short-horned cattle and Leicester sheep, neither of them, however, always in a pure state, form the principal stock; and as so large a proportion of even the arable land is always in grass, the number of both is very great. On farms partly arable and partly hill-pasture, the cross between the Cheviot and the Leicester is found to answer very well. Many of the farmers of late have purchased Highland stots or kyloes at the Falkirk trysts, which have been wintered for a year and then sold to advantage. The greatest improvement recently made is sheep or surface drains, which have not only had the effect of drying the meadow and marshy land, and thereby adding to the fineness and thickness of the grass, but also of curing to a great extent the rot and several other disorders which afflicted the sheep. By means of turnips, most of the disposable stock, whether of cattle or sheep, are carried forward till they are ready for the butcher, when the far greater part is sent to the weekly market of Morpeth in Northumberland, for the consumption of Newcastle and other towns in the north of England.

The progress which agriculture has made in this district has not been much favoured by its situation in regard to markets, coal, and lime. Weekly markets are held at Jedburgh, Hawick, and Kelso, where the corn is sold by sample upon very short credit, what is bought being paid for next market-day. Kelso market is the best attended, and the grain bought there is sent to Berwick for exportation to London. A considerable proportion is also sent to Dalkeith, and paid for by ready money. The carts that attend the Dalkeith market, on their return bring back coals or lime, which abound in that quarter. Bone manure, which is now getting into general use, is principally procured from Berwick. If either of the railways projected for connecting Newcastle and Edinburgh be carried into effect, it will be of great advantage to the county.

The towns are Kelso, Jedburgh, Hawick, and Melrose; and of the villages the most considerable are Yetholm and Kirk-Yetholm, near its eastern boundary. For notices of the towns, the reader is referred to them under their alphabetical heads. The two Yetholms are worthy of notice for their fairs, at which a great part of the cattle, sheep, and wool of the county are sold; and Kirk-Yetholm is remarkable for being the principal colony of gipsies in Scotland. At Jedburgh, Kelso, Melrose, and the village of Gattonside, there are some valuable orchards, particularly at Jedburgh and Melrose, where some very old trees which belonged to their abbeys are still remarkably prolific.

This county, placed on the borders of the two kingdoms, which were constantly at war with each other, presents the ruins of a great many castles and towers, and other remains, of an early age. Amongst these may be mentioned the Castles of Hermitage in Liddesdale; Cessford in Eckford parish; Ferniehirst near Jedburgh; Brankholm on the banks of the Teviot, several miles above Hawick; and Harden, situated in Borthwick Vale, a mile from Hawick, formerly the seat of the Scotts of Harden. The site where the important Castle of Jedburgh stood is now occupied by a prison. The celebrated Catrail, erected by the Britons under the Roman yoke, and also the Roman road, both cross this county. Their remains can be distinctly traced. The county was also distinguished for its religious buildings, for which we refer to the articles Jedburgh, Kelso, and Melrose. The ancient burgh and town of Roxburghe, which at one time was the fourth town in Scotland in importance and population, was situated on the beautiful peninsula formed by the junction of the Tweed and the Teviot rivers. It was regularly fortified by walls and ditches; and although it cannot be traced to a remoter period than the reign of Alexander I., it is believed to have been a royal burgh before that time, and, as such, governed by an alderman and inferior functionaries. It formed one of the court of four boroughs, which by the wisdom of David I. was instituted as a higher court, for hearing and deciding upon the appeals brought before them by the other royal burghs of the kingdom. Money was also coined here, and coins are yet to be seen in the depositories of antiquaries, of the date of William the Lion and James II. Situated as it was at the foot of one of the strongest castles on the border, it underwent many changes. It was several times burned by the English army, more particularly in the year 1369 and 1460. This fate was the more easily accomplished from the buildings being entirely of wood; and its restoration in a short time is the more easily explained, from the materials yielded by the forests which then covered the country. This mode of erection also accounts for not a vestige of the town now remaining. Its site has been used for centuries, and is still used, for holding the ancient fair of St James. The castle of the same name was built on an eminence at the west end of the town. This eminence rises to the height of nearly forty feet above the level of the Teviot, which here runs at the south base of the castle. The waters of the river were made subservient to fill the deep fosse which surrounded the fortress on the west, north, and east sides, by means of a dam thrown obliquely across the stream. Only a few remains of what appear to be the outward defences are now standing, but by their thickness they attest its prodigious strength. The interior of the building is now so overgrown with tall trees, that it is impossible to give any idea of the formation of its defences within. What remains is most probably the foundations of the fort erected by the Earl of Somerset after his expedition into Scotland in the year 1547. But it is needless to enter into historical facts connected with this fortress, as these will be given under the history of Scotland.

There are various fairs held in the county. The most important are, St Boswell's, held on the 18th of July, for cattle, sheep, horses, linen and woollen cloth; and St James's, held on the 5th of August, for nearly the same articles as at St Boswell's. There are also fairs held at Melrose, Yetholm, Hawick, Jedburgh, &c.

The following is a tabular view of the population of the county in the years 1811, 1821, and 1831.

YEARS.	HOUSES.			OCCUPATIONS.			PERSONS.		
	Inhabited.	Families.	Uninhabited.	Families chiefly employed in Agriculture.	Families chiefly employed in Trade, Manufactures, and Handicraft.	All other Families not comprised in the two preceding classes.	Males.	Females.	Total of Persons.
1811	2173	2849	88	1268	797	784	5,592	6,786	12,378
1821	6587	8639	269	3613	2822	2204	19,408	21,484	40,892
1831	6732	8930	286	3134	2942	2854	20,761	22,902	43,663

Roxburghshire sends one member to Parliament; and Jedburgh, its only royal burgh, joins with Lauder, Haddington, Dunbar, and North Berwick, in electing another. This is one of the few Scottish counties in which there are regular assessments for the poor. Amongst the eminent men to whom this district has given birth are, Thomson, Armstrong, Lord Kames, Elliot the brave defender of Gibraltar, Leyden, Park the African traveller, and William Dawson the father of the improved agriculture of Scotland.

ROY BAREILLY, a town of Hindustan, in the nabob of Oude's territories, situated on the Sye river, forty-five miles south-east by south from Lucknow. Long. 81. 12. E. Lat. 26. 16. N.

ROYAL, something belonging to a king. Thus we say royal family, royal assent, royal exchange, and so forth.

Royal Family. The first and most considerable branch of the king's royal family, regarded by the laws of England, is the queen.

1. The Queen of England is either queen regent, queen consort, or queen dowager. The queen regent, regnant, or sovereign, is she who holds the crown in her own right; as Queen Elizabeth, Queen Anne, and our present sovereign Queen Victoria. The queen consort is the wife of the reigning king; and she by virtue of her marriage is participant of divers prerogatives above other women. The husband of a queen regnant, as Prince George of Denmark

Royal.

was to Queen Anne, is her subject, and may be guilty of high treason against her; but in the instance of conjugal fidelity he is not subjected to the same penal restrictions. Hence, if a queen consort is unfaithful to the royal bed, this may debase or bastardize the heirs to the crown; but no such danger can be consequent on the infidelity of the husband to a queen regnant. A queen dowager is the widow of the king, and as such enjoys most of the privileges belonging to her as queen consort. But it is not high treason to conspire her death, or to violate her chastity; because the succession to the crown is not thereby endangered. Yet still, *pro dignitate regali*, no man can marry a queen dowager without special license from the king, on pain of forfeiting his lands and goods.

2. The Prince of Wales, or heir apparent to the crown, and also his royal consort, and the princess royal or eldest daughter of the king, are likewise peculiarly regarded by the laws. For, by statute 25 Edw. III. to compass or conspire the death of the former, or to violate the chastity of either of the latter, is as much high treason as to conspire the death of the king or violate the chastity of the queen; and this upon the same reason as was before given, because the prince of Wales is next in succession to the crown, and to violate his wife might taint the blood-royal with bastardy. And the eldest daughter of the king is also alone inheritable to the crown on failure of issue male, and therefore more respected by the laws than any of her younger sisters; insomuch that upon this, united with other principles, whilst our military tenures were in force, the king might levy an aid for marrying his eldest daughter, and her only. The heir apparent to the crown is usually made Prince of Wales and Earl of Chester, by special creation and investiture; but being the king's eldest son, he is by inheritance Duke of Cornwall, without any new creation.

3. The rest of the royal family may be considered in two different lights, according to the different senses in which the term *royal family* is used. The larger sense includes all those who are by any possibility inheritable to the crown. Such, before the Revolution, were all the descendants of William the Conqueror, who had branched into an amazing extent by intermarriages with the ancient nobility. Since the Revolution and Act of Settlement, it means the Protestant issue of the Princess Sophia, now comparatively few in number, but which in process of time may possibly be as largely diffused. The more confined sense includes only those who are in a certain degree of propinquity to the reigning prince, and to whom therefore the law pays an extraordinary regard and respect; but after that degree is past, they fall into the rank of ordinary subjects, and are seldom considered any further unless called to the succession upon failure of the nearer lines. For though collateral consanguinity is regarded indefinitely with respect to inheritance or succession, yet it is and can only be regarded within some certain limits in any other respect, by the natural constitution of things and the dictates of positive law.

By statute 12 Geo. III. c. 11, no descendant of the body of Geo. II. other than the issue of princesses married into foreign families, is capable of contracting matrimony, without the previous consent of the king signified under the great seal; and any marriage contracted without such a consent is void. It is provided, however, that such of the said descendants as are not above twenty-five, may, after a twelvemonth's notice given to the king's privy council, contract and solemnize marriage without the consent of the crown, unless both houses of parliament shall, before the expiration of the said year, expressly declare their disapprobation of such intended marriage; and all persons solemnizing, assisting, or being present at any such prohibited marriage, shall incur the penalties of the statute of *præmunire*.

Royal Oak, a fair spreading tree at Boscobel, in the parish of Donnington, in Staffordshire, the boughs of which were once covered with ivy, in the thick of which King Charles II. sat in the day-time with Colonel Careless, and in the night lodged in Boscobel House. They are mistaken who speak of it as an old hollow oak, it being then a gay flourishing tree, surrounded with many more. Its poor remains were fenced in with a handsome wall, with this inscription in gold letters: *Felicissimam arborem quam in asylum potentissimi regis Caroli II. Deus op. max. per quem reges regnant, hic crescere voluit.*

Roymungul || Rubens.

ROYMUNGUL, a river of Bengal, which falls into the Sunderbunds, and is strongly affected by the tides. The East India Company have an extensive salt manufactory on its banks.

ROYSTON, a market-town on the northern border of the county of Hertford, and partly within the county of Cambridge, thirty-eight miles from London. There was here an ancient priory, said to have been founded in the reign of Henry II. by a lady of the name of Roysia, from whom the town takes its name. The chapel of the priory now serves as the parish church. There is a large market held on Thursday, at which much corn is sold. There are some considerable brewers. The population amounted in 1811 to 1331, in 1821 to 1474, and in 1831 to 1757.

RSHOW Waldimirow, a city of Russia, in the province of Twer, and the capital of a circle of the same name. It is situated on the river Volga, where it receives the waters of the Ryolenka. It contains twelve churches, 1252 houses, and 7500 inhabitants. It has considerable trade by the river in the productions of the land, and some manufactures. Long. 34. 29. E. Lat. 56. 10. N.

RUABON, a large village or town of the county of Denbigh, in North Wales, 192 miles from London, and four from Wrexham. It is pleasantly situated on an elevation, and has a neat church, with some elegant monuments to the family of Sir Watkins William Wynn, whose magnificent seat of Wynnstay is near to it. The agricultural society established at this place has much contributed to the improvement of the soil and of cultivation. The population amounted in 1801 to 5598, in 1811 to 6122, in 1821 to 8556, and in 1831 to 8353; but it includes the whole parish, which comprehended five townships.

RUANELLI, a valley in the island of Ceylon, famed for its precious stones. The river on which Columbo, the capital, is situated, is navigable to this place by boats. The precious stones and other metallic substances are found in the environs of Ruanelli, amongst the sand and gravel of the river. They consist chiefly of sapphires, topazes, garnets, amethysts, moonstone, tourmalines, and cats-eyes. The land is let on short leases to the highest bidder; and although they are exempted from duties, it produces, after all, but a trifling revenue.

RUBBER, India. See Caoutchouc.

RUBENS, Sir Peter Paul, the most eminent of the Flemish painters, was born in the year 1577, but whether at Antwerp or Cologne is uncertain. His father, who was a counsellor in the senate of Antwerp, had been forced by the civil wars to seek refuge in Cologne; and during his residence there Rubens is commonly said to have been born.

The genius of Rubens, which began to unfold itself in his earliest years, was cultivated with peculiar care, and embellished with every branch of classical and polite literature. He soon discovered a strong inclination for designing, and used to amuse himself with that employment in his leisure hours, whilst the rest of his time was devoted to other studies. His mother, perceiving the bias of her son, permitted him to attend the instructions of Tobias Verhaecht, a painter of architecture and of landscape. He next became the pupil of Adam Van Oort; but he soon found that the abilities of this master were insufficient to answer his elevated ideas. His surly temper, too, was disgustful to Rubens, whose natural disposition was modest and amiable.

Anxious to find an artist whose genius and dispositions were congenial with his own, he became the disciple of Octavio Van Veen, generally known by the name of Otho Venius, a painter of singular merit, and who was not only skilled in the principles of his art, but also distinguished for learning and other accomplishments. Between the master and the scholar a remarkable similarity appeared in temper and inclination; indeed the whole turn of their minds was the same. It was this congeniality of sentiments which animated Rubens with that ardent passion for the art of painting which at length determined him to pursue it as a profession. From this time he gave up his whole mind to it; and so successful were his exertions, that he soon equalled his master.

In order to arrive at that perfection which he already beheld in idea, it became requisite to study the productions of the most eminent artists; and for this purpose he travelled throughout Italy, visiting the most valuable collections of paintings and antique statues with which that country abounds.

Sandrat, who was intimately acquainted with Rubens, informs us that he was recommended to the Duke of Mantua by the Archduke Albert, who had witnessed his talents in the finishing of some fine paintings designed for his own palace. At Mantua he was received by the duke with the most flattering marks of distinction, and had opportunities of improving himself, which he did not neglect. He there carefully studied the works of Julio Romano; and he next visited Rome, where he had an opportunity of examining the productions of Raffaelle. The paintings of Titian and Paul Veronese called him to Venice, where he improved himself in the art of colouring.

He continued in Italy seven years. At length receiving intelligence that his mother was taken ill, he hastened to Antwerp. But his filial affection was not gratified with a sight of her. She died before his arrival. He married soon afterwards; but his wife dying at the end of four years, he retired for some time from Antwerp, and endeavoured to soothe his melancholy by a journey to Holland. At Utrecht he visited Hurtort, whom he greatly esteemed.

The fame of Rubens was now spread all over Europe. He was invited by Mary de' Medici, queen of Henry IV. of France, to Paris, where he painted the galleries in the palace of Luxembourg. These form a series of paintings which delineate the history of Mary; and afford a convincing proof how well qualified he was to excel in allegorical and emblematical compositions. Whilst at Paris he became acquainted with the Duke of Buckingham, who was so taken with his great talents and accomplishments, that he judged him well qualified to explain to Isabella, the wife of Albert the archduke, the cause of the misunderstanding which had taken place between the courts of England and Spain. In this employment Rubens acquitted himself with such propriety, that Isabella appointed him envoy to the king of Spain, with a commission to propose terms of peace, and to bring back the instructions of that monarch. Philip was not less captivated with Rubens, conferring on him the honour of knighthood, and making him secretary to his privy council. Rubens returned to Brussels, and thence passed over into England in 1630 with a commission from the Catholic king to negotiate a peace between the two crowns. He was successful in his negotiation, and a treaty was concluded. Charles I. who then filled the British throne, could not receive Rubens in a public character on account of his profession; nevertheless, he treated him with every mark of respect. Having engaged him to paint some of the apartments of Whitehall, he not only gave him a handsome sum of money, but, as an acknowledgment of his merit, created him a knight; and the Duke of Buckingham, his friend and patron, purchased of him a collection of pictures, statues, medals, and antiques, for the sum of ten thousand pounds.

He returned to Spain, where he was magnificently honoured and rewarded for his services, being created a gentleman of the king's bed-chamber, and named secretary to the council of state in the Netherlands. Rubens, however, did not lay aside his profession. He returned to Antwerp, where he married a second wife, called Helena Forment, who, being an eminent beauty, helped him much in the figures of his women. But he died on the 30th of May 1640, in the sixty-third year of his age, leaving vast riches to his children. Albert his eldest son succeeded him in the office of secretary of state in Flanders.

As Rubens was possessed of all the ornaments and advantages that render a man worthy to be esteemed or courted, he was always treated as a person of consequence. His figure was noble, his manners engaging, and his conversation lively. His learning was universal. Though his favourite study must have occupied him much, yet he found time to read the works of the most celebrated authors, especially the poets. He spoke several languages perfectly, and was an able statesman, as well as an excellent painter. His house at Antwerp was enriched with every thing that was rare and valuable in the arts. It contained one spacious apartment, in imitation of the rotunda at Rome, adorned with a choice collection of pictures which he had purchased in Italy, part of which he sold to the Duke of Buckingham.

His genius qualified him to excel equally in every thing that can enter into the composition of a picture. His invention was so fertile, that, if he had occasion to paint the same subject several times, his imagination always supplied him with something striking and new. The attitudes of his figures are natural and varied, the carriage of the head is peculiarly graceful, and his expression is noble and animated.

He is by all allowed to have carried the art of colouring to its highest pitch. He understood so thoroughly the true principles of the chiaro-scuro, that he gave to his figures the utmost harmony, and a prominence resembling real life. His pencil is mellowed, his strokes are bold and easy, his carnation glows with life, and his drapery is simple but grand, broad, and hung with much skill. The great excellence of Rubens appears in his grand compositions. For as they are to be viewed at a distance, he laid on a proper body of colours with uncommon boldness, and fixed all his tints in their proper places; so that he never impaired their lustre by breaking or torturing them, but touched them in such a manner as to give them a lasting force, beauty, and harmony.

It is generally allowed that Rubens wanted correctness in drawing and designing; some of his figures being heavy and too short, and the limbs in certain parts not being justly sketched in the outline. Though he had spent seven years in Italy in studying those antiques by which other celebrated artists had modelled their taste, and though he had examined them with such minute attention as not only to perceive their beauties, but to be qualified to describe them in a dissertation which he wrote on that subject; yet he seems never to have divested himself of that heavy style of painting which, being peculiar to his native country, he had insensibly acquired. The astonishing rapidity too with which he painted, made him fall into inaccuracies, from which those works that he finished with care are entirely exempted. Amongst his finished pieces may be mentioned the Crucifixion of Jesus Christ between the Two Thieves; but of all his works the paintings in the palace of Luxembourg best display his genius and his style.

It is the observation of Algarotti, that he was more moderate in his movements than Tintoretto, and softer in his chiaro-scuro than Carravaggio; but not so rich in his compositions, nor so light in his touches, as Paul Veronese, in his carnations less true than Titian, and less delicate than Vandyck. Yet he contrived to give his colours the utmost transparency and harmony, notwithstanding their extraordinary deepness; and he possessed a strength and grandeur of style which were entirely his own. See the article Painting.

RUBIN, or ROBOAN, a small island in the Red Sea, at the Straits of Babelmandel, separated from the continent by a channel not above a stone-cast in breadth, which may be forded at low water. Here pilots are taken in for the voyage up the Red Sea, and to its different ports.

RUBRIC, in the canon law, signifies a title or article in certain ancient law-books, and which was so called because written, as the titles of the chapters in our ancient bibles are, in red letters.

RUBY, a species of precious stone, belonging to the siliceous genus. The ruby is of various colours, as, of a deep red colour inclining a little to purple, or the carbuncle of Pliny; the spinell, of the colour of a bright corn poppy flower; and the balass or pale red inclining to violet. Tavernier and Dutens inform us that in the East Indies all coloured gems are named rubies, without regard to what their colours may be; and that the particular colour is added to the name of each in order to distinguish them from one another. The spinell rubies are above half the value of diamonds of the same weight; and the balass is valued at thirty shillings per carat. Tavernier mentions one hundred and eight rubies in the throne of the Great Mogul, from one to two hundred carats, and a round one almost two and a half ounces. There is also mention made by other travellers, of rubies exceeding two hundred carats in weight. According to Dutens, a perfect ruby, if it weigh more than three and a half carats, is of greater value than a diamond of the same weight. If it weigh one carat, it is worth ten guineas; if two carats, forty guineas; three carats, a hundred and fifty guineas; if six carats, upwards of a thousand guineas.

RUCTATION, a ventosity arising from indigestion, and discharging itself at the mouth with a very disagreeable noise.

RUDBECK, Olaus, a learned Swedish physician, was born of an ancient and noble family in 1630. He became professor of medicine at Upsal, where he acquired great applause by his extensive knowledge, and died in 1702. His principal works are twofold, 1. *Exercitatio Anatomica, exhibens ductus novos hepaticos aquosos, et vasa glandularum serosa*, in 4to; 2. *Atlantica, sive Manheim, vera Japheti posterorum sedes ac patria*, four vols. folio. He there endeavours to prove that Sweden was the country whence all the ancient Pagan divinities and our first parents were derived; and that the Germans, English, French, Danes, Greeks, and Romans, with all other nations, originally came from thence. This work, in a complete state, is of the greatest rarity.

RUDDER, in *Navigation*, a piece of timber turning on hinges in the stern of the ship, and which, opposing sometimes one side in the water and sometimes another, turns or directs the vessel this way or that. See the article Ship-Building.

RUDGELEY, a market-town in the county of Stafford, of the hundred of Cuttlestone, 131 miles from London, and seven from Lichfield. It is a well-built place, and contains many manufacturers of hats and of other articles; and being, by means of canals, favoured with water communication with the whole of the interior of the kingdom, has considerable trade. There is a good market, which is held on Tuesday. The population amounted in 1801 to 2030, in 1811 to 2213, in 1821 to 2677, and in 1831 to 3165.

RUDOLSTADT, a city, the capital of the principality of Schwarzburg-Rudolstadt, in Germany. It is situated on the river Saale, over which there is a stone bridge. It is surrounded with walls, is well built and paved, and contains the palace of the prince, two churches, a theological seminary, and two hospitals, with 550 houses, and 4160 inhabitants, who subsist by the expenditure of the government and the college, by making woollen goods, and by breweries and distilleries. Long. 11. 15. 15. E. Lat. 50. 43. 51. N.

RUDDIMAN, Thomas, one of the most eminent grammarians which Scotland has produced, was born in October 1674, at Raggel, in the parish of Boyndie and county of Banff. His father, James Ruddiman, was a farmer, and strongly attached to the house of Stuart.

Mr Ruddiman was instructed in the principles of Latin grammar at the parish school of Boyndie, where his application was so vigorous, and his progress so rapid, that he quickly surpassed all his class-fellows. His master, George Morrison, who was a skilful and attentive teacher, being unwilling to check his ardour for learning, permitted him to follow the impulse of his genius, and to advance without waiting the slow progress of the other boys.

The pleasure which the youthful mind receives from vivid description, though wild and romantic, approaches to ecstasy, and often makes an impression which remains indelible. Whilst at school, the first book which charmed the opening mind of Ruddiman was Ovid's Metamorphoses; nor did he cease to relish the beauties of this author when his judgment was mature, for during the rest of his life Ovid was his favourite poet.

At the age of sixteen he became anxious to pursue his studies at the university; but his father thinking him too young, opposed his inclination. Hearing of the competition trial which was annually held at King's College, Aberdeen, for a certain number of bursaries on the foundation of that university, Ruddiman's ambition was kindled. Without the knowledge of his father, and with only a single guinea in his pocket, which his sister had privately given him, he set out for that place. On the road he was met by a company of gipsies, who robbed him of his coat, his shoes, his stockings, and his guinea. But this misfortune did not damp his enterprising spirit. He continued his journey to Aberdeen, presented himself before the professors as a candidate; and, though he had neither clothes to give him a decent appearance, nor friends to recommend him, he gained the first prize.

After attending the university for four years, he obtained the degree of master of arts, an honour of which he was always proud. The thesis says, the disputation on this occasion lasted *ab aurora usque ad vesperum*, that is, "from morning till night." Though Ruddiman was only twenty years of age when he left the university, it appears from a book entitled *Rhetoricorum Libri tres*, composed before this period, but never published, that he had then read the Roman classics with uncommon attention and advantage.

He was soon after engaged as a tutor to the son of Mr Robert Young of Auldbar, the great grandson of Sir Peter Young, who under the direction of Buchanan had been preceptor of James VI. His income here must have been very small, or his situation unpleasant; for within a year he accepted the office of schoolmaster in the parish of Laurencekirk. The profession of schoolmaster in a country parish at that period could not open any field for ambition, nor any prospect of great emolument; for by an act of parliament passed in 1633, the salary appropriated to this office could not be increased above 200 merks Scotch, or L.11. 2s. 2⅔d. sterling. In discharging the duties of this humble but important station, it is probable that he used Simson's *Rudimenta Grammatica*, which was then generally taught in the northern schools, and by which he himself had been instructed in the principles of Latin grammar.

When Ruddiman had spent three years and a half in this employment, the celebrated Dr Pitcairne happening to pass through Laurencekirk, was detained in that village by a violent storm. Pitcairne wanting amusement, inquired at the hostess if she could procure any agreeable companion to bear him company at dinner. She replied, that the schoolmaster, though young, was said to be learned, and, though modest, she was sure he could talk. Pitcairne was delighted with the conversation and learning of his new companion, invited him to Edinburgh, and promised him his patronage.

When Ruddiman arrived in Edinburgh, the Advocates Library, which had been founded eighteen years before by Sir George Mackenzie, attracted his curiosity and attention, and he was soon afterwards appointed assistant-keeper under Mr Spottiswoode the principal librarian. His salary for executing this laborious office was L.8. 6s. 8d. He had, besides, a small honorary present from those who were admitted advocates, for correcting their theses; and he was also paid for copying manuscripts for the use of the library. The faculty, however, before he had held the office two years, were so highly pleased with his conduct, that they made him a present of fifty pounds Scotch, or L.4. 3s. 4d. sterling.

During the sitting of the Court of Session he attended the library from ten till three. But this confinement did not prevent him from engaging in other laborious duties. A part of his time was occupied in teaching young gentlemen the Latin language. Some he attended at their lodgings, some waited upon him, and some resided in his own house. An exact list of the names of those who attended him, expressing the date of their entry, and the sums which he was to receive from each, has been found in his pocket-book, a curious relic, which is still preserved.

When Ruddiman's merit as a scholar became better known, his assistance was anxiously solicited by those who were engaged in literary publications. Freebairne, a respectable bookseller of that period, prevailed upon him to correct and prepare for the press Sir Robert Sibbald's *Introductio ad historiam rerum a Romanis gestarum in ea Borealis Britanniæ parte quæ ultra murum Picticum est.* For his labour he received L.3 sterling. At the request of Mr Spottiswoode, librarian, he contributed for L.5 sterling his aid to the publication of Sir Robert Spottiswoode's Practiques of the Laws of Scotland.

In 1707 he commenced auctioneer, an employment not very suitable to the dignified character of a man of letters. But to this occupation he was probably impelled by necessity; for upon balancing his accounts at the end of the preceding year, the whole surplus was L.28. 2s. with prospects of L.236. 7s. 6d. Scotch. Ruddiman had a family, and seems to have been a stranger to that foolish pride which has seduced some literary men into the opinion, that it is more honourable to starve than have recourse to an occupation which men of rank and opulence are accustomed to despise. The same year he published an edition of *Voluseni de Animi Tranquillitate Dialogus*, to which he prefixed the life of Volusenus. Volusenus or Wilson was a learned Scotchman, and had the honour to be patronized by Cardinal Wolsey. In 1709 he published *Johnstoni Cantici Solomonis Paraphrasis Poetica*, and *Johnstoni Cantica* with notes, which he dedicated in verse to his friend and patron Dr Pitcairne. The edition consisted of two hundred copies. The expense of printing amounted to L.5. 10s. sterling, and he sold them at a shilling each copy.

The philological talents of Ruddiman were next directed to a more important object, in which they became more conspicuous and useful. Freebairne the bookseller proposed to publish a new edition of the Scottish translation of Virgil's Æneid by Gawin Douglas, bishop of Dunkeld. Of the contributions which some eminent characters of the age presented, the most valuable were supplied by Ruddiman. Freebairne acknowledged in general terms this obligation, but has not done him the justice to inform the reader what these valuable contributions were, and Ruddiman's modesty restrained him from publicly asserting his claim. From the pocket-book which has been already mentioned, it appears that Ruddiman corrected the work and wrote the glossary; and there is strong reason to believe that he was the author of the forty-two general rules for assisting the reader to understand the language of Douglas. To those who wish to be acquainted with the ancient language of this island, the glossary will be a treasure, as it forms a compendious dictionary of the Anglo-Saxon. For this elaborate work Ruddiman was allowed L.8. 6s. 8d. sterling.

The reputation of Ruddiman had now extended to a distance. He was invited by the magistrates of Dundee to be rector of the grammar-school of that town; but the faculty of advocates, anxious to retain him, augmented his salary to L.30. 6s. 8d. sterling, and he declined the offer.

In 1711 he assisted Bishop Sage in publishing Drummond of Hawthornden's works; and performed the same favour to Dr Abercrombie, who was then preparing for the press his Martial Achievements. In 1713 he was deprived of his friend Dr Pitcairne. On this occasion he testified all the respect which friendship could inspire to the memory of his deceased patron and surviving family. He composed Pitcairne's epitaph, and conducted the sale of his library, which was disposed of to Peter the Great of Russia.

In 1714 the Rudiments of the Latin Tongue were published. Eighteen or nineteen Latin grammars, composed by Scotchmen, had appeared before this period; yet such is the intrinsic value of this little treatise, that it soon superseded all other books on the subject, and is now taught in all the grammar-schools in Scotland. It has also been translated into other languages.

He was next called upon to publish the works of Buchanan. The value of these he enhanced by an elaborate preface, his *Tabula Regum Scotiæ Chronologica* and *Propriorum Nominum Interpretatio*. The interpretation of proper names was highly requisite; for Buchanan has so disguised them in the Roman dress, that the original name is scarcely discernible; and the preface puts the reader on his guard against the chronological errors and factious spirit of the history. Ruddiman also added a learned dissertation, entitled *De Metris Buchananæis Libellus*, and subjoined annotations critical and political on the History of Scotland. As he espoused the cause of Queen Mary, he raised against himself a host of enemies, and gave occasion to that celebrated controversy which has been carried on with much keenness and animosity, and with little intermission, even to the present times. For this work Ruddiman was promised L.40 sterling.

He had now been so long accustomed to superintend the press, that he was led to form the plan of erecting a printing-office himself. Accordingly, in the year 1715, he commenced printer in partnership with his brother Walter, who had been regularly bred to the business; and some years afterwards he was appointed printer to the university, along with James Davidson, bookseller.

The first literary society formed in Scotland was instituted in the year 1718. It probably derived its origin from the factious and turbulent spirit of the times. The learned, anxious perhaps to find some respite from the political dissensions of the day, endeavoured to procure it in elegant amusement; for one of the fundamental articles of the new association was, that the "affairs of church and state should not be introduced." Ruddiman and the masters of the high school had the honour to found this society. They were afterwards joined by Lord Kames.

In 1725 was published the first part of his *Grammaticæ Latinæ Institutiones*, which treated of etymology. The second part, which explained the nature and principles of syntax, appeared in 1731. He also wrote a third part on prosody, which is said to be more copious and correct than any other publication on the subject. When urged to give it to the public, he said dryly, "The age has so little taste, that the sale would not pay the expense." Of this work he published an abridgment, to which he subjoined an extract of his prosody.

Ruddiman next engaged in the management of a newspaper, an employment for which his genius and industry seemed to render him well qualified. But those who should expect either much information or amusement from this publication, would perhaps be greatly disappointed. The newspaper which he conducted was the Caledonian Mercury, and was established in 1720, by William Rolland, a lawyer. Ruddiman acted only for five years in the capacity of printer; but upon the death of Mr Rolland in 1729, the property was transferred to him, or to his brother Walter and him conjunctly. This paper continued in the family of Ruddiman till the year 1772, when it was sold by the trustees of his grandchildren. The Caledonian Mercury was at first printed three times a week, on Monday, Tuesday, and Thursday, in a small quarto of four pages, with two columns in each page, and fifty lines in each column; so that the whole paper contained only four hundred lines.

Mr Ruddiman, after the death of Mr Spottiswoode, librarian, remained for some time in his former station; but he was at length appointed keeper of the library, though without any increase of salary; and some years afterwards Mr Goodal, the defender of Queen Mary, succeeded him in the office of sub-librarian.

The assiduous application of Ruddiman, supported by such learning, was entitled to wealth, which now indeed flowed upon him in what was at that period deemed great abundance. On the 1st of October 1735, it appeared, from an exact statement of his affairs, that he was worth L.1882. 5s. 2d. sterling; and on the 20th of May the ensuing year his wealth had increased to L.1985. 6s. 3d. sterling. In 1710 he had valued his effects at L.24. 14s. 9d. sterling.

In 1737 the schoolmasters and teachers in Edinburgh formed themselves into a society, in order to establish a fund for the support of their widows and children. Of this scheme Ruddiman was an active promoter, and was chosen treasurer. Perhaps it was this association which in 1742 gave to the Scotch clergy the idea of forming their widows' fund.

In 1739 he published *Selectus Diplomatum et Numismatum Scotiæ Thesaurus*. This work was projected and begun by Anderson, and hence called Anderson's *Diplomata*, but was finished by Ruddiman. The preface, which is an excellent commentary on Anderson's performance, was written by Ruddiman, and displays a greater extent of knowledge than any of his other productions.

As Ruddiman had imbibed from his father those political principles which attached him to the family of Stuart, he probably did not remain an unconcerned spectator of the civil commotions which, in 1745, agitated Scotland. He did not, however, take any active part in the rebellion. His principles, he has been heard to say, induced him to be a quiet subject and a good citizen. He retired to the country during the summer of 1745; and whilst his fellow-citizens were spilling each other's blood, he was more happily engaged in writing Critical Observations on Burmann's Commentaries on Lucan's *Pharsalia*. The Caledonian Mercury was in the mean time marked with a jealous eye. His son, who had for some time been the principal manager of that newspaper, having copied from an English paper a paragraph which was reckoned seditious, was imprisoned. The solicitation of his father procured his release; but it was too late, for the unhappy young man had contracted a distemper in the tolbooth of Edinburgh which brought him to a premature grave.

During the last seventeen years of his life, Ruddiman was almost incessantly engaged in controversy. To this he was in some measure compelled by the violent attacks which some critics of the times had successively made upon his works. He was first called upon by Benson, auditor in the exchequer, to determine the comparative merit of Buchanan and Johnson as poets. He gave a decided preference to Buchanan in perspicuity, purity, and variety of style; but, like a candid critic, allowed Johnson to be superior in the harmony of his numbers. His next antagonist was Logan, one of the ministers of Edinburgh, a weak and illiterate man, but an obstinate polemic. The subject of contest was, whether the crown of Scotland was strictly hereditary, and whether the birth of Robert III. was legitimate. Ruddiman maintained the affirmative in both points, and certainly far surpassed his antagonist in the powers of reasoning. He proved the legitimacy of Robert by the public records of the kingdom, with a force of argument which admits of no reply; but in discussing the first question, by which he was led to consider the contest between Bruce and Baliol, he was not so successful; for there are many instances in the history of Scotland in which the brother succeeded to the crown in preference to the son. He showed, however, that the Scottish crown was at no period properly elective; and that, according to the old licentious constitution of the kingdom, the right of Bruce, who was the nearest in blood to the royal stock, was preferable to the claim of Baliol, though descended from the eldest daughter.

But the labours of Ruddiman did not end when the pen dropt from the feeble hand of Logan. He was soon called upon to repel the attacks of Love, schoolmaster of Dalkeith, who maintained, in opposition to him, that Buchanan had neither repented of his treatment of Queen Mary, nor had been guilty of ingratitude to that princess. That Buchanan ever repented there is reason to doubt. Whether he was guilty of ingratitude, let the unbiassed determine, when they are assured by authentic records that Mary conferred on him a pension for life of five hundred pounds Scotch.

When Ruddiman had arrived at his eightieth year, and was almost blind, he was assailed by James Man, master of an hospital at Aberdeen, with a degree of rancour and virulence, united with some learning and ability, which must have touched him in a sensible manner, and alarmed his fears for his reputation after his decease. He was called a finished pedant, a furious calumniator, and a corrupter of Buchanan's works. The venerable old man again put on his armour, entered the lists, and gained a complete victory. Man, with all his acuteness, could only point out twenty errors in two folio volumes. Some of these were typographical, some trifling, and some doubtful. Ruddiman, with much pleasantry, drew up against Man an account of four hundred and sixty-nine errors, consisting of fourteen articles, of which two or three may be produced as a specimen: 1. Falsehoods and prevarications, twenty; 2. absurdities, sixty-nine; and, 3. passages from classical authors which were misunderstood by Man, ten. The triumph which he gained over this virulent adversary he did not long enjoy, for he died at Edinburgh on the 19th of January 1757, in the eighty-third year of his age, and was buried in the Greyfriars churchyard, without any monument to distinguish his grave. He was three times married, but left behind him only one daughter, Alison, who was married in 1747 to Mr James Stewart. He is supposed to have died worth L.3000 sterling.

He was of the middle size, of a thin and straight make, and had eyes remarkably piercing. Of his talents and learning his works afford the most satisfactory proofs. His memory was tenacious and exact; and he was so great a master in the Latin language that he has perhaps been equalled by none since the days of Buchanan.

Ruddiman has left a character unstained by vice and distinguished by many virtues. His piety was exemplary.

He spent Sunday in religious employment, and, we are informed, had prayers read to him every morning by his amanuensis when the infirmities of age rendered such an assistance necessary. He was frugal of his time, neither indolent nor fond of amusement, and so remarkably temperate, that it is said he was never intoxicated. Though often forced into controversy, and treated with insolence, he never descended to scurrility, nor cherished resentment against his enemies. His candour was much admired in one instance, in the favourable character, which he published in the Caledonian Mercury, of his antagonist Love after his decease. Upon the whole, it must be allowed that Ruddiman has been of great service to classical literature, and an honour to his native country.

RUDIMENTS, the first principles or grounds of any art or science.

RUDRAPRAYAGA, a celebrated place of Hindu pilgrimage, in the province of Serinagur. It is situated at the confluence of the rivers Alcananda and Calyganga, a large stream which rises in the mountains of Kedar. The confluence of these rivers is esteemed one of the sacred places of ablution, and is annually visited by an immense concourse of pilgrims of both sexes. Long. 79. 2. E. Lat. 30. 19. N.

RUE, Charles de la, a French orator and poet, was born at Paris in the year 1643. He was educated at the college of the Jesuits, where he afterwards became professor of humanity and rhetoric. At an early age his talent for poetry disclosed itself. In 1667, when he was only twenty-four years old, he composed a Latin poem on the conquests of Louis XIV.; which was so much esteemed by Corneille that he translated it into French, presented it to the king, and at the same time passed so high encomiums on the superior merit of the original, that the author was received into the favour of that monarch, and ever after treated by him with singular respect.

De la Rue, anxious to preach the gospel to the Canadians, requested leave of absence from his superiors; but having destined him for the pulpit, they refused to comply with his request. Accordingly, he commenced preacher, and became one of the most eminent orators of his age. In his discourses he would probably have been too lavish of his wit, if he had not been cautioned against it by a judicious courtier. “Continue,” said he, “to preach as you do. We will hear you with pleasure as long as you reason with us; but avoid wit. We value the wit contained in two verses of a song more than all that is contained in most of the sermons in Lent.”

De la Rue died at Paris on the 27th of May 1725, at the advanced age of eighty-two. He was one of those who published editions of the classics for the use of the Dauphin. Virgil, which fell to his share, was published with notes and a life of the poet in 1675, 4to, and is a valuable and useful edition.

RUFFHEAD, Dr Owen, was the son of his majesty’s baker in Piccadilly. His father having bought a lottery ticket for him in his infancy, which happened to be drawn a prize of L.500, this sum was applied to educate him for the law. He accordingly entered in the Middle Temple, and seconded so well the views of his father, that he became a good scholar and an acute barrister. Whilst he was waiting for opportunities to distinguish himself in his profession, he wrote a variety of pamphlets on the politics of the day, and was afterwards distinguished by his accurate edition of the Statutes at Large, in 4to. He now obtained good business, though more as a chamber counsellor in framing bills for parliament than as a pleader; but his close application to study, with the variety of works he engaged in as an author, so impaired his constitution, that after the last exertion of his abilities to defend, by a pamphlet, the conduct of administration towards Mr Wilkes, he was prevented from receiving the reward of a place in the treasury by his death in 1769, at about forty-six years of age. Some time before his death, Bishop Warburton had engaged him to write his long-promised Life of Alexander Pope, which, however, when executed, was very far from giving general satisfaction. The author attributed his ill success to the deficiency of his materials; whilst the public seemed rather to be of opinion that, as a lawyer, he ventured beyond his proper line when he assumed the task of a critic in poetry.

RUFINUS was born about the middle of the fourth century, at Concordia, an inconsiderable town in Italy. At first he applied himself to the belles lettres, and particularly to the study of eloquence. To accomplish himself in this elegant art, he removed to Aquileia, a town at that time so celebrated that it was called a second Rome. Having made himself acquainted with the polite literature of the age, he withdrew into a monastery, where he devoted himself to the study of theology. Whilst thus occupied, St Jerome happened to pass through Aquileia. Rufinus formed an intimate friendship with him; but, to his inexpressible grief, he was soon deprived of the company of his new friend, who continued his travels through France and Germany, and then set out for the East. Rufinus, unable to bear his absence, resolved to follow him. Accordingly, he embarked for Egypt; and having visited the hermits who inhabit the deserts of that country, he repaired to Alexandria to hear the renowned Didymus. Here he was gratified with a sight of St Melania, of whose virtue and charity he had heard much. The sanctity of his manners soon obtained the confidence of St Melania, which continued without interruption during their residence in the East, a period of thirty years. The Arians, who swayed the ecclesiastical sceptre in the reign of Valens, persecuted Rufinus with great cruelty. They threw him into a dungeon, loaded him with fetters, and, after almost starving him to death, banished him to the deserts of Palestine. But from this exile he was relieved by the pecuniary aid of St Melania, who employed her wealth in ransoming those confessors who had been condemned to prison or banishment.

St Jerome, supposing that Rufinus would immediately proceed to Jerusalem, wrote to one of his friends there congratulating him on the prospect of so illustrious a visiter. To Jerusalem he accordingly proceeded, and having built a monastery on the mount of Olives, he there assembled a great number of hermits, whom he animated to virtue by his exhortations. He converted many to the Christian faith, and persuaded more than four hundred hermits who had taken part in the schism of Antioch to return to the church. He also prevailed on many Macedonians and Arians to renounce their errors.

His attachment to the opinions of Origen set him at variance with St Jerome, who, being of a temper peculiarly irritable, not only retracted all the praises which he had lavished upon him, but loaded him with severe reproaches. Their disputes, which were carried to a very indecent height, tended to injure Christianity in the eyes of the weak. Theophilus, their mutual friend, settled their differences; but the reconciliation was of short continuance. Rufinus having published a translation of the principles of Origen at Rome, was summoned to appear before Pope Anastasius. He made a specious apology for not appearing, and sent a vindication of his work, in which he attempted to prove that certain errors, of which Origen had been accused, were perfectly consistent with the opinions of the orthodox. St Jerome attacked Rufinus’s translation. Rufinus composed an eloquent reply, in which he declared that he was only the translator of Origen, and did not consider himself bound to sanction all his errors. Most ecclesiastical historians say that Rufinus was excommunicated by Pope Anastasius;

but for this no good evidence has been adduced. In 407 he returned to Rome; and the year after, that city being threatened by Alaric, he retired to Sicily, where he died in 410.

RUGBY, a market-town of the county of Warwick, in the hundred of Knightlow, eighty-four miles from London. It is situated on the Grand Junction Canal, and has a good market on Saturday. The free-school here is celebrated, and has educated many youths of the first families of the kingdom. The population amounted in 1801 to 1487, in 1811 to 1805, in 1821 to 2300, and in 1831 to 2501.

RUGENWALD, a city of Prussia, in the government of Stralsund, and the capital of the circle of Schlawe-Pollnow. It is situated on the river Wipper, about a mile distant from the Baltic Sea. It is a fortified place, containing 460 houses, with 4100 inhabitants, who have some foreign trade, some ship-building, and manufactures of sailcloth and cordage, with many distilleries and breweries. It is frequented as a sea-bathing place in the summer. Long. 12. 18. E. Lat. 54. 22. N.

RUHNKENIUS, David, a classical critic of great eminence, was born at Stolpen, in Prussian Pomerania, in the year 1723. Of the early part of his studies little is known, but it appears that he was some time at Schlaff, from which he removed to Königsberg, where he met with the celebrated Kant, whose system has so much engaged the attention of Europe. He afterwards repaired to Göttingen to attend the lectures of Gesner, and to enlarge his knowledge of the Greek language. Some time after this period he formed an acquaintance with Ritter and Berger, whilst he resided at Wittemberg, where he continued about two years. His earliest production was a disputation *De Galla Placidia Augusta*, daughter of Theodosius, and the sister of Arcadius and Honorius. Under Berger he studied Roman antiquities and eloquence; under Ritter, jurisprudence and history. He relinquished the study of divinity, for which he was at first designed, and prevailed with his parents to allow him to transfer his residence to Leyden, where he arrived with recommendations to many of the learned. He pursued his studies with avidity and zeal, and accompanied Alberti in his visit to the Spa in the year 1750. Hemsterhuis wished to attach him to Holland, urging him to persevere in the study of the law, as affording an additional chance of employment. This advice he thought proper to follow, and published a translation of some works of Theodorus, Stephanus, and other Greek civilians.

In the year 1755 he went to Paris, where Capperonnier, who was at that time keeper of the king's library, received him kindly. He now formed an acquaintance with Dr Musgrave and Mr Tyrwhitt, who were there for the purpose of examining the manuscripts of Euripides. He had also formed the resolution of going to Spain; but Hemsterhuis recalled him, as he needed his assistance as lecturer in the Greek tongue. In 1755, Ruhnkenius took possession of his office, and read an excellent discourse *De Græcia Artium et Doctrinarum Inventrice*.

About this time he was useful to Ernesti, in his edition of Callimachus; and, in 1761, he succeeded Oudendorp as professor of history and of eloquence, delivering an inaugural oration *De Doctore Umbratico*. About a year after this event, Ruhnkenius was offered the chair of Gesner in the university of Göttingen. This offer he however declined; but, on his recommendation, the office was very worthily bestowed upon Heyne.

In 1764 he married an Italian lady, who, about six years afterwards lost both her speech and sight by a stroke of apoplexy. She had two daughters, one of whom was afterwards blind. The desire of Ruhnkenius to do Ernesti a favour, made him turn his attention to the Memorabilia of Xenophon; and he was led to examine with particular attention the treatise of Longinus on the Sublime. Having risen superior to his domestic misfortunes about the year 1772, he pursued his new edition of Velleius Paterculus, and he prepared a second edition of his *Epistola Critica*, and a collection of *Scholia* on Plato. In the year 1766, he published a valuable tract *De Vita et Scriptis Longini*, in the form of an academical dissertation, to which he prefixed the name of one of his pupils. His Velleius Paterculus appeared in 1779, and in 1780 Homer's reputed hymn to Ceres. In 1786, he published the first part of Apuleius, which had been prepared by Oudendorp, and a new edition of his own Timæus in 1789; and at the same time he collected and published the works of Muretus, in five volumes 8vo.

Both the body and mind of Ruhnkenius were much weakened in consequence of the loss of friends, an attack of the gout, and the misfortunes of the Batavian republic; but he was in some measure relieved by the satisfaction he felt at the dedication of Homer by Wolf, although he was not of that writer's opinion that the works of Homer were written by different authors. He sunk into a kind of stupor on the 14th of May 1798, which in two days put a period to his existence.

His knowledge and learning were unquestionably immense; and he was allowed to be lively, cheerful, and gay, even to an extreme. Many posthumous honours were conferred upon him, and a pension settled on his unfortunate widow. When Whyttenbach took possession of Ruhnkenius's chair, he delivered a discourse on the early age of Ruhnkenius, which he proposed as an example to the Batavian youth who made the belles lettres their study.

RUIB ISLE, a small island in the Eastern Seas, about six leagues from Waygoo, and surrounded by a multitude of smaller islands, with very deep waters between them. Long. 129. 55. E. Lat. 0. N.

RULE, in matters of literature, a maxim, canon, or precept, to be observed in any art or science.

Rule, in a monastic sense, a system of laws or regulations, according to which religious houses are governed, and which the religious make a vow, at their entrance, to observe.

Rules of Court, in *Law*, are certain orders made from time to time in the courts of law, which attorneys are bound to observe, in order to avoid confusion; and both the plaintiff and defendant are at their peril also bound to pay obedience to rules made in court relating to the cause depending between them.

RUM, a species of brandy or vinous spirits, which is distilled from sugar-canes.

Rum, according to Dr Shaw, differs from simple sugar-spirit, in that it contains more of the natural flavour or essential oil of the sugar-cane; a great deal of raw juice and parts of the cane itself being usually fermented in the liquor or solution of which the rum is prepared.

RUMBO, a Malay kingdom, in the peninsula, about sixty miles from the city of Malacca. The sultan and all the principal officers of this state hold their authority immediately from Menangcabow in Sumatra, and have commissions for their respective offices. They have a peculiar dialect, called by the inhabitants of Malacca the language of Menangcabow.

RUMFORD, Count. See Thompson, Sir Benjamin.

RUMINANT, in *Natural History*, is applied to an animal which chews over again what it has eaten before, and which is popularly called chewing the cud.

RUN, a very extensive salt morass in Hindustan, which bounds the western frontier of the province of Gujerat, and communicates with the Gulf of Cutch. It is several hundred miles in length, and exhibits a variety of appearances, being in some places a widely expanded sheet of shallow water, only a few inches deep, and in others an impassable swamp. In some places it is a dry unproductive bank of sand, impregnated with saline particles, adverse to vegetation. Including its windings, it extends over many hundred miles, and sweeps round the north of Cutch. It appears at one time to have been covered with the waters of the ocean.

RUNALA, a town of Hindustan, in the Mahratta territories, and the province of Kandesh, eighty-four miles east from Surat. Long. 74. 30. E. Lat. 21. 17. N.

RUNCIMAN, Alexander, an eminent Scottish painter, was born in Edinburgh in the year 1736. He was the son of an architect, a profession which has a strong affinity to that of painting. The opportunity he thus enjoyed of examining his father's drawings gave him an early propensity to the art in general, which he very soon evinced by making sketches of any remarkable object, either of nature or art, that happened to come in his way. We are unacquainted with the gradual progress of his fertile genius; but it is not to be supposed that he remained long satisfied with the delineations of straight lines, whilst the fascinating beauties of landscape lay open to his inspection. Water that falls over a rugged precipice in the form of cascades, or the foaming surges of the deep when carried like hoar frost with impetuosity into the air, both astonish and delight by their awful grandeur. These objects, and such as these, would naturally fire, at an early period, the genius of Runciman.

He was bound an apprentice to John and Robert Norry in the year 1750, the former of whom was a landscape-painter of very considerable eminence, and by his instructions our young artist made rapid progress. About the year 1755, when only nineteen years of age, he began professionally to paint landscapes; from which it appeared that they were by no means first attempts, as they evinced his ardent application to study before he ventured to appear at the tribunal of the public. Yet although these were excellent, they were nothing more than the dawn of that distinguished eminence to which he afterwards attained. His reputation as a painter of landscape continued to increase during five years; but such was the strength of his genius, and the amazing fertility of his invention, that he could not rest satisfied with eminence in a single department. About the year 1760 he successfully attempted historical painting, in which his mind had more ample scope than in pourtraying the solemn silence of a field, a humble cottage, or a shepherd void of ambition. Six years of his life were devoted to the study and practice of this important branch of the art, notwithstanding his situation was attended with numerous disadvantages. Great, however, as his attainments were in this department, he could never be satisfied with himself till he had studied in Italy those masterly performances which it was his highest ambition to imitate.

He accordingly set out for Italy in the year 1766, when just thirty years of age; and during a residence of five years in that enchanting country, where specimens of his favourite art are met with in all their grandeur and perfection, he continued to copy the best pictures of the ancient masters, in consequence of which his taste was very much corrected and improved. His conceptions were also greatly enlarged by the steady contemplation of so many works of the greatest and most celebrated artists. The art of composition, which it is of the first consequence for an historical painter to understand, was only to be acquired from the study of its principles, as they are exemplified in such highly-finished models; and to these he applied himself with indefatigable industry. He caught the rich yet chaste colouring of the Venetian school with such truth that he was allowed to surpass all his competitors in this valuable quality.

In the year 1771, Runciman returned to his native country in the full possession of such improvements as were to be expected from the opportunities he had enjoyed, and also with a judgment very much matured. It will readily be granted that he had now some claim upon the patronage of his country, and we are happy to add that this was not withheld; for the Board of Trustees, and Sir James Clerk of Pennycuick, were amongst his patrons; and to Mr Robert Alexander in particular, a respectable merchant in Edinburgh, his country was more indebted for fostering his rising genius than to the whole of its nobility.

An academy for the study of drawing and painting was established in Edinburgh by the honourable trustees for the encouragement of the arts in Scotland, of which De la Cour and Pavilon, two French artists of some ability, were successively chosen masters. When Pavilon died in 1771, an application was made to Runciman to take charge of the academy, the laborious and interesting duties of which he discharged much to his own honour and the benefit of his country.

His masterly work in the hall of Ossian at Pennycuick, the seat of his patron Sir James Clerk, was projected and begun by him soon after his return to Edinburgh. The next performance of Runciman was the picture of the Ascension, painted on the ceiling above the altar of the episcopal chapel, Cowgate, Edinburgh.

The fire and the feeling displayed in his King Lear were conceived and executed in a manner not inferior to those of Shakspeare; and the Andromeda, from which Legat took his highly-finished engraving, will bear a comparison, in colouring, with the works of Titian or Correggio. He appears to have regarded his own historical work of Agrippina landing the ashes of Germanicus her husband, as a capital performance, in the execution of which he had bestowed more than ordinary pains.

Whilst his health permitted, which the painting of the hall of Ossian had much impaired, he continued to superintend the business of the academy, and devoted his leisure hours to the drawing of historical pieces. He enjoyed a competency from his office as teacher, which, with the emoluments arising from his other works, made him independent.

Runciman as a man was possessed of great candour and simplicity of manners, having a happy talent for conversation, which made some of the most distinguished literary characters, such as Hume, Robertson, Kames, and Monboddo, extremely fond of his company; but his genuine worth, and his real goodness of heart, were only fully known to his most intimate friends. He could communicate information with great facility, and gave his best advice to young artists, with a view to facilitate the progress of their improvement.

As a painter, his character has been elegantly drawn by a brother artist, Mr John Brown, who was better qualified than most men to make a proper estimate of his merits. "Mr Runciman was an artist by nature, eminently qualified to excel in all those nobler parts of the art, the attainment of which depends upon the possession of the highest powers of the mind. Though for a long period of years labouring under every possible disadvantage, he completed works which, upon the whole, are equal to the best of those of his contemporaries, and in some respects it may be boldly asserted that they are superior. His fancy was fertile, his discernment of character keen, his taste truly elegant, and his conceptions always great. Though his genius seems to be best suited to the grand and serious, yet many of his works amply prove that he could move with equal success in the less elevated line of the gay and pleasing. His chief excellence was composition, the noblest part of the art, in which it is doubted whether he had any living superior. With regard to the truth, the harmony, the richness, and the gravity of colouring; in that style, in short, which is the peculiar characteristic of the ancient Venetian, and the direct contrast to the modern English school, he was unrivalled. His works, it must be granted, like all those of the present times, were far from being perfect; but it was Mr Runciman's peculiar misfortune, that his defects were of such a nature as to be obvious to the most unskilful." The fine arts and his friends were deprived of this distinguished painter on the 21st of October 1785.

RUNGPOOR, a town and district of Hindustan, in the north-eastern extremity of Bengal, situated about the twentieth degree of north latitude. The district is bounded on the north by the Bootan Hills, on the south by Mymunsing, on the east by the Brahmapootra, and on the west by Dinagepore. The river Durlah separates it from Couch Bahar. It is an open country, level, and well watered and productive. It yields in abundance silk, rice, indigo, hemp, and tobacco. Some parts of it are equal in fertility to any part of Bengal; but, on the whole, it is not so well cultivated or so populous as the other parts of this province. Besides the Brahmapootra, the principal rivers are the Teestah and the Durlah; and the chief towns Rungpoor, Mungulhaut, and Guzgotta. The tobacco grown here is mostly consumed in the southern and eastern districts of Bengal. The glandular swellings of the throat are very prevalent amongst the inhabitants, although parts of the district are a hundred miles distant from the Alpine region. This district was taken possession of by the Mahommedans early in the thirteenth century, and was always governed by a military collector. It was at first partially wrested from the rajah of Couch Bahar, when it was formed into a circar, and was finally conquered by the generals of Aurungzebe. It is now under a British establishment of a judge, collector, &c. The result of some queries by the Marquis of Wellesley in 1801 gave a population of 400,000. Rungpoor, the capital, is situated on the eastern bank of the Goggot river. It is a regularly-built town, and carries on a considerable trade with Bootan, Assam, and Calcutta. Long. 89. 5. E. Lat. 25. 47. N.

RUNGPORE, an extensive fortress of Hindustan, which is sometimes, but erroneously, called the capital of Assam. Gergong is the real capital, of which Rungpore is only the fort. It is situated on an island, and can only be approached by a bridge, which was built centuries ago, and remains a monument of the abilities of the Bengal artificers who were employed to construct it. Long. 94. 40. E. Lat. 26. 35. N.

RUNIC, a term applied to the language and letters of the ancient Goths, Danes, and other northern nations. See SCOTLAND.

RUNNER, in nautical language, a rope belonging to the garnet and the two bolt-tackles. It is received in a single block joined to the end of a pendant; it has at one end a hook to hitch into any thing, and at the other a double block, into which is reeved the fall of the tackle, or the garnet, by which means it purchases more than the tackle would without it.

RUNNET, or RENNET, is the concreted milk found in the stomachs of sucking quadrupeds, which have as yet received no other nourishment than their mother's milk. In ruminating animals, which have several stomachs, it is generally found in the last, though sometimes in the next to it. If the runnet is dried in the sun, and then kept close, it may be preserved in perfection for years. Not only the runnet itself, but also the stomach in which it is found, curdles milk without any previous preparation. But the common method is, to take the inner membrane of a calf's stomach, to clean it well, to salt and hang it up in brown paper. When this is used the salt is washed off, then it is maccrated in a little water during the night, and in the morning the infusion is poured into the milk to curdle it.

RUPEE, a silver coin current in the East Indies, equal to about two shillings and sixpence sterling.

RUPERT, Prince palatine of the Rhine, son of Frederick prince elector palatine of the Rhine, and Elizabeth daughter of James I. of England, was born in 1619. He gave proofs of his bravery at the age of thirteen; and in 1642 came over into England, and offered his service to Charles I. his uncle, who gave him a command in his army. At Edgehill he charged with incredible bravery, and made a very great slaughter of the parliamentarians. In 1643 he seized the town of Cirencester, obliged the governor of Lichfield to surrender, and having joined his brother Prince Maurice, reduced Bristol in three days, and passed to the relief of Newark. In 1644 he marched to relieve York, where he gave the parliamentarians battle, and entirely defeated their right wing; but Cromwell charged the Marquis of Newcastle with such an irresistible force, that Prince Rupert was entirely defeated. After this the prince put himself into Bristol, which surrendered to Fairfax after a gallant resistance. The king was so enraged at the loss of this city, so contrary to his expectation, that he recalled all Prince Rupert's commissions, and sent him a pass to go out of the kingdom. In 1648 he went to France, where he was highly complimented by that court, and kindly received by Charles II. who for the time sojourned there. Afterwards he was constituted admiral of the king's navy; attacked the Dutch ships, many of which he took; and having engaged with De Ruyter, obliged him to fly. He died in 1682, and was interred with great magnificence in Henry VII.'s chapel, Westminster. Mr Grainger observes, that he possessed in a high degree that kind of courage which is better in an attack than a defence, and is less adapted to the land-service than that of the sea, where precipitate valour is in its element. He seldom engaged but he gained the advantage, which, however, he generally lost by pursuing it too far. He was better qualified to storm a citadel, or even to mount a breach, than patiently to sustain a siege, and would have furnished an excellent hand to a general of a cooler head.

This prince is celebrated for the invention of prints in mezzotinto, of which he is said to have taken the hint from a soldier's scraping his rusty fusil. The first print of this kind ever published was done by his highness, and may be seen in the first edition of Evelyn's *Sculptra*. The secret is said to have been soon afterwards discovered by Sherwin, an engraver, who made use of a loaded file for laying the ground. The prince, upon seeing one of his prints, suspected that his servant had lent him his tool, which was a channelled roller; but upon receiving full satisfaction to the contrary, he made him a present of it. The roller was afterwards laid aside; and an instrument with a crenelled edge, shaped like a shoemaker's cutting knife, was used instead of it. He also invented a metal called by his name, in which guns were cast; and contrived an excellent method of boring them, for which purpose a water-mill was erected at Hackney-marsh, to the great detriment of the undertaker, the secret dying with the inventor.

RUPERT's Drops, a sort of glass drops with long and slender tails, which burst to pieces on the breaking off those tails in any part. They are said to have been invented by Prince Rupert, and are therefore called by his name.

RUPNAGUR, a town of Hindustan, in the province of Ajmeer, belonging to Dowlet Row Scindia. It is thirteen miles north-east from the city of Ajmeer. Long 74. 58. E. Lat. 26. 43. N.

RUPPIN, a city of Prussia, the capital of a circle of the same name, in the government of Potsdam, which extends over 725 square miles, and comprehends five cities, 97 villages, 84 hamlets, and 54,600 inhabitants. The city is situated on the lake Rhin, whence, by sluices, a stream is carried through it. Although ancient, it is well built, and was formerly fortified. It contains two churches, a gymnasium with six professors, 800 houses, and about 6400 inhabitants. By the lake and a canal which joins the river Havel, the trade is extended to the Elbe. The occupations of the citizens chiefly consist in making woollen goods of various kinds, tanning leather, brewing beer, and distilling corn-spirits. Near to it there is much tobacco cultivated. Long. 22. 48. 47. E. Lat. 52. 55. 59. N.

RUSCIUD, a small river of Persia, which falls into the Persian Gulf, forty-eight miles west of Ormus.

RUSCSUK, or Rusdschuk, a city of Turkey in Europe, and of the district of Silistria. It is situated on the river Danube, at the point where the Kara Lom falls into that great stream. It is fortified, and has extensive suburbs, a fortress, nine mosques, several Greek and Armenian churches, some Jewish synagogues, and a great number of baths. It has 6000 houses, and is supposed to contain 30,000 inhabitants, who make linen, woollen, cotton, and silk goods, and carry on extensive trade by the river. Lat. 43. 51. 3. N.

RUSH, Benjamin, a celebrated American physician, born on the 5th of January 1745, near Bristol, in Pennsylvania, was descended from a family who were originally Quakers, and who had accompanied Penn, in 1683, to his infant colony.

He lost his father at an early age, and having been first placed by his mother at a school kept by the Rev. S. Finley, he proceeded to finish his classical education at the college of Princeton, and there took a degree of bachelor of arts before he was sixteen. He then determined to make the profession of physic the pursuit of his life, and went to study it, first under the care of Dr Redman of Philadelphia, and then at Edinburgh, where he was created a doctor of physic in 1768. At the time of his return from Europe, a new school of medicine was about to be founded in Philadelphia, and he became professor of chemistry immediately upon his arrival. In 1776, he began to take an active part, with the rest of his countrymen, in the political struggle of the day, and he was chosen a member of congress for the state of Pennsylvania; in 1777 he was appointed surgeon-general to the army, and not long afterwards became physician-general. He also contributed his best efforts to the improvement of the internal government of the state which he represented. But he soon withdrew his attention from political affairs, in order to devote it exclusively to medical and literary subjects; and he continued to be actively engaged in the practice of physic for the remainder of his life.

In 1776 he married Miss Julia Stockton of New Jersey. He had by her thirteen children, nine of whom survived him in respectability and prosperity. In 1791, when the two medical colleges of Philadelphia were incorporated into a single university, he was appointed professor of the institutes of medicine, and of clinical practice. In 1793, he greatly distinguished himself by the new and apparently successful modes of practice that he introduced in the epidemic yellow fever, which was then causing great mortality throughout the United States; and which, shortly before his death, he was induced to believe not contagious, but derived from some general causes independently of the previous existence of the disease. He died on the 13th of April 1813, after an illness of five days, of a typhus fever, with some pulmonary symptoms. He had for a considerable part of his life been threatened with consumption, but had combated its attacks with unusual success. The number of his writings is considerable in proportion to their bulk; the times and the state of society in which he lived being such as to produce rather hasty and spirited than highly finished compositions.

1. His inaugural dissertation was entitled *De Concoctione ciborum in ventriculo*, and contained an explanation of the opinions relating to digestion, which he had learned from Dr Cullen. Edinburgh, 1768.

2. Account of the Effects of the Stramonium. American Phil. Trans. i. 1770.

3. On the utility of Wort in ill-conditioned Ulcers. Med. Obs. Inq. iv. 1770; addressed to Dr Huck.

4. Inquiry into the Natural History of Medicine amongst the Indians of North America; an anniversary oration delivered in 1774.

5. Remarks on Bilious Fevers, addressed to Dr Huck. Med. Obs. Inq. v.

6. Account of the Influence of the Revolution on the Human Body; with Observations on the Diseases of Military Hospitals.

7. Inquiry into the Cause of the Increase of Bilious and Intermitting Fevers in Pennsylvania. American Trans. ii.

8. Observations on Tetanus.

9. Inquiry into the Influence of Physical Causes upon the Moral Faculty.

10. Remarks on the Effects of Ardent Spirits upon the Body and Mind.

11. Inquiry into the Causes and Cure of Pulmonary Consumption, in his Medical Inquiries and Observations, i. Phil. 1788. His grand object, in the cure of consumption, is to recommend exercise, and every thing which will enable the patient to take exercise; anticipating a practice which has become somewhat fashionable in England of late years, from its frequent success as a temporary palliative. The subject is continued in the second volume of the Inquiries, published in 1793; and bleeding is very strongly recommended in the earlier and only curable stages. Consumption, he observes, is common in America, though scrofula scarcely ever occurs; and it has sometimes been known to be clearly communicated by infection to the negroes belonging to a family, who had, of course, no consanguinity that could account for a similarity of constitution. Five volumes, in the whole, of this collection, appeared from 1788 to 1798; a second edition was published in 1804, in four volumes 8vo; a third in 1805, revised and enlarged, with a continuation of the Histories of the Yellow Fever from 1793 to 1809; a Defence of Bloodletting as a Remedy for Certain Diseases; A View of the State of Medicine in Philadelphia; An Inquiry into the Sources of the Usual Forms of Summer and Autumnal Diseases in the United States; and the recantation of his opinion of the contagious nature of the yellow fever, already mentioned.

12. Information to Europeans disposed to Emigrate to the United States, in a Letter to a Friend.

13. Observations on the Population of Pennsylvania.

14. Observations on Tobacco.

15. A New Mode of Inoculating Small-Pox, a Lecture. Reprinted, Phil. 1792, 8vo.

16. Essay on the Study of the Latin and Greek Languages, American Museum; condemning it as a waste of time, oppressive to the poor dunces who are tortured into their parts of speech, to the great scandal of a humane and republican country, and subversive of a proper respect for the rights of boys, and, consequently, for the rights of man.

17. Essays, Literary, Moral, and Philosophical, 1798, 8vo, containing a republication of the last article, together with the author's Eulogiums on Dr Cullen and on Professor Rittenhouse, delivered in 1790 and 1796, and with some other miscellaneous papers of less moment. 1806.

18. Lectures on the Cause of Animal Life, 1791.

19. Account of the Sugar Maple Tree. American Trans. iii. 1791.

20. Observations on the Black Colour of the Negro, American Trans. iv. 1792; attributing the blackness to leprosy.

21. History of the Yellow Fever, 1794. This celebrated work has been translated into French and Spanish. At the time of its publication, an almost superstitious dread was entertained by medical men of the use of the lancet in idiopathic fever; and few books have ever had so powerful and extensive an effect in altering the general treatment of a disease as this history had produced in every part of the world. Probably, indeed, it may have carried a number of the younger and bolder practitioners into an opposite extreme; but, with respect to the author's claims

to merit on the occasion, it must be allowed that the innovation showed an uncommon combination of courage with talent and good sense; and the accurate description of the disease that he has given us fully establishes his claim to the character of an accurate nosologist.

22. On the Symptoms and Cure of Dropsy, and especially of Water in the Head. 1793.

23. An Account of the Influenza of Philadelphia in 1789, 1790, 1791.

24. Observations on the State of the Body and Mind in Old Age. 1794.

25. Observations on the Nature and Cure of Gout and Hydrophobia. 1797.

26. Inquiry into the Cause and Cure of the Cholera Infantum. 1797.

27. Observations on Cynanche Trachealis. 1797.

28. Introductory Lectures. 1801. Ed. 2, 1811; with ten new introductory lectures, and two lectures on the Pleasures of the Senses and of the Mind.

29. In 1809 he published the works of Sydenham and of Cleghorn, with Notes, and in 1810 those of Pringle and Hilary.

30. On Diseases of the Mind, 8vo, 1812; an elaborate work, which had long been impatiently expected.

31. A letter on Hydrophobia, 1813; addressed to Dr Hosack, and containing additional reasons for believing the seat of the disease to be chiefly in the blood-vessels; an opinion which, in all probability, has at least tended to shorten the sufferings of several individuals on whom the experiment of profuse depletion has been tried.

Dr Rush's numerous publications obtained him many marks of respect from his contemporaries, and procured him admission, as an honorary member, into the most distinguished literary and philosophical societies of Europe. His name was familiar to the medical world as the Sydenham of America. His accurate observations and correct discrimination of epidemic diseases well entitled him to this distinction; while, in the original energy of his reasoning, he far excelled his prototype. His literary and professional character, indeed, appears to have been greatly influenced by the moral and political sentiments which were prevalent in his day. A love of innovation led him to that proud defiance of established authority which is just as likely to be pernicious as to be salutary. The study of the learned languages he depreciated, in one of his early essays, as unfit for a republican education; and this was the first step to the true Jacobin doctrine, that it was unrepublican and aristocratical to have received any education whatever. In physic, his rejection of the prejudices of antiquity was somewhat more consistent with moderation, and the reform that he attempted was occasionally more successful than his literary speculations; nor can it be denied that there are a multitude of original suggestions in his works, which may very probably be found capable of affording valuable hints to the lovers of medical experiments.

Hosack and Francis in the *American Med. Philos. Register;* Chalmers's *Biographical Dictionary,* XXV. London, 1816, 8vo. (L. L.)

RUSHWORTH, John, the compiler of some very useful historical collections, was born in Northumberland about the year 1607, being descended of honourable ancestors. After attending the university of Oxford for some time, he removed to Lincoln's Inn; but the study of the law not suiting his genius, he soon deserted it, in order to seek a situation where he might more easily gratify his love for political information. He frequently attended the meetings of parliament, and wrote down the speeches both of the king and members. During the space of eleven years from 1630 to 1640, when no parliament was held, he was an attentive observer of the great transactions of state in the star-chamber, the court of honour, and exchequer chamber, when all the judges of England assembled there on cases of great emergency. Nor did he neglect to observe with a watchful eye those events which happened at a distance from the capital. He visited the camp at Berwick, and was present at the battle of Newborn, at the treaty of Ripon, and at the great council of York.

In 1640 he was appointed assistant to Henry Elsynge, clerk to the House of Commons, and thus had the best opportunities of being acquainted with their debates and proceedings. The Commons considered him as a person worthy of confidence; and, in particular, they trusted him with carrying their messages to the king whilst he remained at York. And when the parliament created Sir Thomas Fairfax their general, Rushworth was appointed his secretary, and discharged the office much to the advantage of his master. When Fairfax resigned his commission, his secretary returned to Lincoln's Inn, and was soon afterwards (in 1651–52) chosen one of the committee that was appointed to deliberate concerning the propriety and means of altering or new-modelling the common law. He was elected one of the representatives for Berwick-upon-Tweed to the parliament which Richard Cromwell assembled in 1658, and was re-elected by the same town to the parliament which restored Charles II. to the crown.

After the Restoration, he delivered to the king several books of the privy-council, which he had preserved in his own possession during the commotions which then agitated the country. Sir Orlando Bridgeman, keeper of the great seal, chose him his secretary in the year 1677, an office which he enjoyed as long as Sir Orlando kept the seals. In 1678 he was a third time chosen member for Berwick, and a fourth time in the ensuing parliament in 1679. He was also a member of the parliament which was convened at Oxford. The different offices he had held afforded him favourable opportunities of acquiring a fortune, or at least an independence; yet, whether from negligence or prodigality, he was never possessed of wealth. Having run himself into debt, he was arrested and committed to the King's Bench prison, Southwark, where he lingered for the last six years of his life in the most deplorable condition. His memory and judgment were much impaired, partly by age and partly by the too frequent use of spirituous liquors. He died on the 12th of May 1690.

His Historical Collections of private Passages in State, weighty Matters in Law, and remarkable Proceedings in Parliament, were published in folio at different times. The first part, comprehending the years between 1618 and 1629, appeared in 1659. The copy had been intrusted by Oliver Cromwell to Whitelock, with instructions to peruse and examine it. Upon perusing it, he thought it necessary to make some alterations and additions. The second part was published in 1680; the third in 1692; the fourth and last, which comes down to the year 1648, was published in 1701; and altogether they made seven volumes. These underwent a second edition in 1721; and the trial of the Earl of Strafford was added, which made the eighth. This work has been much applauded by those who condemn the conduct of Charles I., and accused of partiality by those who favour the cause of that unhappy monarch. One person in particular, Dr John Nelson of Cambridge, in a Collection of the Affairs of State, published by the command of Charles II., undertook to prove that Rushworth has concealed truth, endeavoured to vindicate the prevailing detractions of the times, as well as their barbarous actions, and with a kind of rebound to libel the government at second hand. But this accusation seems to be carried too far. His principles indeed led him to show the king and his adherents in an unfavourable light, and to vindicate the proceedings of parliament; yet it cannot justly be affirmed that he has misrepresented or falsified any of the speeches or facts which he has admitted into his collection.

RUSS, a small island in the Eastern Seas, near the west coast of Nassau. Long. 99. 48. E. Lat. 2. 53. S.

RUSSELL, William, a very popular historian, the eldest son of Alexander Russell and Christian Ballantyne, was born in the year 1741 at Windydoors, a farm-house in the parish of Stowe and county of Selkirk. Most of the parish is within the limits of the county of Edinburgh. At an early age he was sent to school in the neighbouring village of Inverleithen, well known as a delightful place of summer resort. Here he acquired an elementary knowledge of the Greek and Latin languages; and private study afterwards enabled him to supply many of the deficiencies of his early education. In 1756 he was removed to Edinburgh, in order to be instructed in writing and arithmetic; and after having attended to these branches for about ten months, he was bound an apprentice to the bookselling and printing business for the term of five years. While engaged in this occupation, he discovered the utmost ardour in literary pursuits; nor was his situation unfavourable to the acquisition of useful and elegant knowledge.

After the completion of his apprenticeship, he published a select collection of modern poems, which was favourably received. The first edition we have not seen; the second bears the subsequent title: "The select Poems of our most celebrated contemporary British Poets: viz. Dr Akenside, Mr Gray, Mr Mason, W. Shenstone, Esq. Mr W. Collins, Lord Lyttelton, Mess. Wartons, Mr Blacklock, Mr Beattie, Mr Ogilvie, *etc.* Vol. I. Second edition, with additions." Edinb. 1764, 12mo. He afterwards congratulated himself on having contributed to extend the popularity of Gray and Shenstone in the northern part of the kingdom. It may be mentioned as a proof of his classical taste, that at this early period of life he entertained the highest admiration for the sublime odes of Gray, which he was accustomed to recite in a wild and enthusiastic manner. In the year 1763, while employed as a journeyman printer, he became a member of a literary association, denominated the Miscellaneous Society, which was composed of students and other young men anxious to exercise their talents and to improve their taste. This juvenile society included other individuals who afterwards rose to distinction. Among these we find Sir Robert Liston, who was employed in several important embassies, and Mr Dalzel, who became professor of Greek in this university.

About the same period he made an attempt to adapt Crebillon's *Rhadamisthe et Zénobie* to the English stage. The manuscript was submitted to the inspection of his two friends Liston and Dalzel; who, after a very careful perusal, stated not a few objections to particular passages, though they do not appear to have condemned the entire performance. This tragedy was at length offered to Garrick: but Murphy's Zenobia was at that time in rehearsal; and if the merit of Russell's play had been more conspicuous, it probably would not have been accepted. In 1764, he issued proposals for publishing a second volume of his collection of poems, which however did not make its appearance. With the view of arranging his materials, he now retired to the country, and about this period of his life he maintained an epistolary correspondence with Lord Elibank, Dr Ogilvie, and Mr Dalzel, by all of whom he seems to have been regarded as a young man of promising talents. In the course of the ensuing year, Lord Elibank, who was himself a man of literature, invited him to his seat in the county of Haddington, where he spent the greater part of the autumn, and had an opportunity of conversing with many distinguished individuals. To this nobleman he seems to have looked for favour and protection. The hope of obtaining preferment through his influence, had induced him to relinquish his original employment; and in the mean time he continued to prosecute his studies, particularly in the departments of history and polite literature.

Having resided with his father till the month of May 1767, he proceeded to London in quest of honour and emolument. But his high hopes were speedily blasted; and after having in vain waited for advancement through the influence of Mr Hume, Lord Elibank, General Murray, and Governor Johnstone, he was under the necessity of contracting his views, and engaging himself as a corrector of the press in the great office of William Strahan, afterwards printer to his majesty. To find himself thus placed in a situation so inadequate to his expectations, must have cast a temporary gloom over his mind; but the freshness of youth, added to the natural vivacity of his mind, would have enabled him to support even greater disappointments. In some brief notices found among his papers after his death, he mentions his expectations of preferment through the interest of these individuals; but he does not aver that his hopes were founded on their promises. The disappointments of human life may very frequently be traced to the unreasonableness of our expectations.

In the year 1769 he quitted the employment of Mr Strahan, and was engaged as overseer of the printing office of Brown and Adlard. During the same year he published an "Ode to Fortitude," which was immediately reprinted at Edinburgh by his former masters, Martin and Wotherspoon. His "Sentimental Tales" appeared in 1770; and from this time he contributed to the periodical publications many essays in prose as well as verse. In 1772 he published a collection of "Fables, Moral and Sentimental," and "An Essay on the Character, Manners, and Genius of Women, from the French of M. Thomas." In 1774 he produced an octavo volume under the title of "Julia, a Poetical Romance." Of this work, which is founded on the *Nouvelle Heloise* of Rousseau, neither the plan nor the execution can be commended. In the estimate of his literary character Russell dissented from the public opinion: his historical works, which have met with a very favourable reception, he considered as greatly inferior to his poetical works, which have been totally neglected. But his friends certainly had no reason to regret that the collective edition of his poems, which he long meditated, never made its appearance. On the death of Hume he produced an elegy which occasioned a sarcastic effusion from another poet. Mickle, who abhorred the scepticism of Hume, and who believed himself to have been materially injured by Smith, concludes his verses with this stanza:

For him shall Russell rant and rave
In hobbling rumbling lays;
And Smith in barbarous sleepy prose
Shall grunt and croak his praise.

Russell is the author of the verses on the death of Dr Armstrong, subscribed W. R. and dated from Gray's Inn, Sept. 10, 1779, which are commonly printed with the poems of that classical writer. Before this period he had apparently relinquished his connexion with the printing-office, and had entirely devoted himself to the pursuits of literature. His "History of America," published in numbers, was completed in the course of the same year. This work was received with some degree of favour; but the splendid merit of Dr Robertson's history precluded all competition. During the same year, 1779, he likewise published, in octavo, the first two volumes of "The History of Modern Europe; with an account of the Decline and Fall of the Roman Empire, and a View of the Progress of Society from the fifth to the eighteenth century. In a Series of Letters from a Nobleman to his Son." Their reception was so favourable as to exceed his most sanguine expectations. His studies experienced a temporary interruption in 1780, when he embarked for Jamaica in order to recover some money, due to him as the heir of his brother James, who, after a residence of several years, had died in that island. He after-

Russell.

wards resumed his historical labours, which were occasionally interrupted by his love of poetry. In the year 1783 he published "The Tragic Muse," a poem addressed to Mrs Siddons. To address verses to a player has been considered as beneath the dignity of the literary character. It would be a crime, said a periodical writer, to sacrifice genius on such an uninteresting occasion: we have more dignified subjects for the poetic Muse than an individual whose excellence is only a dazzling meteor, and must be forgotten in a few years at most. Players have sometimes been extravagantly extolled, particularly by grateful or aspiring poets who have written for the stage, and it will doubtless be granted that a poet may easily find a more dignified theme: but supreme excellence in any ingenious art seems to be no improper subject of panegyric; and so rare and difficult are the fleeting attainments of a great actor, that it may be considered as a generous exertion of poetic talent to rescue them from oblivion.

The three volumes which completed the History of Modern Europe made their appearance in 1784. From the manuscript notices to which we have already referred, it appears that in the composition of each of these five volumes he spent about twelve months. This work, which is the chief foundation of his reputation, possesses great merit as a popular view of a very extensive period of history. The author displays no inconsiderable judgment in the selection of his leading incidents, and in the general arrangement of his materials; and he seems to have studied the philosophy of history with assiduity and success. His narrative is always free from languor; and his reflections are conveyed in a lively and elegant style. It is however to be regretted that he should have adopted the useless expedient of exhibiting his work as a series of letters from a nobleman to his son: every reader is sufficiently aware that Dr Russell did not belong to the order of nobility; and the frequent recurrence of "my dear Philip," is too apt to remind us of Lord Chesterfield. This work has very often been reprinted, and it still continues to maintain its original popularity. Russell closes his history with the peace of Paris in 1763. A continuation, extending to two volumes, was added by the late Dr Coote; and another writer has continued the narrative to the death of William the Fourth.

In the year 1787 he married Isabella Scott, a lady of Eskdale, to whom he had long been attached, and in whom he found a pleasant and intelligent companion. He now entered upon the occupation of a comfortable farm at Knottyholm, in the parish of Canonby and county of Dumfries. He fixed his residence in an elegant cottage, delightfully placed on the brink of the Esk, and at the distance of about five miles from the town of Langholm. This may well be described as "a land of brooks of water, of fountains and depths that spring out of valleys and hills." A more beautiful tract of pastoral country than that which extends for about twelve miles along the banks of the river, it would not perhaps be very easy to mention. Here he spent the remainder of his days. In this neighbourhood there were several intelligent individuals, with whom he lived in habits of intimacy. Of these the most conspicuous was the late Mr Maxwell, who was eminently distinguished for his scientific skill in music.[1]

He had now acquired the reputation of a very popular historian; and in 1792 the university of St Andrews conferred upon him the degree of LL. D. Academical honours have sometimes been more unworthily bestowed. The very favourable reception of his last publication had induced him to retrace his steps; and during the following year he published at London, in two volumes octavo, "The History of Ancient Europe; with a View of the Revolutions in Asia and Africa. In a Series of Letters to a young Nobleman." In the composition of this work, he professes to have been peculiarly studious to found his facts on original authorities, and to clear the narrative of unimportant events. He seems however to have allotted too many of his pages to the poetical details of the Trojan war. This production partakes of the peculiar merits of his modern history; but as the author did not live to complete his design, it never attained to the same popularity. Of these two volumes, the greater proportion relates to the history of Greece; and the same ground has recently been trodden by Dr Gillies and Mr Mitford. Dr Coote, having afterwards been induced to supply what he had left deficient, published "The History of Ancient Europe; in a Series of Letters from a Gentleman to his Son: intended as an accompaniment to Dr Russell's History of Modern Europe." Lond. 1815, 3 vols. 8vo.

Dr Russell did not long survive the publication of his last work. A stroke of palsy suddenly terminated his life, on the 25th of December 1793, after he had completed the fifty-second year of his age. His remains were interred in Westerkirk churchyard, where a plain mural stone distinguishes his grave. He left a widow, who died a few years ago, and an only child, a daughter, who still survives, and continues to reside at Knottyholm.

He had engaged in various projects which he did not live to execute. Besides two complete tragedies, entitled Zenobia and Pyrrhus, he left in manuscript "An Analysis of Bryant's Ancient Mythology," and the following unfinished productions. 1. The Earl of Strafford, a tragedy. 2. Modern Life, a comedy. 3. The Love-Marriage, an opera. 4. Human Happiness, a poem, intended to have been completed in four books. 5. An Historical and Philosophical View of the Progress of Mankind in the Knowledge of the Terraqueous Globe. 6. The History of Modern Europe, part iii. from the peace of Paris in 1763, to the general pacification in 1783, including an Account of the American War, and of the European Transactions in the East Indies. In a Series of Letters from a Nobleman to his Son. 7. The History of England from the beginning of the reign of George III. to the conclusion of the American War. In the composition of the last of these works Dr Russell was engaged at the close of his life. It was to be comprised in three volumes octavo; for the copyright of which Mr Cadell had stipulated to pay him seven hundred and fifty pounds. (x.)

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[1] John Maxwell, Esq. of Broomholm was born in the year 1726. In July 1754 he succeeded to an estate which has now belonged to the family for more than two centuries. His father was William Maxwell, his mother was a daughter of Scott of Wool in Selkirkshire. By his wife, Wilhelmina Malcolm, he had nine sons, of whom only one now survives. Her father was minister of Ewes, and the grandfather of the late Sir John Malcolm. Mr Maxwell was for many years a justice of the peace and a deputy lieutenant of the county of Dumfries. He was a remarkably handsome man, about six feet high, and possessing a pleasing address. Broomholm, two miles from Langholm, and three from Dr Russell's place of residence, stands in a delightful valley near the junction of the Esk and Tarras, and is surrounded by extensive and lofty woods. He published, but without his name, "An Essay upon Tune; being an Attempt to free the Scale of Music, and the Tune of Instruments, from Imperfection." Edinb. 1781, 8vo. Pp. 290. The ingenious author died in the month of March 1806, at the age of seventy-nine years and ten months. He had a brother named Walter, and a sister named Mary. She was the wife of Mr John Little of Langholm, and the mother of the late Colonel Little, so highly distinguished in the wars of India.

RUSSIA.

History.

Origin of the Russian empire.

About the fifth century, a horde of those nations that roved at large on the banks of the Dnieper and the Volkhof, established themselves in that part of the region bordering on the Dnieper, where is now situated the government of Kief or Kiow. These people were called Slavi, or Slavonians, and had advanced eastward from the shores of the Danube. They appear to have laid the first foundation of the Russian monarchy, and to have built Kief, where they fixed their capital. It is probable that about the same time another tribe of Slavi had settled still farther to the east, in the province of Novgorod, where they built the city still known by that name, as their metropolis. Of the government and transactions of these people we have no regular accounts till the conclusion of the ninth century. It appears, however, from a work of the Emperor Constantine Porphyrogenneta on the administration of the empire, that in his time the city of Novgorod was a place of great importance, and carried on an extensive commerce, both with Constantinople and the countries bordering on the Baltic. The government of the Novgorodians appears to have been republican, but the people were probably rather merchants than warriors. We find them involved in frequent disputes with the neighbouring nations, from whose ravages they suffered considerable losses.

Settlement of the Varagians in Russia.

If we may credit the Russian historians, the Slavi that had settled about Kief and Novgorod must have extended the boundaries of their territory northwards as far as the shores of the Baltic. We find that they were much harassed by a piratical nation who dwelt on the coasts of that sea, and were denominated Varages or Varagians, and who made frequent descents on the Russian coasts, and ravaged the country. It is not improbable that these Varagians formed a part of the Scandinavian nations who, under the names of Danes and Saxons, successively made themselves masters of England. They were occasionally employed by the weaker neighbouring states as mercenary auxiliaries, and in this capacity they were once called to the assistance of the Novgorodians. The auxiliaries, after having overcome the enemies whom they were invited to combat, began to think of availing themselves of the advantages which their bravery had given them over their employers. From allies and servants they soon became the masters of the Slavi; and finding the country about Novgorod superior to that which they had left, they resolved to take up their residence in their new quarters.

An. 860. Establishment of the monarchy under Ruric.

Their leader Ruric built, near the Volkhof, a town whose site is now called Old Ladoga. Here he established the seat of his government. The event appears to have taken place about the year 860; and from this period we may date the commencement of the Russian monarchy. Ruric was assisted by two other chiefs of the Varages, Sinaus and Truvor, who are supposed to have been his brothers, and with whom he divided the territory of which he had possessed himself. Of these, Sinaus took up his residence at Bielo Osero, or the White Lake; while Truvor kept his court at Isborsk, or, according to some, at Twertzog, in the district of Pleskow. The three chiefs having thus divided among them the territories of the Novgorodians, continued to reign in amity with each other for several years.

Opposition of the Slavi.

The Slavi, however, did not immediately submit to the dominion of their new masters. They flew to arms, and chose for their leader Vadim, who by his feats in war had acquired the honourable appellation of the *valiant.* A fierce engagement took place between the Novgorodians and the Varages, which ended in favour of the latter, and the brave Vadim, with several other chiefs of the Novgorodians, lost their lives in the attempt to free their country from its ambitious guests. This new success emboldened Ruric to extend his territories, and to change the seat of government from the insignificant town of Ladoga, to the spacious and opulent city of Novgorod. Soon after, by the death of his partners in sovereignty, he became sole monarch of the conquered territory, where he reigned without further molestation for seventeen years, and became the primogenitor of a long line of descendants, who held the throne without interruption for several centuries. He appears to have been zealous for the strict administration of justice in his dominions, and issued his command to all the boyars, or nobles, who held territories under him, in order to see it exercised in an exact and uniform manner. Ruric assumed the title of grand prince. His dominions extended over the present governments of Riga, Revel, Polotsk, Pscov, Vyborg, St Petersburg, Novgorod, Smolensk, Olonetz, Archangel, Vladimir, Yaroslavl, Kostroma, and Vologda.

An. 879. Regency of Oleg.

As Ruric left only one son, Igor, who was still a minor at his father's death, Oleg, a kinsman of the deceased monarch, took upon him the administration of affairs. Either from the natural restlessness of the Varages, or from the spirit of rebellion manifested by the Novgorodians, which indicated the necessity of employing his people on some active enterprise, the new ruler did not long remain idle. He appears very early to have projected the extension of his territories, by annexing to them the settlement which the Slavi had formed about Kief, against which he soon undertook a formidable expedition. Collecting a numerous army, composed of Slavi, Varages, and Tschudes (a Finnish tribe dwelling in districts embraced in the modern governments of Pscov and Revel), he carried with him the young prince Igor, and opened the campaign with the capture of Lubitch, and of Smolensk the capital of the Krivitsches.

Annexation of Kief to the Russian principality.

Having advanced near the walls of Kief, he did not think it advisable to hazard an open attack. He therefore had recourse to artifice, and leaving behind him the greater part of his troops, he concealed the remainder in the barks that had brought them down the Dnieper from Smolensk. He himself, disguising his name and quality, passed for a merchant sent by Oleg and his ward Igor on business of importance to Constantinople; and he despatched officers to Oskhold and Dir, the two chieftains of the Kievians, requesting permission to pass through their territory into Greece, and inviting them to visit him as friends and fellow-citizens, pretending that indisposition prevented him from paying his respects to them in person. The princes, free from mistrust, accepted Oleg's invitation, and scarcely thought it necessary to take with them their ordinary attendants. They were soon undeceived; for when they arrived at the regent's encampment, they were quickly surrounded by the Varagian soldiers, who sprung from their place of concealment in the barks. Oleg taking Igor in his arms, and casting on the sovereigns of Kief a fierce and threatening look, exclaimed, "You are neither princes nor of the race of princes; behold the son of Ruric." These words, which formed the signal that had been agreed on, were no sooner uttered, than his soldiers rushed on the two princes, and laid them prostrate at the feet of their master. The inhabitants of Kief, thrown into consternation by this bold and treacherous act, made no resistance, but opened the gates of their city to their invader; and thus the two Slavonian states were united under one head.

Having thus made himself master of the key to the eastern empire, Oleg prepared to carry into effect his ambitious designs against Constantinople. Leaving Igor at Kief, he himself embarked on the Dnieper with eighty-thousand warriors, on board of not fewer than two thousand vessels. Their passage down the river met with no obstruction, till they came to that part where its course is embarrassed for nearly fifteen leagues by seven rocks; and here began a series of perils, labours, and fatigues, which none but barbarians could have overcome. They were obliged to unload their barks, and convey them over the rocks; and, in particular, at the fourth rock, they carried their baggage for above six thousand paces, exposed to the perpetual risk of attack from the neighbouring nations with whom they were at war, while thus hampered and encumbered. Having at length reached the mouth of the Dnieper, Oleg drew together his scattered vessels to be repaired, and waited for a favourable wind to carry him across the Black Sea to the mouth of the Dniester. Here the vessels were again refitted, and hence the expedition, coasting along the shores of the Euxine, soon arrived at the Strait of Constantinople.

First Russian expedition against Constantinople.

The inhabitants of the imperial city, on discovering the approach of the barbarians, had drawn a massy chain across the harbour, thus hoping to prevent their landing. In this hope, however, they were deceived. The invaders drew ashore their barks, fitted wheels to their flat bottoms, and converted them into carriages, which by the help of sails they forced along the roads that led to the city, and thus arrived under the walls of Constantinople. In their route they ravaged the whole country, and pillaged and demolished the houses; loaded the inhabitants with irons, and committed other enormities which generally attend the incursions of a barbarous enemy. The weak Leo, who then swayed the sceptre of the Grecian empire, instead of making a manly resistance, is said to have attempted carrying off his enemy by poison; but this not succeeding, he was obliged to purchase from the conqueror an ignominious peace. Oleg on his return made his entrance into Kief laden with the wealth acquired by his victory; and the people, dazzled with such splendid objects, imagined their prince to be endowed with supernatural powers, and looked up to him with a reverence approaching to adoration.

Soon after his return to his own dominions, the Russian monarch despatched deputies to Constantinople with the articles of a treaty, which he required the Greek emperor to sign. This treaty, which is preserved in the Chronicles of Nestor, is extremely curious; and we learn from it many important particulars respecting the internal policy of the Russians at the beginning of the tenth century. Several articles of it show that the Russian laws laid great stress on oaths; that they pronounced the sentence of death against the murderer, instead of inflicting on him only a pecuniary fine, and thus allowing the rich to commit assassination with impunity; that the punishment of offences did not extend to the entire confiscation of goods, and hence the widow and orphan did not suffer for a crime of which they were innocent; that robbery, which attacks only property, was punished by the privation of property; that the citizens, secure in their possessions, were under no apprehension that the sovereign would seize on their heritage, and might even dispose of their effects in favour of friends.

Oleg maintained the sovereign power for thirty-three years; nor does it appear that, Igor, even after he attained the age of majority, had any share in the administration, till the death of his guardian, in 913, left him in full possession of the throne.

An. 913.
Accession of Igor.

Igor had reached his fortieth year before he entered upon the government. He soon discovered marks of the same warlike spirit which had actuated his predecessor. Among the nations that had been subjugated by Oleg, several, on the accession of the new sovereign, attempted to regain their independence; the Drevlians, who dwelt on the banks of the Uscha, in the present district of Vrutsch, being the first to revolt. They were, however, soon quelled, and punished by the imposition of an increased tribute.

Igor had next to contend with more formidable enemies. The Petchenegans, a nation hitherto unknown, quitted their settlements on the Yaik and the Volga, and made incursions into the Russian territory. These people appear to have been at least as powerful and warlike as the Varages; and Igor, finding himself unable to cope with them, concluded a treaty of alliance. About five years afterwards, disputes arose between the new allies, and both had recourse to arms. It appears that the Russians were finally victorious, and the Petchenegans were for some time disabled from giving further molestation.

An. 94
Second
pedition
against
Constan
nople.

The Russian monarch, in imitation of his guardian, soon turned his attention towards the Grecian empire, where depredations might apparently be made with impunity. He equipped an immense armament, consisting, if we may credit the improbable tale of the Russian annals, of ten thousand barks, each carrying forty men, thus forming an army of four hundred thousand warriors. He set sail for Constantinople, without any previous declaration of war, and without any ostensible motive for thus infringing the treaty which had been concluded some years before between Oleg and Leo. In his route he overran and ravaged the provinces of Paphlagonia, Pontus, and Bithynia, plundering the towns, and butchering the inhabitants. For some time the barbarians met with no opposition, as the imperial troops were engaged in distant provinces; but the government of the empire was now in very different hands from those which had held it during the former invasion. The Grecian forces were well appointed, and commanded by two generals of approved ability and courage. These were Theophanes and Phocas, of whom the former commanded the fleet, and the latter the army. The Russians had soon cause to repent their temerity. Theophanes attacked them on board their ships, within sight of the Pharos, and throwing among them the unquenchable Grecian fire, with the effects of which they were wholly unacquainted, produced such confusion, that many plunged into the sea in order to avoid the flames that threatened and pursued them. Their vessels were dispersed, shattered, or burned, and great numbers of their crews perished. The remainder reached the shores of Bithynia; but before they could recover from their consternation, they were met by Phocas, who fell upon them with his troops, and made prodigious slaughter. So great were the losses sustained by Igor in this unfortunate expedition, that he carried back with him scarcely a third of his army. This second naval expedition of the Russians against Constantinople took place in 941.

Though discouraged by the ill success which had attended his first invasion of the Grecian empire, Igor was too much stimulated by the desire of plunder, not to risk a second attempt. Three years afterwards, he collected new forces, took into pay many of the Petchenegans, and again set out for Greece; but before he had advanced beyond the Taurican Chersonesus, the emperor Romanus, informed of his approach, and not choosing to hazard the result of an engagement, sent deputies to the Russian leader, offering to pay him the same tribute which had been given to his predecessor. With this offer Igor complied, and once more retired with his army.

Igor was now far advanced in years; but the insatiable rapacity of his officers, ever craving for fresh spoils from vanquished nations, impelled him to turn his arms against the Drevlians, for the purpose of obtaining from them an increase of their yearly tribute. In this unjust attack he was at first successful, and returned loaded with the contributions which he had levied from that people; but having dismissed great part of his troops with the spoils of the vanquished, and marching with the remainder too far into the country, he fell into an ambuscade, which the Drevlians, now grown desperate, had formed on his approach, in the neighbourhood of Iskorosch. The Russians were soon overpowered, and Igor being made prisoner, was put to death.

A 945.
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Before the death of Oleg, Igor had married a princess of a bold and daring spirit, named Olga, by whom he had one son, Sviatoslaf; but as this boy was very young at the death of his father, the queen-mother Olga assumed the reins of government. Her first care was to take signal vengeance upon the unhappy Drevlians, for having bravely defended themselves against the encroachments of foreign enemies. This tribe, satisfied with the death of their oppressor, appeared desirous of renewing their amicable intercourse with the Russians, and their chief, Male, is even said to have made an offer of his hand to Igor's widow. Olga, with that deep cunning and concealed malice that so often mark the character of the despotic leader of a barbarous people, pretended to listen to their overtures, and received the deputies of Male, but immediately ordered them to be privately put to death. In the mean time she invited a larger deputation from the Drevlian chief, which she treated in the same inhuman manner, taking care that no tidings of either murder should be carried to the Drevlians. She then set out, as if on an amicable visit, to conclude the new alliance, and having proclaimed a solemn entertainment, to which she invited some hundreds of the principal inhabitants of the Drevlian towns, she caused them to be treacherously assassinated. But this was only the first step to the more dreadful vengeance which she had resolved to inflict on this deluded people. She laid waste the whole country of the Drevlians, and in particular the town near which Igor had lost his life. For a long time she could not master the place, as the inhabitants, dreading the horrible fate that awaited them, from the revengeful spirit of Olga, defended themselves with the utmost valour and success. At length, being assured of clemency, upon condition of sending to their besieger all the pigeons of the town, they submitted; but the queen causing lighted matches to be fastened to the tails of the pigeons, set them at liberty. The birds flew to their usual places of residence in the town, which were speedily in a conflagration. The wretched inhabitants endeavouring to escape the flames, fell into the hands of the Russsian soldiers, planted around the town for that purpose, by whom they were put to the sword.

This was the only warlike transaction, if it deserves that name, which took place during the regency of Olga. Though not uncommon in the annals of a barbarous people, it would have been sufficient to hand down her name with detestation to posterity, had she not, in the opinion of her panegyrists, atoned for the enormity by attempting to introduce into her dominions the Christian religion.

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Hitherto the Slavi, and the Scandinavian nations who had taken possession of their territories, were Pagans; and their religious ceremonies, like those of all the surrounding nations, were marked by an absurd and cruel superstition. Their deities seem to have been borrowed, partly from the Greeks and Romans, and partly from the Scythians; but were characterised by peculiar names, and represented by idols of complex workmanship and grotesque appearance. Thus, the god Perune, or Perkune, who was the chief among the Slavonian deities, was personated by an idol whose head was of silver, its ears and mustachios of massy gold, its legs of iron, and its trunk of hard incorruptible wood. It was decorated with rubies and carbuncles, and held in its hand a stone carved, being the symbol of lightning. The sacred fire burned continually before it; and if the priests suffered this to be extinguished, they were doomed to perish in the flames, as enemies of the god. Sacrifices of their flocks to this supreme deity were regarded as trifling. His altar smoked with the blood of captives, and even the children of his worshippers were sometimes immolated to appease his wrath or propitiate his favour.

Conversion of Olga to Christianity.

It is uncertain at what time the light of Christianity began to beam on the nations that occupied the banks of the Dnieper, nor are we acquainted with the circumstances that led to the conversion of the queen-regent. We find, however, that about the middle of the tenth century, she undertook a journey to Constantinople for the express purpose of being initiated into the religion of Jesus. Constantine Porphyrogenneta, who then sat on the imperial throne, received the royal convert with the greatest honour and respect; he himself conducted her to the baptismal font, and, in the character of her sponsor, gave to her the name of Helen. Her example, however, had little influence on her son, or the nation at large. The Russians do not seem to have been very ardent in their religious observances, nor peculiarly attached to the opinions of their forefathers; but the nature of Christianity, and the character of its disciples, were not in their eyes sufficiently striking or alluring to produce any change in their religious system. Olga's son, Sviatoslaf, either from his contempt for the unwarlike character of the Greek Christians, or through fear of the ridicule to which his conversion might subject him from his young companions, disregarded all his mother's solicitations. He did not, however, prevent the people from receiving baptism, and a few proselytes were made. Though the character of Olga, even after her conversion to Christianity, was by no means such as to entitle her to the rank which she afterwards attained among the Russian saints, it appears that she had given her son many wise and prudent instructions respecting the government of his future empire. She travelled with him round the country; superintended the erection of bridges and the making of roads, for the benefit of trade and commerce; built several towns and villages, and founded such laudable institutions, as sufficiently evince her talents for governing a nation. She died about the year 969, at a very advanced age.

Reign of Sviatoslaf.

It is probable that Olga retired from the administration of affairs soon after her conversion to Christianity; for we find Sviatoslaf in full possession of the government long before his mother's death. This prince has been considered as one of the Russian heroes; and if a thirst for blood, a contempt of danger, and a disregard of the luxuries and conveniences of life, be admitted as the characteristics of a hero, he deserves the appellation. His habits rendered him the idol of his army. He took up his habitation in the camp, where he led a life exactly similar to that of the meanest soldier.

An. 965.

His first expedition was against the Kozares, a people who had come from the shores of the Caspian and the sides of the Caucasus, and had established themselves along the eastern coast of the Black Sea. They had rendered tributary both the Kievians, and the Viateches, a Slavonian nation that dwelt on the banks of the Oka and the Volga. Sviatoslaf, desirous of transferring to himself the tribute which the Kozares derived from the latter people, marched against them, and appears to have succeeded in his design. He defeated them in a pitched battle, and took by storm their capital city, Sarkel or Belgorod. It is said by some historians that he even annihilated the nation; and certain it is, that from that time no mention is made of the Kozares.

His alliance with the Greek emperor.

The martial fame of Sviatoslaf had extended to Constantinople; and the Emperor Nicephorus Phocas, who was then harassed by the Ungrians, assisted by his treacherous allies the Bulgarians, applied for succours to the Russian chieftain. A subsidiary treaty was entered into between them, and Sviatoslaf hastened southward with a numerous army. He quickly made himself master of most of the Bulgarian towns along the Danube, and was so elated with his success that he determined to remove the centre of his government from Kief to the city of Pereiaslavatz, now Yamboly, situated upon the shores of that river. He was soon obliged, however, to postpone the completion of this design, on receiving intelligence that his old enemies the Petchenegans had assembled in great numbers, ravaged the Kievian territory, and laid siege to the capital, within the walls of which were shut up his mother and his sons. He hastened to the relief of his family, but before he reached home, the Petchenegans had been induced to raise the siege by an artifice of the Kievian general. Sviatoslaf on his arrival pursued the enemy, defeated them, and obliged them to sue for peace.

His division of the principality.

He now resumed his design of establishing himself on the banks of the Danube, and divided his hereditary dominions among his children. He gave Kief to Yaropolk, the Drevlian territory to Oleg, and on Vladimir, a natural son, born to him by one of the attendants of Olga, he bestowed the government of Novgorod. On his return to Bulgaria, indeed, he found that his affairs had assumed a very different aspect; for the Bulgarians, taking advantage of his absence with his troops, had recovered most of their towns, and seemed well prepared to resist the encroachments of a foreign power. Sviatoslaf, however, soon regained all that he had lost.

During these transactions the Emperor Nicephorus had been assassinated, and John Zimisces, his murderer, had succeeded to the imperial diadem. The new emperor sent ambassadors to the Russian monarch, requiring him to comply with the stipulations of his treaty with Nicephorus, and evacuate Bulgaria, which he had agreed to occupy as an ally, but not as a master. Sviatoslaf refused to give up his newly-acquired possessions, and prepared to decide the contest by force of arms. The particulars of this campaign, and the numbers of the contending armies, are very differently related by the Russian annalists, and the historians of the Grecian empire; the former stating that Sviatoslaf had not more than ten thousand men, and yet was victorious over the troops of Zimisces; while the Grecian historians affirm that the Russians amounted to three hundred thousand, but were defeated, and compelled to abandon Bulgaria. As far as respects the issue of the war, the Grecian writers are probably correct; for it is certain that Sviatoslaf retreated towards Russia with the shattered remains of his army. He did not, however, live to reach the capital; for having, contrary to the advice of his most experienced officers, attempted to return to Kief by the dangerous navigation of the Dnieper, he was intercepted by the Petchenegans near the cataracts of that river. After remaining upon the defensive during winter, exposed to all the horrors of famine and disease, he, on the return of spring, attempted to force his way through the ranks of the enemy; but his troops were defeated, and himself killed in the battle.

An 973. Succession of Yaropolk.

Yaropolk, the sovereign of Kief, may be considered as the successor of Sviatoslaf upon the Russian throne; but his reign was short and turbulent. A war took place between him and his brother Oleg, on account of a base assassination committed by the latter upon the son of his father's friend and privy councillor Svenald. Oleg was defeated and slain, and the other brother, Vladimir, dreading the increased power and ambitious disposition of Yaropolk, abandoned his dominions, which were quickly seized on by the Kievian prince. Vladimir had retired among the Varagians, from whom he soon procured such succours as enabled him to make effectual head against the usurper. While his natural courage was thus increased, his enmity against Yaropolk received an additional spur from an affront inflicted on him by a lady whom he had sought in marriage, but who, despising the meanness of his birth, as being the son of a slave, had rejected his proposals, and offered her hand to Yaropolk. The vindictive Vladimir, on being informed of this insult, attacked the possessions of the lady's father, put both him and his two sons to the sword, and obliged the princess to accept his hand, yet reeking with her parent's blood. He now advanced towards Kief, where Yaropolk was by no means prepared to oppose him. The Kievian prince had indeed been lulled into security by the treacherous report of one of his voyvodes, who was in the interest of Vladimir, and who not only prevented Yaropolk from taking effectual measures for his safety, but found means to raise suspicions in his breast against the inhabitants of his capital, which he thus induced him to abandon. The Kievians, left without a leader, opened their gates to Vladimir; and the wretched Yaropolk, still misled by the treachery of his adviser, determined to throw himself on the mercy of his brother. It is probable that this would have availed him little, as Vladimir seems to have determined on his death; but before he could reach the arms of his revengeful brother, Yaropolk was assassinated by some of his Varagian followers.

An. 981.

By this murder the conqueror acquired the undivided possession of his father's territories, and maintained the sovereignty during a long reign, respected at home, and feared abroad. Indeed, had not the commencement of his reign been stained with the blood of his father-in-law and his brother, we might place him among the most distinguished monarchs of the age in which he lived, as he not only extended and enriched his empire, but was the means of establishing in his dominions, upon a firm and lasting basis, the Christian religion, which, though introduced by Olga, appears hitherto to have made but a very trifling progress.

Reign of Vladimir the Great.

The commencement of Vladimir's reign formed but a continuation of those enormities which had conducted him to the throne. He began with removing Blude, the treacherous voyvode by whom his brother had been betrayed into his power, and to whom he had promised the highest honours and dignities. Accordingly, for three days he suffered Blude to live in all the splendour of a prince. At the end of that period he thus addressed him: "I have fulfilled my promise; I have treated thee as my friend; the honours thou hast received exceed thy most sanguine wishes. To-day, as the judge of crimes and the executor of justice, I condemn the traitor, and punish the assassin of his prince." Having uttered these words, he caused Blude to be put to death. He displayed still more the perfidiousness of his character in his behaviour towards the Varagians, who had assisted in placing him on the throne of his ancestors; for on their requesting permission to go and seek their fortune in Greece, he granted their request, but privately advertised the emperor of their approach, and caused them to be arrested and secured.

Vladimir engaged in numerous wars, and subjected several of the neighbouring states to his dominion. He seized on part of the Polish territories, and compelled the Bulgarians who dwelt in the districts that now form the government of Kazan to do him homage. He subjected the Petchenegans and Khazares, who lay in the immediate neighbourhood of the Kievian state; he reduced to his authority Halitsch and Vladimir, countries which are now called Gallicia and Lubomiria; he conquered Lithuania as far as Memel, and took possession of a great part of the modern Livonia.

Originally a devout Pagan.

His conduct after these successes by no means prognosticated his future zeal for the Christian religion. None of the Russian monarchs appears to have been more devout in the adoration of their heathen deities. It was usual for him to return thanks to the gods for the success which they had granted to his arms, and to show his gratitude by offering on their altars a part of the prisoners he had taken in war. Upon one occasion his piety extended so far, that he resolved on selecting one of his own subjects as the object of his sacrifice, thinking that he should thus more worthily testify his gratitude for the signal favours he had received from heaven. His choice fell upon a young Varagian, who was the son of a Christian, and had been brought up in the new faith. The unhappy father refused the demanded victim. The enraged people, deeming their prince and their religion insulted, assailed the house, and having burst open the doors, butchered both the father and the son, folded in mutual embraces.

Es lishes Ch tiani- ty Rus- sia.

Yet this furious Pagan and bloody warrior afterwards became a most zealous Christian, and a shining example of charity and benevolence to his subjects. The circumstances that led to these important changes are, as well as the martial achievements of this favourite prince, related with great minuteness by the Russian annalists, and give this part of their chronicles the air rather of a historical romance than a narrative of facts. We are told that the fame of Vladimir's military exploits had rendered him so formidable to the neighbouring nations, that each courted his alliance, and strove to render this more lasting by engaging him in the ties of the same religion with themselves. In particular, the Grecian emperors sent to him a philosopher, whose exhortations, though they did not at first induce Vladimir to embrace the Greek ritual, at least succeeded in giving him a favourable opinion of it; so that the philosopher was entertained with respect, and returned home loaded with presents. We are also told, that, determined to act in the most impartial manner with respect to the several religions which he had been invited to embrace, the prince despatched persons remarkable for their wisdom and sagacity to visit the surrounding nations, inspect the religious tenets and ceremonies that distinguished them, and communicate to him the result of their observations. On the return of these deputies, the report of those who had visited the churches of Constantinople, and witnessed the imposing splendour of religious adoration, and the gorgeous decorations of the Greek priests in the superb basilica of St Sophia, proved so satisfactory to Vladimir, that he determined on embracing the Christian religion according to the observances of the Greek church. But though he resolved on baptism, he was too proud to seek from the Greek emperor a priest by whom the solemn ordinance might be performed. He assembled an army selected from all the nations of which his empire was composed, and marching to Taurida, laid siege to Theodosia, which is the modern Kaffa. On sitting down before the walls of this place, he is said to have offered up the following characteristic prayer: "O God, grant me thy help to take this town, that I may carry from it Christians and priests to instruct me and my people, and convey the true religion into my dominions." His prayer was at length granted; for, rather by stratagem than by force, he made himself master of the town, and, through it, of the whole of the Crimea. He might now have received baptism; but his desire of being initiated in the Christian faith seems to have been excited more by ambition than by true devotion. His ruling passion promised to be amply gratified by an alliance with the Grecian emperors, as he would thus acquire some legal claim on the territories which they possessed. He therefore demanded in marriage Anna, the sister of Basilius and Constantine, who jointly held the imperial dignity; threatening, that if they refused his proffered alliance, he would lay siege to Constantinople. After some deliberation, the emperors complied, on condition that Vladimir and his people should become Christians; and these conditions being accepted, the Russian monarch was baptized, took the name of Basilius, received the Grecian princess, and, as the reward of his victories, carried off several popes and archimandrites, together with sacred vessels and church books, images of saints, and consecrated relics

His tered cha ter.

Whatever might have been the considerations that swayed Vladimir in his conversion to the Christian faith, it is certain that his new religion had the happiest influence on his subsequent life and conduct. He not only abjured idolatry himself, and destroyed the idols which he had caused to be raised in his dominions, but he used every exertion to persuade and compel his subjects to follow his example. Before his conversion he is said to have possessed five wives and eight hundred concubines; but after he became a Christian, he maintained an unshaken fidelity towards the imperial princess. As a Pagan he had been lavish of human blood; but after he had adopted the religion of Jesus, he could scarcely be prevailed on to sentence to death a single highway robber. His former delight had been in storming towns and gaining battles; but he now found his greatest pleasure in building churches, and endowing seminaries of education. He encouraged the raising of new cities and towns; peopled the waste districts of his country with the prisoners whom he had taken in war; and not only conducted himself as a sovereign who consulted the welfare of his dominions, but displayed many benevolent and amiable qualities that highly endeared him to his subjects. By thus showing that Christianity had made him both a milder and a wiser prince, he insured from his people a respect for the new religion, whilst the striking example of the sovereign and his nobles could not fail to influence the minds of the inferior orders. Having one day issued a proclamation, ordering all the inhabitants of Kief to repair next morning to the banks of the river to be baptized, the people cheerfully obeyed the order; observing, that if it were not good to be baptized, the prince and the boyars would never submit to the ceremony.

An. 1015. Death and character of Vladimir.

The establishment of Christianity in the Russian dominions forms one of the most prominent features in the reign of Vladimir, and gives him a much juster claim to the title of Great, which has been bestowed on him by historians, than all his numerous victories. We have therefore dwelt on it with the greater minuteness. Indeed the latter transactions of his reign afford but little interest. His last days were embittered by domestic vexations. His wife and one of his favourite sons died long before him; while another of his sons, Yaroslaf, on whom he had bestowed the government of Novgorod, refused to acknowledge him as his liege lord, and applied to the Varagians for assistance against his father. The aged Vladimir, compelled to march against a rebellious son, died of grief upon the road, after a long and glorious reign of thirty-five years.

His improvement of the Russian monarchy.

Notwithstanding the unfavourable circumstances we have noticed, the improvement which Russia owed to this prince was great and permanent. With the Christian religion he imported from Greece the arts which then flourished in that empire; and almost entirely new-modelled the language of his country, by engrafting on it the more refined dialect of the Greeks, and adopting, in a great measure, the letters of their alphabet.

The dominions of Russia, which at first consisted of two principalities, that of Novgorod, bordering on the Baltic, and that of Kief, occupying no very large space on the eastern bank of the Dnieper, were, by the victories of Vladimir, extended westward along the shores of the Baltic into Lithuania and Poland; southward along the shores of the Euxine, so as to include the Crimea and great part of the Bulgarian territories; whilst to the east it extended to the Oka, the Don, and the Volga. He still maintained the seat of government at Kief, of which he was styled grand prince, whilst the other districts were either tributary to that principality, or held of it as their superior.

Partition of his dominions amongst his sons.

Before his death, Vladimir had divided his extensive territories amongst his twelve sons, reserving to himself and his immediate heir the grand principality of Kief. The consequences of this ill-judged distribution were disunion, contention, and almost perpetual warfare amongst the brothers. The most respectable, and in the end the most powerful of these, was Yaroslaf, or, as he is commonly called, Jarislas, prince of Novgorod. This prince, finding that Sviatopolk, who had raised himself to the sovereignty of Kief after his father's death, attempted by assassination, or force of arms, to take possession of the neighbouring principalities, determined to resist him in his encroachments. Collecting an army of Novgorodians, he, in 1016, drove Sviatopolk from Kief, and forced him to seek an asylum with his father-in-law, Boleslas, duke of Poland. Boleslas, easily persuaded to engage in the cause of his son-in-law, accompanied Sviatopolk into Russia with an army, retook Kief, and obliged the Novgorodian prince to retire with precipitation. Whilst he was endeavouring to collect fresh forces to renew the war with Boleslas and Sviatopolk, the latter, by the treachery and perfidy with which he treated his Polish allies, contributed to his own downfall. He caused great numbers of the Poles to be secretly massacred, a transaction by which Boleslas was so incensed, that he plundered Kief, made himself master of several places on the Russian frontiers, and then left his perfidious son-in-law to shift for himself. Sviatopolk now sought assistance from the Petchenegans, and with an army of these auxiliaries offered battle to Yaroslaf, not far from the place where he had, four years before, caused one of his brothers to be murdered. The contest was long and bloody, but terminated in favour of Yaroslaf. Sviatopolk was put to flight, and died soon afterwards.

Reign of Yaroslaf. By this victory Yaroslaf acquired possession of the greater part of his father's dominions, and testified his gratitude for the assistance given him by the Novgorodians, by the attention which he paid to the particular improvement of that state. He drew up for it a code of laws, which are still known by the appellation of the municipal law of Novgorod. He also exerted himself for the welfare of other towns, and of the country at large.

An. 1051. Yaroslaf did not neglect the advancement of the Christian religion. He established a metropolitan in Kief, and thus gave to the Russian clergy a head, who might watch over the morals of the inferior pastors, and provide for the general dissemination of the Christian doctrine. He collected several books on the Greek religion, and caused many of them to be translated into the Russian language.

An. 1054. This monarch is supposed to have died in 1054, and to have reigned thirty-five years. He followed the example of his father, in dividing his territories amongst his sons, though he endeavoured to prevent the dissensions which he himself had witnessed from such a partition, by exhorting them on his death-bed to the most intimate concord, and endeavouring to convince them that they would be respected by their subjects, and feared by their enemies, only whilst they continued to act with unanimity.

Dissensions among the successors of Yaroslaf. We know little of the proceedings of Yaroslaf's successors, except that Isiaslaf, his eldest son, who until 1078 reigned as grand prince of Kief, had frequent disputes with his brothers, in which he was assisted by the Poles, and supported by the influence of the Roman pontiff.

From the death of Isiaslaf to the beginning of the thirteenth century, the history of Russia comprises little else than a continued series of intestine commotions and petty wars with the neighbouring states. The same system of dismemberment was continued by the succeeding princes, and was attended with the same result. There were during this period not fewer than seventeen independent principalities, though these were at length reduced to seven, viz. those of Kief, Novgorod, Smolensk, Vladimir, Tver, Halitch, and Moskva or Moscow. Of these, Kief and Novgorod long continued to be the most powerful, though they could not always maintain their superiority over the others; and towards the latter end of the period which we have mentioned, the district of Vladimir erected itself into a grand principality, and became at least as powerful as Kief and Novgorod.[1]

Inroads of the Poles. During the intestine broils that attended the dismemberment of the Russian monarchy, the ambition of its neighbours, with the folly of the contending princes, who solicited foreign aid against their rivals, contributed to diminish the strength and resources of the empire. In particular, the Poles and the Hungarians availed themselves of these circumstances. By ravaging the towns and villages, carrying off the captives into slavery, and making a prey of whatever appeared most useful, they quickly recompensed themselves for their assistance. The Poles seem to have been the most successful in their depredations, and to have fully revenged themselves for their former humiliation.

Invasion of Tartars. A state of anarchy and confusion, such as we have described, held out a strong temptation to powerful states in the vicinity. In the neighbourhood of the Sea of Aral, not far from the confines of Vladimir and Kief, the wandering hordes of Mongols, or Mongol Tartars, had taken up their residence. They were perhaps descended from the ancient Scythians, and long dwelt on the confines of China. Hence they gradually marched westward, and about the year 1223 arrived on the shores of the Sea of Aral, under the conduct of Tuschi, son of the famous Tschinghis Khan, chief of the Mogul empire. From the Aral, Tuschi conducted his horde along the shores of the Caspian Sea, and gradually approached the Dnieper. In his course he attacked and overcame the Tscherkasses, or Circassians, who on his approach had joined with the Polovtzes to resist the terrible enemy. The defeated Polovtzes gave notice to their neighbours the Russians, of the approaching storm, and invited them to form a common cause against the enemy. In the mean time the Tartars had sent ambassadors to the Russians, hoping to prevent their alliance with the Polovtzes, and thus the more easily to subdue the disunited nations. For this time, however, the Russians were true to their own interest. In concert with the Polovtzes they assembled an army, and prepared to resist the incursions of the Tartars. Both parties met near the small river Kalka, which flows into the Sea of Azof, and a furious engagement took place, ending in the complete overthrow of the Russians and their allies.

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[1] In the supremacy of these three great principalities, we may trace the division of European Russia into Great, Little, and White Russia; a distinction which long maintained its ground, and in later times gave to the sovereign of this empire the title of monarch or emperor of all the Russias. Great Russia comprehended the principality of Novgorod, and extended northward to the White Sea, eastward to the river Dvina, and the entrance of the Petchora into the Ural Mountains; whilst to the south it bordered on the district of Vladimir, as far as the Volga and the mouth of the Medveditza, and to the west on Lithuania and Prussia, including the tributary tribes on the Baltic, as far as Memel. Its capital was Novgorod. Little Russia extended on the north along the river Ager to White Russia, on the east above the Donetz and the Oka to the Polovtzes and the Petchenegans; whilst to the south it stretched as far as the Tauric Chersonesus, or the Crimea, and to the west along the banks of the river Goryn. This was the principality of Kief, and in that city was the seat of government. The principality of Vladimir received the name of White Russia. It extended northward along the Volga, to the southern boundary of Great Russia; to the east it bordered on the possessions of the Ugres, and the territory of the Mordvines, stretching down the Volga to the mouth of the Oka; and to the south it extended along the Oka to the principality of Riazan, and the Bulgarian territory. The metropolis of this division was at first Shuja, and afterwards in succession Rostof, Susdal, and Vladimir, till at length the seat of government was transferred to Moscow.

The principality of Novgorod appears, during this interval, to have been the most respectable for its commercial intercourse with the neighbouring nations, and for the independent spirit of its internal government. This, though nominally monarchical, seems to have possessed much of a republican character. The princes were evidently dependent on the people, and some ludicrous instances of this dependence are related by the old historians. One of the grand princes had so much displeased his people, that they refused to pay him their usual obedience. As the prince seems to have been aware of the little influence which he possessed in the state, he employed the metropolitan of the principality to negotiate a reconciliation. This prelate, accordingly, by a letter addressed to the Novgorodians, interceded for the sovereign, and pledged himself as surety for his good behaviour.

About thirteen years after this defeat, another horde of Tartars, headed by Baaty Khan, the grandson of Tschinghis Khan, penetrated into Russia, after having attacked and defeated their neighbours the Bulgarians. The invaders soon spread far and wide the terror of their name. Wherever they came, the whole face of nature was laid waste; towns and villages were destroyed by fire; all the men capable of bearing arms were put to the sword, and the children, women, and old men, carried into captivity. If the inhabitants of the towns to which they approached offered a compromise, the faithless barbarians affected to receive their submission, but immediately broke the agreement, and treated those who surrendered to their mercy with as much rigour as those who had endeavoured to defend themselves and had been overcome. If the inhabitants of the open towns and villages came out to meet them, and to receive them as conquerors and friends, death, torture, or the most ignominious bondage, was the reward of their spontaneous submission.

The first state which the Tartars attacked was Riazan, the prince of which applied for assistance to Yury, commonly called by historians George Vsevolodovitch, grand prince of Vladimir. He sent them a few auxiliaries, but these either came too late, or their number was too small. The principality of Riazan fell, and its fall was succeeded by that of Pereiaslavl, Rostof, Susdal, and several others. Like a furious torrent rushing down the mountain side, and irresistibly bearing with it all that impedes its progress, these barbarous hordes poured rapidly along, sweeping all before them in one common devastation. They now approached the principality of Vladimir, and no army appeared to resist them upon the frontiers. They advanced unimpeded to the capital, which, left to its fate by the grand prince, had nothing to expect but the same cruel treatment which the neighbouring cities had received. Yury, with unpardonable negligence, was celebrating a marriage feast, when he ought to have been employed in collecting the means of defence against the enemy, of whose approach to his borders he had received timely intimation. The city of Vladimir, which contained the princess and two of her sons, was left to the protection of a chieftain totally unqualified for its defence; and the inhabitants seemed to share in the pusillanimity of their governor. Instead of annoying the enemy by occasional excursions, and preparing the means of defending the walls against a sudden attack, they gave themselves up to terror and despair; and as they conceived death to be inevitable, they prepared for it, by taking the habits of monks and nuns, in order to insure to themselves a blissful departure. A prey to fear and despondency, the city soon fell into the hands of the Tartars. They one morning scaled the walls, and meeting with little opposition, quickly made themselves masters of the place, when they cast aside every feeling of humanity, and, like beasts of prey, glutted their appetite for blood amongst the wretched inhabitants. The grand princess, and other ladies of distinction, dreading the brutality of the relentless conquerors, had taken refuge in the choir of a church, an asylum which all the assurances of the Tartars that they should suffer no injury could not prevail on them to abandon. It was therefore set on fire by the barbarians, who feasted their ears with the shrieks and groans of the women as the flames surrounded them.

Yury, incensed almost to desperation at the fate of his capital, and the horrible death of his wife and children, was determined to take signal vengeance on the assailants. He assembled all the forces which he could draw together; and though his army was greatly inferior in number to the Tartars, he marched against the enemy, and attacked them with the most determined valour. The struggle was short but bloody. The Tartars were victorious, and the body of Yury was found amongst the slain.

This appears to have been the only vigorous stand made by the Russian princes. The Tartars pushed forward with rapidity, and successively overpowered the principalities of Novgorod and Kief. In the latter city they found immense booty; but this circumstance did not prevent them from repeating here the same bloody scenes which they had acted in the other capitals. The governor was preserved from the cruelties that had been inflicted upon the inhabitants, by the courage he had displayed in defence of the city; and his noble demeanour, when he fell into the hands of the conqueror, acquiring the esteem and affection of that chief, enabled him to obtain a temporary repose to his country.

Succession of Russian princes under the Tartars.

The Tartars had now established themselves in the Russian territories, and their khan or chief, though he did not himself assume the nominal sovereignty, reigned as paramount lord, and placed on the throne any of the native princes whom he found most obsequious to his will, or who had ingratiated themselves by the magnificence of their presents. Till the middle of the fourteenth century, the throne was successively occupied by Yaroslaf II., Alexander Yaroslavitch called Saint Alexander Neffsky, Yaroslaf Yaroslavitch, Vasilii Yaroslavitch, Dimitri Alexandrovitch, Andrei, Daniil, both brothers of Dimitri, Mikaila Yaroslavitch, Yury Danilovitch, Alexander Mikailovitch, Ivan Danilovitch, Simeon Ivanovitch, and Ivan Ivanovitch.

Partial subjugation of Russia by the Poles.

During these several reigns, the miseries of a foreign yoke were aggravated by all the calamities of intestine discord and war; whilst the knights of Livonia, or Brothers of the Short Sword, as they are sometimes called, a kind of military order of religious, on one side, and the Poles on the other, catching at the opportunity, and attacking Russia, took several of its towns, and even some considerable countries. The Tartars and Russians, whose interests were in this case the same, often united to oppose their common enemy; but they were generally worsted. The Livonians took Pleskow, and the Poles made themselves masters of Black Russia, the Ukraine, Podolia, and the city of Kief. Casimir the Great, one of their kings, carried his conquests still farther. He asserted his pretensions to a part of Russia, in right of his relation to Boleslas, duke of Kalitz, who died without issue, and forcibly possessed himself of the duchies of Perzesmylia, Kalitz, and Luckow, with the districts of Sanock, Lubakzow, and Trebowla; of all which countries he made a province of Poland.

The newly-conquered Russians were ill disposed to endure the government of the Poles, whose laws and customs were more contrary to their own than those of the Tartars had been. They joined the latter to rid themselves of the yoke, and assembled an army numerous enough to overwhelm all Poland, but destitute of valour and discipline. Casimir, undaunted by this deluge of barbarians, presented himself at the head of a few troops on the borders of the Vistula, and obliged his enemies to retire.

An. 1362. Reign and successes of Dimitri Ivanovitch.

About the year 1362 Dimitri Ivanovitch received the sovereignty from the Tartar chief, and established the seat of his government at Moscow. This prince possessed considerable ambition, and contrived to inspire the other Russian princes with so much respect for his person and government, that they consented to hold their principalities as fiefs under Dimitri. This increased the consequence of the Russian prince, and excited the jealousy of Mammai the Tartar khan, who determined to take measures for maintaining his superiority. He began by demanding an increase of tribute; but when Dimitri demurred to this new encroachment, the khan not only insisted on his demand, but required the grand prince to appear before him in person. This requisition Dimitri thought proper to refuse, and prepared to support his refusal by force of arms. The terror with which the Tartars had inspired the inhabitants of Russia had now considerably subsided, whilst the hatred which the Russians bore these haughty masters was kept alive by the barbarism of their manners and the difference of their religion. The Christian ministers, justly dreading that the Tartars, in their furious progress, might extirpate Christianity, contributed all in their power to confirm the spirit of revolt amongst the people; and they promised the crown of martyrdom to such as should fall in battle against the infidels. Thus the contest into which the grand prince determined to enter in support of his authority became in some measure a holy war, undertaken in defence of the national religion. This combination of favourable circumstances operated so strongly in favour of Dimitri, and the princes that had confederated with him, that they soon collected an army of two hundred thousand men. With this force the grand prince left Moscow, and marched towards the Don, on the southern bank of which the Tartars were encamped. Arrived at this river, he left it to the choice of his troops, either to cross the river and encounter the enemy on the other side, or to await the attack where they were. The general voice declared for passing over to the assault. He accordingly transported his battalions across the river, that he might cut off all hope of escaping by retreat. The fight now commenced, and though the numbers of the enemy far exceeded their own, the Russians defended themselves valiantly against the furious onset of the Tartars; but as these barbarians were continually relieved by fresh reinforcements, they appeared to be gaining ground. Indeed, nothing but the impossibility of retreating across the river, and the firm persuasion that death would immediately transport them to the mansions of eternal bliss, restrained the Russians from a general flight. At the moment when the day seemed entirely lost, a detachment of the grand prince's army which had been stationed in reserve, and had remained out of the view of the enemy, came up with unabated force, fell on the rear of the Tartars, and threw them into such terror and confusion that they fled with Mammai at their head, leaving the Russians masters of the field.

This glorious victory, which took place in 1380, was attended with numerous advantages to the Russian cause. In particular, it taught the native princes that the Tartars were not unconquerable; and that nothing was wanting to relieve them from the galling yoke under which they had long groaned, but mutual union, courage, and prudence. The Tartars appear to have been so much humbled by this defeat, that for a time they left the Russians to enjoy in peace their recovered liberty. This forbearance, however, was not of long duration. Before the death of Dimitri, returning with increased numbers, they laid siege to Moscow, which, after an obstinate defence, was at length induced to surrender, and Russia once more submitted to her old masters.

An. 1389.
Reign of Vasilii.

Dimitri died in the year 1389, and was succeeded by his son Vasilii Dimitrievitch. In the reign of this prince a new incursion of the Tartars took place, under the great Timur or Tamerlane, who, after having subdued all the neighbouring Tartar hordes, extended his conquests to the Russian territories, took Moscow by assault, and carried off immense plunder.

The grand principality of Vladimir, or, as it may now be called, of Moscow, had, at the end of the fourteenth century, attained its greatest height, whilst that of Kief had proportionally declined. This latter principality was, at the time of which we are now writing, under the dominion of the Poles, having been seized on in 1320 by Gedemin, duke of Lithuania.

Accession of Ivan Vasiliivitch.

The later part of the fifteenth century forms a splendid epoch in the Russian history. At this time, viz. from 1462 to 1505, reigned Ivan Vasiliivitch, or, as he is commonly called, John Basilovitz. This able prince, by his invincible spirit and refined policy, became both the conqueror and deliverer of his country, and laid the first foundation of its future grandeur. Observing with indignation the narrow limits of his power at his accession to the throne, after the death of his father Vasilii the Blind, he began immediately to resolve within himself upon the means of enlarging his dominions. He demanded and obtained in marriage Maria, sister of Michael duke of Twer, whom he soon afterwards deposed, on pretence of revenging the injuries done to his father, and added this duchy to his own territories of Moscow. Maria, by whom he had a son, who died before him, did not live long; and upon her death he married Sophia, daughter of Thomas Palæologus, who had been driven from Constantinople, and forced to seek shelter at Rome, where the pope portioned this princess, in hopes of thus procuring great advantage to the Catholic religion; but his expectations were frustrated, Sophia being obliged to conform to the Greek church after her arrival in Russia.

Incited by his wife to shake off the Tartar yoke.

The Russians certainly owed to this alliance their deliverance from the Tartar yoke. Shocked at the servile homage exacted by these proud victors, when she saw her husband going to meet their ambassadors at some distance from the city, and standing to hear what they had to say, whilst they were at dinner, Sophia told him that she was surprised to find she had married a servant to the Tartars. Nettled at the reproach, Ivan feigned himself ill when the next deputation from the Tartars arrived, and by means of this stratagem avoided a repetition of the humiliating ceremonial. Another circumstance equally displeasing to the princess was, that the Tartars possessed by agreement, within the walls of the palace at Moscow, houses in which their ministers resided; a stipulation which they had made at once to show their power and watch the actions of the grand prince. To rid her husband and herself of these unpleasant neighbours, Sophia sent a formal embassy to the khan, to inform him, that as she had been favoured with a vision from above, commanding her to build a temple in the place where then stood the houses of the Tartar ministers, her mind could not be at ease till she had fulfilled the divine command; she therefore desired his leave to pull them down, and give his people others. The khan consented. The houses within the Kremlin were demolished, and no new ones being provided, the Tartar residents were obliged to leave Moscow; an affront which their prince was not able to revenge, as he was then engaged in a war with the Poles.

His successes against the Tartars.

Ivan, taking advantage of this circumstance, and having gradually increased his forces, now openly disclaimed all subjection to the Tartars, attacked their territories, and made himself master of Kazan. Here he was solemnly crowned with a diadem which is said to be the same that is still used in the coronation of the Russian sovereigns. This took place about the year 1470, and led to a complete emancipation of Russia from the Tartar dominion. Ivan afterwards carried his arms against the neighbouring states. Asiatic Bulgaria, and great part of Lapland, soon submitted to him; and the great Novgorod, a city then so famous that the Russians were accustomed to intimate their idea of its importance by the proverbial expression, Who can resist God and the great Novgorod? was reduced by his generals after a seven years' siege, and yielded immense treasure. After he quitted the city, which had been awed by his presence, the discontents excited at his violent measures broke out into acts of mutiny, upon which he, in 1485, carried off fifty of the principal families, and distributed them through several of the Russian towns. He afterwards removed some thousands of the most considerable inhabitants, and substituted for them more loyal subjects from other places. By these proceedings the flourishing commerce of this city received a considerable shock, and it suffered still more by the imprisonment of all the German merchants, and the confiscation of their effects, with the abolition of the old municipal franchises. Indeed from this period Novgorod never recovered its former splendour.

inva- of Li- a and honia.

After his reduction of this city, Ivan invaded the territories of Livonia and Esthonia, in consequence, as we are told, of an affront offered to him by the inhabitants of Revel. Here, however, he met with a stout resistance, and does not seem to have made much progress. Towards the conclusion of his reign, the Kazanian Tartars, who, though humbled, had continued to inhabit that district, made a hard struggle to shake off the Russian yoke that had been imposed on them; but Ivan had established his authority too firmly for them to accomplish their purpose during his life. He died in 1505, and was succeeded by his son Vasilii Ivanovitch, commonly called Basilius III.

A 1505. rn of lii III.

The Tartars of Kazan were still suffered to maintain a show of independency, by electing their own khans; but a Russian noble, under the denomination of voyvode, was associated with the khan in the government, and took care that the administration should be conducted in such a manner as to secure the interests of his master. About fourteen years after the death of Ivan, however, the Tartars resolved to overturn so humiliating an administration. They murdered the Russian voyvode, expelled their nominal khan, and united themselves with their brethren of the Crimea. With their assistance they assembled a mighty force, entered the Russian dominions, and carried their arms even to the gates of Moscow. The grand prince Vasilii found himself at that time unable to resist the barbarians; and therefore purchased an exemption from general pillage by great presents, and a promise of renewed allegiance. The Tartars retired, but carried off immense booty, and nearly three hundred thousand prisoners, the greater part of whom they sent to Theodosia in the Crimea, and sold to the Turks. This humiliation of Vasilii did not, however, long continue; and he was soon enabled to make head against the Tartars, and to recover possession of the city Kazan, and of Pscove, a city which had been built by the Princess Olga, and was the great rival of Novgorod in wealth and commercial importance. Under this prince all the principalities of Russia were once more united, and they have remained ever since under the dominion of one sovereign.

A 1533. I Vasi- ch II.

It was under the son and successor of Vasilii, Ivan IV., or, as he is styled by the Russian historians, Ivan Vasilii-vitch II., that Russia completely emancipated herself from her subjection to the Tartars, and acquired a vast accession of territory, which extended her empire into the north-east of Asia, and rendered her for the first time superior in extent to any state that had appeared since the Roman empire. Vasilii died in 1533, having reigned twenty-eight years, and lived fifty-five. His son Ivan was only three years old when he succeeded to the throne; and during his minority the state became a prey to anarchy and confusion. But when he attained his seventeenth year, he was able to assume the reins of government without opposition; and, from the important transactions in which he immediately engaged, he must have been possessed of considerable resources.

A 547. Hi ha- rac .

In taking into his own hands the administration of the state, Ivan displayed so much prudence and manly fortitude as soon raised him very high in the estimation of his subjects. At the same time he showed marks of a tyrannical disposition and irritability of temper, which made him rather feared than admired by his friends, whilst they rendered him an object of terror to his neighbours and his enemies. He saw himself surrounded on all sides by contending factions, and to suppress these was the first object of his care. In the choice of means for effecting this, he does not seem to have been very scrupulous, provided they tended to the accomplishment of his end; and in punishing the offences of those who opposed his purpose, his violence of temper not unfrequently led him to confound the innocent with the guilty. He was successful, however, in his great design; and having secured the domestic tranquillity of his dominions, he had leisure to direct his attention to the more remote but not less predominant objects of his ambition. He resolved to attempt liberating his country for ever from the dominion of the Tartars; and he succeeded. In the year 1551 he marched an army in the depth of winter into the district of Kazan, and laid siege to the capital, checking by severe punishments the murmurs of his troops, who loudly and openly expressed their dislike to this expedition.

His siege of the Tartar capital.

Before entering seriously on the siege of Kazan, he built several forts on the frontiers of the Tartar territories, by which he hoped to awe these barbarians, and to prevent them from disturbing the peace of his dominions. He then invested Kazan, and, in the year 1552, made himself master of it by the new, and, to the Tartars, unheard-of method of springing a mine below the walls. The inhabitants that escaped slaughter were offered mercy on condition that they should embrace the Christian faith. By this important conquest, the dominion of the Tartars, who had oppressed the Russians for more than three centuries, was completely and permanently overthrown.

His extension of the Russian territories.

About two years later Ivan extended his conquests eastward to the shores of the Caspian, and took possession of the territory that lay on the right bank of the Volga, round the city of Astracan, which was also inhabited by the Tartar hordes.

His severe treatment of Novgorod.

Ivan, as well as his grandfather, had found it necessary to chastise the inhabitants of Novgorod. But, in the year 1570, this city, being suspected of forming a plot for delivering itself and the surrounding territory into the hands of the king of Poland, felt still more severely the effects of his vengeance. All who had been in any degree implicated in the conspiracy, to the number of twenty-five thousand, suffered by the hands of the executioner. The city of Pscove was threatened with a similar proscription; but Ivan, on their voluntary submission, contented himself with the execution of a few monks, and the confiscation of the property of the most opulent inhabitants. It is not surprising that acts like these should have given to this prince the names of *terrible* and *tyrant*, by which historians have occasionally distinguished him; though it is not a little extraordinary that he should have retained so much interest in the affections of his subjects, that when, to try their attachment, he, in 1575, abdicated the government, and retained only the title of Prince of Moscow, the majority of the nation loudly expressed their wish for him to resume the administration of affairs. We can account for this only by considering the measures which he had adopted for the improvement and the civilization of his people. These were of such a nature as in a great measure to obliterate the remembrance of his cruelty and oppression. He promulgated a new code of laws, composed partly of such ancient statutes as were still in force, and were capable of improvement, and partly of new regulations, which he either contrived himself, or adopted from the neighbouring states. He found it necessary, however, to render many of these laws extremely severe; though their execution was most frequently exemplified in the persons of his nobles, whose proud obstinacy seemed unconquerable by more lenient measures.

Cultivates an intercourse with the neighbouring states.

Ivan cultivated an intercourse with several of the European states, especially with Germany. In 1547, he sent a splendid embassy to the Emperor Charles V., requesting him to permit a number of German artists, mechanics, and literary men, to establish themselves in Russia. Charles readily complied with his request, and several hundred volunteers were collected and assembled at Lubeck, whence they were to proceed through Livonia to Moscow. The Lubeckers, however, afraid lest the improvement of the Russians in arts and manufactures might render them independent of their neighbours, and diminish the commercial intercourse that had long subsisted between their city and the principal towns of Russia, arrested the Germans on their route; and, in concert with the merchants of Revel and Riga, sent a petition to Charles, requesting him to recall the permission he had granted. In consequence of these measures, many of the German artists returned home; but several of them escaped the vigilance of the Lubeckers, and reached Moscow by a circuitous journey. Ivan endeavoured to revenge himself on the Livonians by invading their country, which was strenuously defended by the Teutonic knights; and these champions, finding at last that they were unable to maintain their ground, put the territory under the protection of Poland.

War between the Russians and Swedes.

The Swedes also received a share of the Livonian territories; and this circumstance gave rise to a war between them and the Russians. Ivan invaded Finland; but that country was bravely defended by William of Furstenberg, grand-master of the Livonian knights, with the assistance of the troops of Gustavus Vasa; and it does not appear that Ivan gained much in this expedition, though we are told that the Livonian grand-master ended his life in a Russian prison.

An. 1553. First intercourse between England and Russia.

In 1553, an event happened which first led to an intercourse between Russia and England. Some Englishmen, who were at that time on a voyage of discovery, landed on the shores of the White Sea, where soon after was built the port of Archangel. They were hospitably received by the natives; and intimation of the circumstance being conveyed to Ivan, he sent for the strangers, and was so much pleased with their abilities and deportment, that he resolved to give every encouragement to the English commerce, and thus open a new channel of intercourse with a highly polished nation, by which his subjects might obtain fresh incitements to activity and industry. He expressed the highest esteem for Queen Elizabeth, and requested by his ambassador, that if the ingratitude of his subjects should ever compel him to quit Russia (a circumstance by no means improbable), she would grant him an asylum in her dominions. It was in consequence of this accidental communication between the Russians and the English that England first engaged in a trade to Russia, and promoted this new commerce by the establishment of a company of Russian merchants in London.

Ivan annexes Siberia to the Russian empire.

About twenty years after Astracan had been annexed to the Russian empire, a new acquisition of territory accrued to it from the conquests of a private adventurer, in the unknown regions of Siberia. The steps that led to the acquisition of this immense tract of the Asiatic continent are thus related by Tooke.

"The grand prince, Ivan III. had already sent out a body of men, who penetrated across the Ingrian Mountains, and traversed all the districts as far as the river Oby. But, amidst the urgent affairs of government, the discoveries they made insensibly fell into oblivion. Some years afterwards, a merchant named Stroganof, who was proprietor of some salt-works on the confines of Siberia, was curious to gain a farther knowledge of that country, which was likewise inhabited by Tartars, whose khan resided in the capital Sibir. Perceiving, among the persons who came to him on affairs of trade, men who belonged to no nation with which he was acquainted, he put several inquiries to them concerning the place whence they came, and once sent a few of his people with them back to their country. These people brought with them, at their return from the regions they had now explored, and which proved to be this very Siberia, a great quantity of valuable furs, and thus opened to their master a new road to wealth. However, not so covetous as to wish to keep this treasure to himself, he sent information of it to the court, and the attention of government was once more directed to this country. But the conquest of it, and its conjunction with Russia, was reserved for an adventurer named Timoseycf Yermak. This Yermak, at the head of a gang of Don Kozaks, had made it his practice to rob and plunder the caravans and passengers that occasionally frequented the roads, as well as the inhabitants, wherever he came, and was so fortunate as to escape the search of the Russian troops that had been sent out against him and his band, which consisted of not fewer than six thousand men. On their flight, he and his people accidentally came to the dwelling of Stroganof, where, hearing much talk about Siberia, and being persons who had nothing to lose, and therefore might put all to the hazard, they soon formed a plan to penetrate farther into that country, and there seek at once their safety and their fortune. After numerous struggles and conflicts with the natives, which greatly reduced their numbers, they at length conquered the capital, and shortly after the whole country. Yermak now presented the fruit of his toilsome and perilous victories to his Czar,[1] Ivan, in hopes of obtaining thereby a pardon of his former depredations, which was granted him accordingly; and by the building of several towns, and the constructing a number of forts, the possession of this country was soon permanently secured. The less and the greater Kabardey were also added to Russia in the reign of Ivan. This Czar, however, not only enlarged the circumference of his empire, partly by force of arms and partly by accident, but he resolved to reform his people, to render them more polished, more skilful, and more industrious; but this he found to be the most arduous enterprise he could possibly have undertaken. The insuperable impediments which threw themselves in the way of the execution of this grand work, were the principal incitements to those frequent acts of cruelty and despotism which have covered his memory with so deep a stain."

His victories over the Tartars.

Towards the close of Ivan's reign, a prodigious army of Tartars entered Russia, with a design to subdue the whole country. But Zerebrinoff, the Czar's general, having attacked them in a defile, put them to flight with considerable slaughter. They then retired towards the mouth of the Volga, where they expected a considerable reinforcement; but being closely pursued by the Russians, and the Tartars in alliance with them, they were again defeated, and forced to fly towards Azof, where their army was almost annihilated.

Destruction of Moscow by the Tartars.

From this time the empire of Russia became so formidable that none of the neighbouring nations could hope to make a total conquest of it. The Poles and Swedes indeed continued to be very formidable enemies; and, by the instigation of the former, the Crim Tartars, in 1571, again invaded the country with an army of seventy thousand men, which totally defeated the Russians in a battle fought within eighteen miles of the city of Moscow. The Czar retired with his most valuable effects to a well-fortified cloister; upon which the Tartars entered the city, plundered it, and set fire to several churches. A violent storm which happened at the same time soon spread the flames all over the city, which was entirely reduced to ashes in six hours. The fire likewise communicated itself to a powder magazine at some distance from the city; an accident by which upwards of fifty rods of the city wall, with all the buildings upon it, were destroyed; and, according to the historians, upwards of a hundred and twenty thousand citizens were burned or buried in the ruins. The castle, however, which was strongly fortified, could not be taken; and the Tartars, hearing that a formidable army was coming against them under the command of Magnus duke of Holstein, whom Ivan had made king of Livonia, thought proper to retire. The war, nevertheless, continued with the Poles and Swedes; and the Czar being defeated by the latter after some trifling success, was reduced to the necessity of suing for peace; but the negotiations being broken off, the war was renewed with the greatest vigour. The Livonians, the Poles, and the Swedes, having united in a league against the Russians, gained great advantages over them; and in 1579, Stephen Batory, who was then raised to the throne of Poland, levied an army expressly with a design of invading Russia, and of regaining all that Poland had formerly claimed, which, indeed, was little less than the whole empire. Ivan found his undisciplined multitudes unable to cope with the regular forces of his enemies; their conquests were so rapid that he was soon obliged to sue for peace, which, however, was not granted; and it is possible that the number of enemies which now attacked Russia might have overcome the empire entirely, had not the allies grown jealous of each other. The consequence of this was, that in 1582 a peace was concluded with the Poles, in which the Swedes were not comprehended. However, the Swedes, finding themselves unable to effect any thing of moment after the desertion of their allies, were obliged to conclude a truce; shortly after which, the Czar, having been worsted in an engagement with the Tartars, died in the year 1584.

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[1] Previous to the reign of Vasilii, the predecessor of the monarch whose transactions we are now relating, the Russian sovereigns held the title of Velikii Kniaz, which has been translated Grand Duke, though it more properly denotes Grand Prince; and by this latter appellation we have accordingly distinguished the preceding monarchs. Vasilii, near the conclusion of his reign, adopted the title of Czar or Emperor; but this title was not fully established till the successes and increasing power of his son Ivan enabled the latter to confirm it both at home and abroad; and since his time it has been universally acknowledged.

An. 1584. Reign of Feodor Ivanovitch.

The eldest son of the late Czar, Feodor (or, as he is commonly called, Theodore) Ivanovitch, was by no means fitted for the government of an empire so extensive, and a people so rude and turbulent, as had devolved to him by the death of his father. Ivan had seen the incapacity of his son, and had endeavoured to obviate its effects by appointing three of his principal nobles as administrators of the empire; whilst to a fourth he committed the charge of his younger son Dmitri or Demetrius. This expedient, however, failed of success; and, partly from the mutual jealousy of the administrators, partly from the envy which their exaltation had excited in the other nobles, the affairs of the empire soon fell into confusion. The weak Feodor had married a sister of Boris Gudonof, a man of great ambition, immense riches, and tolerable abilities. He had long directed his wishes towards the imperial dignity, and began to prepare the way for its attainment by removing Dmitri. This young prince suddenly disappeared; and there is every reason to believe that he was assassinated by the order of Boris. Feodor did not long survive his brother, but died in 1598, not without suspicion of having been poisoned by his brother-in-law. We are told that the Czarina, Irene, was so much convinced of this, that, retiring to a convent, she never afterwards held any communication with her brother.

Accession of Boris, and termination of the dynasty of Ruric.

With Feodor ended the family of Ruric, a dynasty which had enjoyed the supreme power in Russia ever since the establishment of the principality by the Varagian chief, that is, during a period of above seven hundred years. On the death of Feodor, as there was no hereditary successor to the vacant throne, the nobles assembled to elect a new Czar; and the artful Boris having, through the interest of the patriarch, procured a majority in his favour, was declared the object of their choice. He pretended unwillingness to accept the crown, declaring that he had resolved to live and die in a monastery; but when the patriarch, at the head of the principal nobles, and attended by a great concourse of people, bearing before them the cross, and the effigies of several saints, repaired to the convent, where the artful usurper had taken up his residence, he was at length prevailed on to accompany them to the palace of the Czars, and suffer himself to be crowned.

Boris is one instance amongst many of a sovereign who became beneficial to his subjects, though he had procured the throne by unjustifiable means. If we give implicit credit to the historians of those times, he was a murderer and a usurper, though he had the voice of the people in his favour; but by whatever means he had attained the imperial power, he seems to have employed it in advancing the interest of the nation, and in improving the circumstances of his people. He was extremely active in his endeavours to extend the commerce, and improve the arts and manufactures, of the Russian empire; and for this purpose he invited many foreigners into his dominions. Whilst he exerted himself in securing the tranquillity of the country, and defending its frontiers against the incursions of his neighbours, he made himself respected abroad, and received ambassadors from almost all the powers of Europe.

An. 1601. Dreadful famine at Moscow.

Soon after the commencement of his reign, the city of Moscow was desolated by one of the most dreadful famines recorded in history. Thousands of people lay dead in the streets and roads; and in many houses the fattest of the inmates was killed to serve as food for the remainder. Parents are said to have eaten their children, and children their parents; and we are told by one writer of the time that he saw a woman bite several pieces out of her child's arm as she was carrying it along. Another relates, that four women having desired a peasant to come to one of their houses, on pretence of paying him for some wood, killed and devoured both him and his horse. This dreadful calamity lasted three years, notwithstanding all the exertions of Boris to provide for the necessities of the inhabitants.

Invasion of the pretender Dmitri.

During these distresses of the capital, the power of Boris was threatened with annihilation by an adventurer who suddenly started up, and pretended to be the young prince Dmitri, whom all believed to have been assassinated, or, as Boris had given out, to have died of a malignant fever. This adventurer was a monk named Otrepief. He retired from Russia into Poland, where he had the dexterity to ingratiate himself with some of the principal nobles, and to persuade them that he was really the lawful heir to the crown of Russia. The better to insure to himself the support of the Poles, he learned their language, and professed a great regard for the Catholic religion. By this last artifice he both gained the attachment of the Catholic Poles, and acquired the friendship of the Roman pontiff, whose blessing and patronage in his great undertaking he further secured, by promising that, as soon as he should have established himself on the throne, he would make every exertion to bring the Russians within the pale of the Catholic church. To the external graces of a fine person, the pretended Dmitri added the charms of irresistible eloquence; and by these accomplishments the Polish voyvode of Sandomir was so much captivated that he not only espoused his cause, but promised to give him his daughter in marriage as soon as he should be placed on the throne of his fathers. This respectable man exerted himself so warmly in behalf of his intended son-in-law, that he brought over even the king of Poland to his party. The Kozaks of the Don, who were oppressed by Boris, hoping to gain at least a temporary advantage by the disturbance excited in favour of the adventurer, eagerly embraced the opportunity of declaring in his favour. The news soon penetrated into Russia; and although Boris did all in his power to destroy the illusion, by prohibiting all intercourse between his subjects and the Poles, and by appealing to the evidence of the murdered prince's mother in proof of his death, the cause of the pretender continued to gain ground. Many circumstances concurred to interest the Russian people in favour of Otrepief. The courtiers of the usurper, who had long been jealous of his elevation, pretended to believe his assertions; whilst those who were persuaded that the young prince had been murdered by order of the present Czar, regarded this event as a judgment from heaven. The greater part of the nation appear to have been persuaded that the pretender was the real Dmitri; and as they believed that he had been miraculously preserved, they piously resolved to concur with the hand of Providence in assisting him to recover his just rights. Thus, before he had set foot in Russia, a numerous party was formed in his behalf. He soon made his appearance on the frontiers with a regiment of Polish troops, and a body of Kozaks. Boris sent an army to oppose him; but though the number of these troops greatly exceeded the small force of the invaders, the latter were so animated by the eloquence of their leader, and the intrepidity and personal bravery which he displayed in the field of battle, that, after a bloody conflict, the army of Boris was defeated, and the pretended Dmitri remained master of the field.

His successes.

This victory served still further to strengthen the belief that Dmitri was favoured by heaven, and consequently could not be an impostor. To confirm the good opinion which he had evidently acquired, the victor treated his prisoners with great kindness; caused the dead to be decently interred; and gave strict injunctions to his troops to behave with humanity in the towns through which he passed. This gentle behaviour, when contrasted with the horrible excesses committed by the soldiers of Boris, wherever the people appeared to show any inclination towards the cause of the invader, gained Dmitri more adherents than even the persuasion that he was the lawful sovereign of the country. Unluckily for Boris, likewise, the superstition of the Russians was about this time directed against him, by the appearance of a comet, and by the more than usual coruscations of the aurora borealis, phenomena which were immediately regarded as manifest demonstrations that the Almighty was pouring out his phials of wrath on the devoted country. Boris, unable to resist the torrent of public opinion in favour of his rival, is said to have taken poison, and thus hastened that fate which he foresaw awaited him if he should fall into the hands of his enemies.

An. 1605.

The death of Boris took place in the year 1605; and though the principal nobility at Moscow placed his son Feodor on the throne, the party of Dmitri was now so strong, that Feodor was dethroned and sent to prison with his mother and sister, within six weeks after his accession.

He ascends the Russian throne.

The successful monk had now attained the summit of his ambitious hopes, and made his entry into Moscow with the utmost magnificence. Not deeming himself secure, however, whilst the son of Boris remained alive, he is said to have caused him to be strangled, together with one of his sisters. The new Czar, though he evidently possessed great abilities, seems to have been deficient in point of prudence. Instead of conciliating the favour of his subjects, he openly displayed his predilection for the Poles, conferring on them high posts and dignities, and even conniving at the extravagance and enormities which they committed. This impolitic conduct, together with his partiality for the Catholic religion; his marked indifference towards the public worship of the national church, and his want of reverence for the Greek clergy; his marrying a Polish lady; his affectation of Polish manners; his inordinate voluptuousness, and the contempt with which he treated the principal nobility; so exasperated the Russians, that discontents and insurrections arose in every quarter of the empire. The populace of the capital were at length roused to fury, by a rumour that a timber fort which he had caused to be constructed before Moscow, was intended to serve as an engine of destruction, and that at a martial spectacle which the Czar was preparing for the entertainment of his bride, the Poles, and other foreigners that composed his body guard, were from this building to cast firebrands into the city, and then slaughter the inhabitants. The people were still further incensed by the clergy, who declaimed against Dmitri as a heretic, and by Schuiskoy, a nobleman who had been condemned to death by the Czar, but had afterwards been pardoned. This nobleman put himself at the head of the enraged mob, and led them to attack the palace. They entered it by assault, put to the sword all the Poles whom they found within its walls, and afterwards extended their massacre to such as were discovered in other parts of the city. Dmitri himself, in attempting to escape, was over taken by his pursuers, and thrust through with a spear; and his dead body, being brought back into the city, lay for three days before the palace, exposed to every outrage that malice could invent or rage inflict. His father-in-law and his wife escaped with their lives, but were detained as prisoners, and the Czarina was confined at Yaroslaf.

Unsettled state of Russia.

Schuiskoy, who had pretended to be actuated by no other motives than those of the purest patriotism, now aspired to the vacant throne, and had sufficient interest to carry his election. His reign was short and uninteresting, and indeed from this time till the accession of the house of Romanof in 1613, the affairs of Russia have little to gratify our curiosity. Schuiskoy's reign was disturbed by the pretensions of two fictitious Dmitris, who successively started up, and declared themselves to be either the late Czar, or the prince whom he had personated; and his neighbours the Swedes and Poles, taking advantage of the internal dissensions in the empire, made many successful incursions into Russia, set fire to Moscow, and massacred above a hundred thousand of the people. The Russians, dissatisfied with the reigning prince, treated with several of the neighbouring potentates for the disposal of the imperial crown. They offered it to Vladislaf, or Uladislas, son of Sigismund, king of Poland, on condition that he should adopt the Greek persuasion; but as he rejected this preliminary, they turned their eyes first on a son of Charles IX. of Sweden, and then on a young native Russian, Mikhail Feodorovitch, of the house of Romanof, a family which was distantly related to their ancient Czars, and of which the head was then metropolitan of Rostof, and as such held in great estimation. The influence of the clergy, who exerted themselves for Mikhail, both by personal intrigues and by the dissemination of pretended revelations from heaven, silenced the supporters of the other claimants; and after a long series of confusion and disaster, there ascended the Russian throne a new family, whose descendants have raised the empire to a state of grandeur and importance unequalled in any former period.

Having traced Russia through the obscurer stages of its history, we are now to witness its sudden elevation amongst the powers of Europe, and to accompany it in its hasty strides towards that importance which it has lately assumed. But before we enter on the transactions that have enriched the pages of the Russian annals since the accession of the house of Romanof, it may not be uninteresting to take a general view of the state of the empire at the beginning of the seventeenth century.

State of the empire at the beginning of the 17th century.

At this period the government of Russia may be considered as a pure aristocracy, since the supreme power rested in the hands of the nobles and the superior clergy. In particular, the boyars, or chief officers of the army, who were also the privy counsellors of the prince, possessed a very considerable share of authority. The election of the late princes Boris, Dmitri, and Schuiskoy, had been conducted principally by them, in concert with the inhabitants of Moscow, where was then held the seat of government. The common people, especially those of the inferior towns, though nominally free, had no share in the government or in the election of the chief ruler. The boors, or those peasants who dwelt on the noblemen's estates, were almost completely slaves, and transferable with the land on which they dwelt. An attempt to annul this barbarous vassalage had been made, both by Boris and by Schuiskoy; but, from the opposition of the nobles, it was abandoned.

The laws then in force consisted partly of the municipal laws drawn up for the state of Novgorod by Yaroslaf, and partly of an amended code, called *Sudebnik*, promulgated by Ivan Vasiliivitch II. By this Sudebnik the administration of the laws was made uniform throughout the empire, and particular magistrates were appointed in the several towns and districts, all subject to the czar as their chief. The Sudebnik consisted of ninety-seven articles, all containing civil laws; as the penal statutes are only briefly mentioned in some articles, so as to appear either connected with the civil, or as serving to illustrate them. The criminal laws were contained in a separate code, called *Gubnaia Gramota*, which is now lost, but is referred to in the civil code. In neither of these codes is there any mention of ecclesiastical affairs; but these were regulated by a set of canons drawn up in 1542, under the inspection of Ivan Vasiliivitch, in a grand council held at Moscow. In the civil statutes of the Sudebnik, theft was punished in the first instance by restitution; or, if the thief were unable to restore the property stolen, he became the slave of the injured party till by his labour he had made sufficient compensation. Of murder nothing is said, except where the person slain was a lord or master, when the murderer was to be punished with death. There is no mention of torture, except in cases of theft.

Before the accession of the house of Romanof, the commercial intercourse which the cities of Novgorod and Pscov, formerly held with the Hanse Towns, had entirely ceased; but this was in some degree compensated by the newly established trade between Russia and England, the centre of which was Archangel. This trade had been lately increased by the products derived from the acquisition of Siberia, in exchange for which the English principally supplied the Russians with broad cloth. In 1568, an English counting-house was established at Moscow, and about the same time the Russian Company was incorporated. Previously to the fifteenth century, the trade of the Russians had been carried on merely by barter; but during that century the coinage of money commenced at Novgorod and Pscov; and from this time their commerce was placed on an equal footing with that of the other European nations.

Except in the article of commerce, the Russians were deplorably behind the rest of Europe; and though attempts had been made by Ivan I., Ivan Vasiliivitch II., and Boris, to cultivate their manners and to improve the state of their arts and manufactures, these attempts had failed of success.[1]

An. 1613. Mikhail makes peace with the Swedes and Poles.

At the accession of Mikhail, who was crowned in June 1613, the Swedes and Poles were in possession of several parts of the empire; and to dislodge these intruders was the first object of the new czar. Aware of the difficulty of contending at once with both these formidable enemies, he began by negotiating a treaty of peace with Sweden. This was not effected without considerable sacrifices. Mikhail agreed to give up Ingria and Karelia, and to evacuate Esthonia and Livonia. Thus freed from his most dangerous enemy, he prepared to oppose the Poles, of whom a numerous body had entered Russia, to support the claims of their king's son Vladislaf. Mikhail proceeded, however, in a very wary manner, and instead of opposing the invaders in the open field, he entrapped them by ambuscades, or allured them into districts already desolated, where they suffered so much from cold and hunger, that in 1619 they agreed to a cessation of hostilities for fourteen years and a half, on condition that the Russians should cede to Poland the government of Smolensk.

His prudent conduct.

Thus freed from external enemies on terms which, though not very honourable, were the best that the posture of his affairs admitted, Mikhail applied himself to arranging the internal economy of his empire. He began by placing his father at the head of the church, by conferring on him the dignity of patriarch, which had become vacant. The counsels of this venerable man were of great advantage to the emperor, and contributed to preserve that peace and tranquillity by which his reign was in general distinguished. His next step was to form treaties of alliance with the principal commercial states of Europe. He accordingly sent ambassadors into England, Denmark, Holland, and the German empire; and Russia, which had hitherto been considered rather as an Asiatic than a European power, became so respectable in the eyes of her northern neighbours, that they vied with each other in their eagerness for establishing with her commercial relations.

Mikhail also commenced those improvements of the laws which we shall presently see more fully executed by his son and successor; but the tide of party ran so high, that he could effect only a very imperfect reformation. He was also obliged to put his frontiers in a state of defence, by providing for the expiration of the truce with Poland, which now drew nigh; and as no permanent peace had been established, both parties began to prepare for a renewal of hostilities. Indeed the armistice was broken by the Russians, who, on the death of Sigismund, king of Poland, appeared before Smolensk, justifying the infringement of the treaty, on the pretence that it was concluded with Sigismund, and not with his successors. Nothing of consequence, however, was then executed; and the Russian commander, after having lain there in perfect indolence, with an army of fifty thousand men, for two years, at length raised the siege. Mikhail attempted to engage the Swedes in an alliance with him against Poland; but failing in this negotiation, he concluded a new treaty, which continued unbroken till his death. This event happened in 1645.

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[1] Tooke furnishes the following characteristic features of the state of Russia in the sixteenth century.

The houses were in general of timber, and badly constructed, except that in Moscow and other great towns there were a few built of brick.

That contempt for the female sex which is invariably a characteristic of defective civilization, was conspicuous among the Russians. The women were kept in a state of perfect bondage, and it was thought a great instance of liberality if a stranger were but permitted to see them. They were scarcely ever allowed to quit the house, even for the purpose of going to church, though attendance on divine worship was considered of the highest importance.

The men of the middle ranks always repaired about noon to the market, where they transacted business, conversed about public affairs, and attended the courts of judicature to hear the causes that were going forward. In agreements and bargains the highest asseveration was, "If I keep not my word, may it turn to my infamy;" a custom extremely honourable to the nation, as they held the disgrace of having forfeited their word to be the deepest degradation.

If the wife was so dependent on her husband, the child was still more dependent on his father; for parents were allowed to sell their children. Masters and servants entered into a mutual contract respecting the terms of their connection; and a written copy of this agreement was deposited in the proper court, where, if either party broke the contract, the other might lodge his complaint.

Single combat still continued to be the last resource in deciding a cause; and to this the judge resorted in cases which he knew not otherwise how to determine. But duels out of court were strictly prohibited; and when these took place, and either party fell, the survivor was regarded as a murderer, and punished accordingly. Personal vengeance was forbidden, under the strictest penalty. The nobles were universally soldiers, and were obliged to appear when summoned, to assist the prince in his wars. Till the end of the sixteenth century the boor was not bound to any particular master. He tilled the ground of a nobleman for a certain time on stated conditions. Thus he either received part of the harvest or of the cattle, a portion of wood, hay, &c.; or he worked five days for the master, and on the sixth was at liberty to till a piece of ground set apart for his use. At the expiration of the term agreed on, either party might give up the contract; the boor might remove to another master, and the master dismiss the boor that did not suit him.

An. 1645.
Accession of Alexei Mikhailovitch.

Mikhail was succeeded by his son Alexei; but as the young prince was only fifteen years of age at the time of his father's death, a nobleman named Morosof had been appointed his governor and regent of the empire. This man possessed all the ambition of Boris, without his prudence and address; and in attempting to raise himself and his adherents to the highest posts in the state, he incurred the hatred of all ranks of the people. Though, by properly organizing the army, he provided for the defence of the empire against external enemies, he shamefully neglected internal policy, and connived at the most flagrant enormities in the administration of justice. These abuses went so far that the populace once stopped the czar as he was returning from church to his palace, calling aloud for righteous judges. Although Alexei promised to make strict inquiry into the nature and extent of their grievances, and to inflict deserved punishment on the guilty, the people had not the patience to await this tardy process, and proceeded to plunder the houses of those nobles who were most obnoxious to them. They were at length pacified, however, on condition that the author of their oppression should be brought to condign punishment. One of the most nefarious judges was executed; and the principal magistrate of Moscow was killed in a tumult. The life of Morosof was spared at the earnest entreaty of the czar, who engaged for his future good behaviour.

Similar disturbances had broken out at Novgorod and Pscov; but they were happily terminated, chiefly through the exertions of the metropolitan Nicon, a man of low birth, who, by his reputation for extraordinary piety and holiness, had raised himself to the patriarchal dignity, and was high in favour with Alexei. The pacific conduct of the neighbouring states did not long continue, though indeed we may attribute the renewal of hostilities to the ambition of the czar.

War with Sweden and Poland.

The war with Poland was occasioned by Alexei's supporting the Kozaks, a military horde, who had left the northern shores of the Dnieper, and retired further to the south. Here they had established a military democracy, and during the dominion of the Tartars in Russia had been subject to the khan of those tribes; but after the expulsion or subjugation of the Tartars, the Kozaks had put themselves under the guardianship of Poland, to which kingdom they formerly belonged. As the Polish clergy, however, attempted to impose on them the Greek faith, they threw off their allegiance to the king of Poland, and claimed the patronage of Russia. Alexei, who seems to have sought a pretext for a rupture with that state, gladly received them as his subjects, hoping, by their assistance, to recover the territories which had been ceded to Poland by his father. He began by negotiation, and sent an embassy to the king of Poland, complaining of some Polish publications, in which reflections had been cast on the honour of his father, and demanding that, by way of compensation, the Russian territories formerly ceded should be restored. The king of Poland of course refused so arrogant a demand, and both parties prepared for war. The Russians, assisted by the Kozaks, were so successful in this contest, that the king of Sweden became jealous of Alexei's good fortune, and apprehensive of an attack. He therefore determined to take a very active part in the war, especially as the Lithuanians, who were extremely averse to the Russian dominion, had sought his protection. The war with Sweden commenced in 1656, and lasted for two years, without any important advantage being gained by either party. A truce was concluded in 1658 for three years, and at the termination of this period a solid peace was established. In the mean time the war with Poland continued, but was at length terminated by an armistice, which was prolonged from time to time during the remainder of Alexei's life.

The reign of this monarch is as remarkable for turbulence as that of his predecessor had been for tranquillity. No sooner was peace established with the neighbouring states than fresh commotions shook the empire from within. The Don Kozaks, who now formed a part of the Russian population, felt themselves aggrieved by the rigour with which one of their officers had been treated, and, placing at their head Radzin, the brother of the deceased, broke out into open rebellion. Allured by the spirit of licentiousness and the hopes of plunder, vast numbers, both of Kozaks and inferior Russians, flocked to the standard of Radzin, and formed an army of nearly two hundred thousand men. This force, however, ill armed and quite undisciplined, was formidable merely from its numbers. Radzin himself seems to have placed no reliance on the courage or fidelity of his followers, and eagerly embraced the first opportunity of procuring a pardon by submission. Having been deceived into a belief that this pardon would be granted on his surrendering himself to the mercy of the czar, he set out for Moscow, accompanied by his brother; but when he had arrived within a short distance of the capital, whither notice had been sent of his approach, he was met by a cart containing a gallows, on which he was immediately hanged. His followers, who had assembled at Astracan, were surrounded by the czar's troops, taken prisoners, and twelve thousand of them hung on the gibbets in the highways.

Commencement of a war with Turkey.

The authority which Alexei had obtained over the Donskoi Kozaks excited the jealousy of the Sublime Porte, which justly dreaded the extension of the Russian territory on the side of the Crimea, a peninsula at that time belonging to Turkey. After a successful attempt on the frontiers of Poland, a Turkish army entered the Ukraine, and the Russians made preparations to oppose them. Alexei endeavoured to form a confederacy against the infidels among the Christian potentates of Europe; but the age of crusading chivalry was over, and the czar was obliged to make head against the Turks, with no assistance but that of the king of Poland. The Turkish arms were for some years victorious, especially on the side of Poland; but at length a check was given to their successes by the Polish general Sobieski, who afterwards ascended the throne of that kingdom. Hostilities between the Turks and Russians were not, however, terminated during the reign of Alexei, and the czar left to his successor the prosecution of the war.

Alexei's improvements of the laws.

The reign of Alexei is most remarkable for the improvements introduced by him into the Russian laws. Before his time the *Emannoy Ukases*, or personal orders of the sovereign, were almost the only laws of the country. These edicts were as various as the opinions, prejudices, and passions of men; and before the days of Alexei they produced endless contentions. To remedy this evil, he made a selection, from all the edicts of his predecessors, of such as had been current for a hundred years, presuming that these either were founded in natural justice, or during so long a currency had formed the minds of the people to consider them as just. This digest, which he declared to be the common law of Russia, and which is prefaced by a sort of institute, is known by the title of the *Uloshenìè* or *Selection*. It was long the standard law-book, all edicts prior thereto being declared to be obsolete. He soon made his new code, however, more bulky than even the Selection; and the additions of his successors are beyond enumeration. This was undoubtedly a great and useful work; but Alexei performed another still greater.

Though there were many courts of judicature in this widely-extended empire, the emperor was always lord paramount, and could take a cause from any court immediately before himself. But as several of the old nobles had the remains of principalities in their families, and held their own courts, the sovereign or his ministers, at a distance up the country, frequently found it difficult to bring a culprit out of one of these hereditary feudal jurisdictions, and to try him by the laws of the empire. This was a very dangerous limitation of imperial power, and the more so that some families claimed even a right of replevance. A fortunate opportunity soon offered of settling the dispute, and Alexei embraced it with great ability.

Some families on the old frontiers were taxed with their defence, for which they were obliged to maintain regiments; and as they were but scantily indemnified by the state, it sometimes required the exertion of authority to make them keep up their levies. When, by the conquest of Kazan, the frontiers were far extended, these nobles found the regiments no longer burdensome, because, by the help of false musters, the formerly scanty allowance much more than reimbursed them for the expense of the establishment. The consequence was, that disputes arose among them about the right of guarding certain districts, and lawsuits were necessary to settle their respective claims. These were tedious and intricate. The emperor ordered all the family archives to be brought to Moscow, and all documents on both sides to be collected. A time was fixed for the examination; a fine wooden court-house was built; every paper was lodged under a guard; and the day was appointed when the court should be opened and the claims heard. But on that morning the house, with all its contents, was in two hours consumed by fire. The emperor then said, "Gentlemen, henceforward your rank, your privileges, and your courts, are the nation's, and the nation will guard itself. Your archives are unfortunately lost, but those of the nation remain. I am the keeper, and it is my duty to administer justice for all and to all. Your rank is not private, but national, attached to the services you are actually performing. Henceforward Colonel Buturlin (a private gentleman) ranks before Captain Viazemsky (an old prince)."

The Russians owe more to this prince than some of their historians seem willing to acknowledge; and there appears to be no doubt that several of the improvements attributed to Peter the Great were at least projected by his father. Under Alexei a considerable trade was opened with China, from which country silks, and other rich stuffs, were brought into Russia, and exchanged for the Siberian furs. The exportation of Russian products to other countries was also increased; and we are assured that Alexei had even projected the formation of a navy, and would have executed the design, had he not been perpetually occupied in foreign wars and domestic troubles.

A 1676.
R n of
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Alexei died in 1676, leaving three sons and six daughters. Two of the sons, Feodor and Ivan, were by a first marriage; the third, Peter, by a second. The two former, particularly Ivan, were of a delicate constitution, and some attempts were made by the relations of Peter to set them aside. These attempts, however, proved unsuccessful, and Feodor became the successor of Alexei.

The reign of this prince was short, and distinguished rather for the happiness which the nation then experienced, than for the importance of the transactions which took place. He continued the war with the Turks for four years after his father's death, and at length brought it to an honourable conclusion, by a truce for twenty years, after the Turks had acknowledged the Russian right of sovereignty over the Kozaks. Feodor died in 1682, but before his death nominated his half-brother Peter his successor.

An. 1682.
Intrigues of the Princess Sophia.

The succession of Peter, though appointed by their favourite czar Feodor, was by no means pleasing to the majority of the Russian nobles, and it was particularly opposed by Galitzin, the prime minister of the late czar. This able man had espoused the interest of Sophia, the sister of Feodor and Ivan, a young woman of eminent abilities and the most insinuating address. Sophia, upon pretence of asserting the claims of her brother Ivan, who, though of a feeble body and weak intellect, was considered as the lawful heir of the crown, had really formed a design of securing the succession to herself; and with that view, had not only insinuated herself into the confidence and good graces of Galitzin, but had brought over to her interests the Strelitzes, who were the body-guard of the czars, and at this time were about fourteen thousand in number. These licentious soldiers assembled for the purpose, as was pretended, of placing on the throne Prince Ivan, whom they proclaimed czar by acclamation. During three days they roved about the city of Moscow, committing the greatest excesses, and putting to death several of the chief officers of state who were suspected of being hostile to the designs of Sophia. Their employer did not, however, entirely gain her point; for as the new czar entertained a sincere affection for his half-brother Peter, he insisted that this prince should share with him the imperial dignity. This was at length agreed to; and on the 6th of May 1682, Ivan and Peter were solemnly crowned joint emperors of all the Russias, while the Princess Sophia was nominated their copartner in the government.

Joint reign of Ivan and Peter I.

From the imbecility of Ivan and the youth of Peter, who was now only ten years of age, the whole power of the government rested with Sophia and her minister Galitzin, although till the year 1687 the names of Ivan and Peter only were annexed to the imperial decrees. Scarcely had Sophia established her authority when she was threatened with deposition, from an alarming insurrection of the Strelitzes. This was excited by their commander Prince Kovanskoi, who had demanded of Sophia that she should marry one of her sisters to his son, but had met with a mortifying refusal. In consequence of this insurrection, which threw the whole city of Moscow into terror and consternation, Sophia and the two young czars took refuge in a monastery about twelve leagues from the capital; and before the Strelitzes could follow them thither, a considerable body of soldiers, principally foreigners, was assembled in their defence. Kovanskoi was taken prisoner, and instantly beheaded; and though his followers at first threatened dreadful vengeance on his executioners, they soon found themselves obliged to submit. From every regiment was selected the tenth man, who was to suffer as an atonement for the rest; but this cruel punishment was remitted, and only the most guilty among the ringleaders suffered death.

An. 1687.
The party of Peter gains ground.

The quelling of these disturbances gave leisure to the friends of Peter to pursue the plans which they had formed for subverting the authority of Sophia; and about this time a favourable opportunity offered, in consequence of a rupture with Turkey. The Porte was now engaged in a war with Poland and the German empire, and both these latter powers had solicited the assistance of Russia against the common enemy. Sophia and her party were averse to the alliance; but as there were in the council many secret friends of Peter, these had sufficient influence to persuade the majority that a Turkish war would be of advantage to the state. They even prevailed on Galitzin to put himself at the head of the army, and thus removed their principal opponent. It is difficult to conceive how a man, so able in the cabinet as Galitzin, could have suffered his vanity so far to get the better of his good sense, as to accept a military command, for which he certainly had no talents. Assembling an army of nearly three hundred thousand men, he marched towards the confines of Turkey, and there consumed two campaigns in marches and countermarches, and lost nearly forty thousand men, partly in unsuccessful skirmishes with the enemy, but chiefly from disease.

While Galitzin was thus trifling away his time in the south, Peter, who already began to give proofs of those great talents which afterwards enabled him to act so conspicuous a part in the theatre of the north, was strengthening his party among the Russian nobles. His ordinary residence was at a village not far from Moscow, and here he had assembled round him a considerable number of young men of rank and influence, whom he called his play-mates. Among these were two foreigners, Lefort a Genevese, and Gordon a Scotchman, who afterwards signalized themselves in his service. These young men had formed a sort of military company, of which Lefort was captain; and the young czar, beginning with the situation of drummer, gradually rose through every subordinate office. Under this appearance of a military game, Peter was secretly establishing himself in the affections of his young companions, and effectually lulled the suspicions of Sophia, till it was too late for her to oppose his machinations.

An. 1689. Peter obtains the undivided sovereignty.

About the middle of the year 1689, Peter, who had now attained his seventeenth year, determined to make an effort to deprive Sophia of all share in the government, and to secure to himself the undivided sovereignty. On occasion of a solemn religious meeting that was held, Sophia had claimed the principal place, as regent of the empire; but this claim was strenuously opposed by Peter, who, rather than fill a subordinate situation, quitted the place of assembly, and, with his friends and adherents, withdrew to the monastery of the Holy Trinity, which had formerly sheltered him and his copartners from the fury of the Strelitzes. This was the signal for an open rupture. Sophia, finding that she could not openly oppose the party of the czar, attempted to procure his assassination; but as her design was discovered, she thought proper to solicit an accommodation. This was agreed to, on condition that she should give up all claim to the regency, and retire to a nunnery. The commander of the Strelitzes, her agent in the assassination of Peter, was beheaded, and the minister Galitzin sent into banishment to Archangel.

He establishes a military and naval force.

Peter now saw himself in undisputed possession of the imperial throne; for though Ivan was still nominally czar, he had voluntarily resigned all share in the administration of affairs, and retired to a life of obscurity. The first object to which the czar directed his attention was the establishment of a regular and well-disciplined military force. He had learned by experience how little dependence was to be placed on the Strelitzes; and these regiments he determined to disband. He commissioned Lefort and Gordon to levy new regiments, which, in their whole constitution, dress, and military exercises, should be formed on the model of other European troops. He next resolved to carry into execution the design which had been formed by his father, of constructing a navy. For this purpose he first took a journey to Archangel, where he employed himself in examining the operations of the shipwrights, and occasionally taking a part in their labours; but as he learned that the art of ship-building was practised in greater perfection in Holland, and some other maritime countries of Europe, he sent thither several young Russians to be initiated into the best methods of constructing ships of war.

His successes against the Turks.

The war with Turkey still languished, but Peter was resolved to prosecute it with vigour, hoping to get possession of the town of Azof, and thus open a passage to the Black Sea. He placed Gordon, Lefort, and two of his nobles, at the head of the forces destined for this expedition, and himself attended the army as a private volunteer. The success of the first campaign was but trifling; and Peter learned that his deficiency of artillery and his want of transports prevented him from making an effectual attack on Azof. These difficulties, however, were soon surmounted. He procured a supply of artillery and engineers from the emperor and the Dutch, and found means to provide a number of transports. With these auxiliaries he opened the second campaign, defeated the Turks on the Sea of Azof, and made himself master of the town. Peter was so elated with these successes, that on his return from the seat of war he marched his troops into Moscow in a triumphal procession, in which Lefort as admiral of the transports, and Schein as commander of the land forces, bore the most conspicuous parts, while Peter himself was lost without distinction in the crowd of subaltern officers.

He now resolved to form a fleet in the Black Sea; but as his own revenues were insufficient for this purpose, he issued a ukase, commanding the patriarch and other dignified clergy, the nobility, and the merchants, to contribute a part of their income towards fitting out a certain number of ships. This proclamation was extremely unpopular, and, together with the numerous innovations which Peter was every day introducing, especially his sending the young nobles to visit foreign countries, and his own avowed intention of making the tour of Europe, contributed to raise against him a formidable party. The vigilance and prudence of the czar, however, extricated him from the dangers with which he was threatened, and enabled him to carry into execution his proposed journey.

An. 1700. Peter engages in a war with Charles XII. of Sweden.

In returning to his own dominions, Peter passed through Rawa, where Augustus king of Poland then was. The czar had determined, in conjunction with Augustus and the king of Denmark, to take advantage of the youth and inexperience of Charles XII. who had just succeeded to the Swedish throne; and in this interview with Augustus, he made the final arrangements for the part which each was to take in the war. Augustus was to receive Livonia as his part of the spoil, while Frederick king of Denmark had his eye on Holstein, and Peter had formed designs on Ingria, formerly a province of the Russian empire.

Defeated by the Swedes.

In the middle of the year 1700, Charles had left his capital to oppose these united enemies. He soon compelled the king of Denmark to give up his designs on Holstein, and sign a treaty of peace; and being thus at liberty to turn his arms against the other members of the confederacy, he resolved first to lead his army against the king of Poland; but on his way he received intelligence that the czar had laid siege to Narva with an army which some authorities calculate at a hundred thousand men. On this he immediately embarked at Carlscrona, though it was then the depth of winter, and the Baltic was scarcely navigable; and soon landed at Pernaw in Livonia with part of his forces, having ordered the rest to Revel. His army did not exceed twenty thousand men, but it was composed of the best soldiers in Europe, while that of the Russians was little better than an undisciplined multitude. Every possible obstruction, however, had been thrown in the way of the Swedes. Thirty thousand Russians were posted in a defile on the road, and this corps was sustained by another body of twenty thousand drawn up some leagues nearer Narva. Peter himself had set out to hasten the march of a reinforcement of forty thousand men, with whom he intended to attack the Swedes in flank and rear; but the celerity and valour of Charles baffled every attempt to oppose him. He set out with four thousand foot and an equal number of cavalry, leaving the rest of the army to follow at their leisure. With this small body he attacked and defeated the Russian armies successively, and pushed his way to Peter's camp, for the attack of which he gave immediate orders. This camp was fortified by lines of circumvallation and contravallation, by redoubts, and by a line of a hundred and fifty brass cannons placed in front; and it was defended by an army of eighty thousand men; yet so violent was the attack of the Swedes, that in three hours the intrenchments were carried, and Charles, with only four thousand men, that composed the wing which he commanded, pursued the flying enemy, amounting to fifty thousand, to the river Narva. Here the bridge broke down with the weight of the fugitives, and the river was filled with their bodies. Great numbers returned in despair to their camp, where they defended themselves for a short time, but were at last obliged to surrender. In this battle, thirty thousand were killed in the intrenchments and the pursuit, or drowned in the river; twenty thousand surrendered at discretion, and were dismissed unarmed, while the rest were totally dispersed. A hundred and fifty pieces of cannon, twenty-eight mortars, a hundred and fifty-one pairs of colours, twenty standards, and all the Russian baggage, fell into the hands of the Swedes; and the Duke de Croy, the Prince of Georgia, and seven other generals, were made prisoners. Charles behaved with the greatest generosity to the conquered. Being informed that the tradesmen of Narva had refused credit to the officers whom he detained prisoners, he sent a thousand ducats to the Duke de Croy, and to every other officer a proportional sum.

Peter was advancing with forty thousand men to surround the Swedes, when he received intelligence of the dreadful defeat at Narva. He was greatly chagrined; but comforting himself with the hopes that the Swedes would in time teach the Russians to beat them, he returned to his own dominions, where he applied himself with the utmost diligence to the raising of another army. He evacuated all the provinces which he had invaded, and for a time abandoned all his great projects, thus leaving Charles at liberty to prosecute the war against Poland.

As Augustus had expected an attack, he endeavoured to draw the czar into a close alliance with him. The two monarchs had an interview at Birzen, where it was agreed that Augustus should lend the czar fifty thousand German soldiers, to be paid by Russia; that the czar should send an equal number of his troops to be trained up to the art of war in Poland; and that he should pay the king three millions of rix-dollars in the space of two years. Of this treaty Charles had notice, and, by means of his minister Count Piper, entirely frustrated the scheme.

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After the battle of Narva, Charles became confident and negligent, while the activity of Peter increased with his losses. He supplied his want of artillery by melting down the bells of the churches, and constructed numerous small vessels on the lake of Ladoga to oppose the entrance of the Swedes into his dominions. He took every advantage of Charles's negligence, and engaged in frequent skirmishes, in which, though often beaten, he was sometimes victorious. He contrived to make himself master of the river Neva, and captured Nyenschantz, a fortress at the mouth of that river. Here he laid the foundation of that city which he had long projected, and which was to become the metropolis of his empire. At length, in 1704, he became master of Ingria, and appointed his favourite Prince Menzikoff to be viceroy of that province, with strict orders to make the building of the new city his principal business. Here edifices were already rising in every quarter, and navigation and commerce were increasing in vigour and extent.

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In the mean time Augustns king of Poland, though treating with Charles for the surrender of his dominions, was obliged to keep up the appearance of war, which he had neither ability nor inclination to conduct. He had been lately joined by Prince Menzikoff with thirty thousand Rnssians; and this obliged him, contrary to his inclination, to hazard an engagement with Meyerfeldt, who commanded ten thousand men, one half of whom were Swedes. As at this time no disparity of numbers whatever was reckoned an equivalent to the valour of the Swedes, Meyerfeldt did not decline the combat, though the army of the enemy was four times as numerous as his own. With his own countrymen he defeated the enemy's first line, and was on the point of defeating the second, when Stanislas, with the Poles and Lithuanians, gave way. Meyerfeldt then perceived that the battle was lost; but he fought desperately, that he might avoid the disgrace of a defeat. At last, however, he was oppressed by numbers, and forced to surrender; suffering the Swedes for the first time to be conquered by their enemies. The whole army were taken prisoners excepting Major-general Krassau, who having repeatedly rallied a body of horse formed into a brigade, at last broke through the enemy, and escaped to Posnania. Augustus had scarcely sung *Te Deum* for this victory, when his plenipotentiary returned from Saxony with the articles of the treaty, by which he was to renounce all claim to the crown of Poland in favour of his rival Stanislas. The king hesitated and scrupled, but at last signed them; after which he set out for Saxony, glad at any expense to be freed from such an enemy as the king of Sweden, and from such allies as the Russians.

Peter determines to continue the war.

The czar Peter was no sooner informed of this extraordinary treaty, than he learned also the cruel fate of his plenipotentiary Patkul, a Livonian emigrant, whom Charles claiming as a subject, seized and executed. Peter immediately sent letters to every court in Christendom, complaining of this breach of the law of nations. He entreated the emperor, the queen of Britain, and the states-general, to revenge this insult on humanity. He stigmatized the compliance of Augustus with the opprobrious name of pusillanimity; and exhorted them not to guarantee a treaty so unjust, but to despise the menaces of the Swedish bully. So well, however, was the prowess of the king of Sweden known, that none of the allies thought proper to irritate him, by refusing to guarantee any treaty which he thought proper to accept. At first, Peter thought of revenging Patkul's death by massacring the Swedish prisoners at Moscow; but from this he was deterred, by remembering that Charles had many more Russian prisoners than he himself had of Swedes. In the year 1707, however, he entered Poland at the head of sixty thousand men, and, assembling a diet, solemnly deposed Stanislas, with the same ceremonies which had been used with regard to Augustus. The appearance of a Swedish army under King Stanislas and General Lewenhaupt put a stop to this invasion, and the czar retired into Lithuania, giving out as the cause of his retreat, that the country could not supply him with the provisions and forage necessary for so great an army.

Charles visits Augustus.

During these transactions Charles had taken up his residence in Saxony, where he gave laws to the court of Vienna, and in a manner intimidated all Europe. At last, satiated with the glory of having dethroned one king, set up another, and struck all Europe with terror and admiration, he began to evacuate Saxony in pursuit of his great plan, the dethroning the czar Peter, and conquering the vast empire of Russia. While the army was on full march in the neighbourhood of Dresden, he took the extraordinary resolution of visiting King Augustus with no more than five attendants. Although he had no reason to imagine that Augustus either did or could entertain any friendship for him, he was not uneasy at the consequences of thus putting himself entirely in his power. He reached the palace door of Augustus before it was known that he was in the city; and he entered the elector's chamber in his boots before the latter had time to recover from his surprise. He breakfasted with him in a friendly manner, and then expressed a desire of viewing the fortifications. While he was walking round them, a Livonian, who had formerly been condemned in Sweden, and served in the troops of Saxony, thought he could never have a more favourable opportunity of obtaining pardon. He therefore begged of King Augustus to intercede for him, being fully assured that his majesty could not refuse so small a favour to a prince in whose power he then was. Augustus accordingly made the request, but Charles refused it in such a manner that he did not think proper to ask it a second time. Having passed some hours in this extraordinary visit, he returned to his army, after having embraced and taken leave of the king he had dethroned.

He marches against the Russians.

The armies of Sweden, in Saxony, Poland, and Finland, now exceeded seventy thousand men; while the available force of Russia amounted to about a hundred thousand. Peter, who had his army dispersed in small parties, instantly assembled it on receiving notice of the king of Sweden's march, was making all possible preparations for a vigorous resistance, and was on the point of attacking Stanislas, when the approach of Charles struck his whole army with terror. In the month of January 1708, Charles passed the Niemen, and entered the south gate of Grodno just as Peter was quitting the place by the north gate. Charles at this time had advanced some distance before the army, at the head of six hundred horse.

The Russians again defeated.

The czar having received intelligence of his situation, sent back a detachment of two thousand men to attack him; but these were entirely defeated, and thus Charles became possessed of the whole province of Lithuania. The king pursued his flying enemies in the midst of ice and snow, over mountains, rivers, and morasses, and through obstacles which appeared to be insurmountable. These difficulties, however, he had foreseen, and had prepared to meet them. As he knew that the country could not furnish provisions sufficient for the subsistence of his army, he had provided a large quantity of biscuit, and on this his troops chiefly subsisted, till they came to the banks of the Beresina, in view of Borisow. Here the czar was posted, and Charles intended to give him battle, after which he could the more easily penetrate into Russia. Peter, however, did not think proper to come to an action, but retreated towards the Dnieper, whither he was pursued by Charles, as soon as he had refreshed his army. The Russians had destroyed the roads and desolated the country, yet the Swedish army advanced with great celerity, and in their march defeated twenty thousand Russians, though intrenched to the very teeth. This victory, from the circumstances in which it was gained, was one of the most glorious that ever Charles had achieved. The memory of it was preserved by a medal struck in Sweden with this inscription; *Sylvæ, paludes, aggeres, hostes, victi.*

Peter attempts to make peace, but is unsuccessful.

When the Russians had repassed the Dnieper, the czar, finding himself pursued by an enemy with whom he could not cope, resolved to make proposals for an accommodation. Charles made only this arrogant reply, "I will treat with the czar at Moscow;" a taunt which was received by Peter with the coolness of a hero. "My brother Charles," said he, "affects to play the Alexander, but he shall not find in me a Darius." He still, however, continued his retreat, and Charles pursued so closely that daily skirmishes took place between his advanced guard and the rear of the Russians. In these actions the Swedes had generally the advantage, though their petty victories cost them dear, by contributing to weaken their force in a country where it could not be recruited. The two armies came so close to each other at Smolensk, that an engagement took place between a body of Russians composed of ten thousand cavalry and six thousand Kalmuks, and the Swedish vanguard, composed of only six regiments, but commanded by the king in person. Here the Russians were again defeated; but Charles, having been separated from the main body of his detachment, was exposed to great danger. With one regiment only he fought with such fury as to drive the enemy before him, when they thought themselves sure of making him prisoner.

An. 1708. Charles advances towards Moscow.

By the 3d of October 1708, Charles had approached within a hundred leagues of Moscow; but Peter had rendered the roads completely impassable, and had destroyed the villages on every side, so as to cut off every possibility of subsistence to the enemy, while the season was far advanced, and the severity of winter was approaching. In these circumstances, the king, at length sensible that he had committed a perilous mistake, endeavoured to retrieve it by a step which proved yet more calamitous. He resolved, before attacking the Russian capital, to achieve the conquest of the Ukraine, where Mazeppa, a Polish gentleman, was general and chief of the Kozaks. Mazeppa having been affronted by the czar, readily entered into a treaty with Charles, whom he promised to assist with thirty thousand men, great quantities of provisions and ammunition, and with all his treasures, which were falsely stated to be immense. The Swedish army advanced towards the river Disna, where they had to encounter the greatest difficulties; a forest above forty leagues in extent, filled with rocks, mountains, and morasses. To complete their misfortunes, they were led thirty leagues out of the right way; all the artillery was sunk in bogs and marshes; the provision of the soldiers, which consisted of biscuit, was exhausted; and the whole army were spent and emaciated when they arrived at the Disna. Here they expected to have met Mazeppa with his reinforcement; but instead of that, they perceived the opposite banks of the river covered with a hostile army, and the passage itself rendered almost impracticable. Charles, however, was still undaunted; he let his soldiers by ropes down the steep banks; they crossed the river either by swimming, or on rafts hastily put together, drove the Russians from their post, and continued their march. Mazeppa soon after appeared, having with him about six thousand men, the broken remains of the army he had promised. The Russians had got intelligence of his designs, defeated and dispersed his adherents, laid his town in ashes, and taken all the stores collected for the Swedish army. However, he still hoped to be useful by his intelligence in an unknown country; and the Kozaks, out of revenge, crowded daily to the camp with provisions.

Greater misfortunes still awaited the Swedes. When Charles entered the Ukraine, he had sent orders to General Lewenhaupt to meet him with fifteen thousand men, six thousand of whom were Swedes, and a large convoy of provisions. Against this detachment Peter now bent his whole force, and marched against him with an army of sixty-five thousand men. Lewenhaupt had received intelligence that the Russian army consisted of only twenty-four thousand, a force to which he thought six thousand Swedes superior, and therefore disdained to intrench himself. A furious contest ensued, in which the Russians were defeated with the loss of fifteen thousand men. Now, however, affairs began to take another turn. The Swedes, elated with victory, prosecuted their march into the interior; but, from the ignorance or treachery of their guides, they were led into a marshy country, where the roads were made impassable by felled trees and deep ditches. Here they were attacked by the czar with his whole army. Lewenhaupt had sent a detachment to dispute the passage of a body of Russians over a morass; but finding his detachment likely to be overpowered, he marched to support them with all his infantry. Another desperate battle ensued. The Russians were once more thrown into disorder, and were just on the point of being totally defeated, when Peter gave orders to the Kozaks and Kalmuks to fire upon all that fled; "Even kill me," said he, "if I should be so cowardly as to turn my back." The battle was now renewed with great vigour; but notwithstanding the czar's positive orders, and his own example, the day would have been lost, had not General Bauer arrived with a strong reinforcement of fresh Russian troops. The engagement was once more renewed, and continued without intermission till night. The Swedes then took possession of an advantageous post, but were next morning attacked by the

Russians. Lewenhaupt had formed a sort of rampart with his waggons, but was obliged to set fire to them to prevent their falling into the hands of the Russians, while he retreated under cover of the smoke. The czar's troops, however, arrived in time to save five hundred of these waggons, filled with provisions destined for the distressed Swedes. A strong detachment was sent to pursue Lewenhaupt; but so terrible did he now appear, that the Russian general offered him an honourable capitulation. This was rejected with disdain, and a fresh engagement took place, in which the Swedes, now reduced to four thousand, again defeated their enemies, and killed five thousand on the spot. After this Lewenhaupt was allowed to pursue his retreat without molestation, though deprived of all his cannon and provisions. Prince Menzikoff was indeed detached with a body of forces to harass him on his march; but the Swedes were now so formidable, even in their extremity, that Menzikoff dared not to attack them, so that Lewenhaupt with his four thousand men arrived safe in the camp of Charles, after having destroyed nearly thirty thousand of the Russians.

This may be said to have been the last successful effort of Swedish valour against the troops of Peter. The difficulties which Charles's army had now to undergo exceeded what human nature could support; yet still they hoped by constancy and courage to subdue them. In the severest winter known for a long time, even in Russia, they made long marches, clothed like savages in the skins of wild beasts. All the draught-horses perished; thousands of soldiers dropt down dead through cold and hunger; and by the month of February 1709 the whole army was reduced to eighteen thousand. Amidst numberless difficulties these penetrated to Pultava, a town on the eastern frontier of the Ukraine, where the czar had laid up magazines, of which Charles resolved to obtain possession. Mazeppa advised the king to invest the place, in consequence of his having correspondence with some of the inhabitants, by whose means he hoped it would be surrendered. He was, however, deceived. The besieged made an obstinate defence; the Swedes were repulsed in every assault, and eight thousand of them were defeated, and almost entirely cut off, in an engagement with a party of Russians. To complete his misfortunes, Charles received a shot in his heel from a carabine, which shattered the bone. For six hours afterwards, he continued calmly on horseback, giving orders, till he fainted with the loss of blood; after which he was carried into his tent.

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For some days the czar, with an army of seventy thousand men, had lain at a small distance, harassing the Swedish camp, and cutting off the convoys of provision; but now intelligence was received that he was advancing as if with a design of attacking the lines. In this situation, Charles, wounded, distressed, and almost surrounded by enemies, is said to have, for the first time, assembled a grand council of war, the result of which was, that it was determined to march out and attack the Russians. Voltaire, however, asserts that the king did not relax one iota of his wonted obstinacy and arbitrary temper; but that, on the 7th of July, he sent for General Renschild, and told him, without any emotion, to prepare for attacking the enemy next morning.

The 8th of July 1709 is remarkable for the battle which decided the fate of Sweden. Charles, having left eight thousand men in the camp to defend the works and repel the sallies of the besieged, began by break of day to march against his enemies with the rest of the army, consisting of twenty-six thousand men, of whom eighteen thousand were Kozaks. The Russians were drawn up in two lines behind their intrenchments, the horse in front, and the foot in the rear, with chasms to suffer the horse to fall back in case of necessity. General Slippenbach was despatched to attack the cavalry, which he did with such impetuosity that they were broken in an instant. They, however, rallied behind the infantry, and returned to the charge with so much vigour, that the Swedes were disordered in their turn, and Slippenbach was made prisoner. Charles was now carried in his litter to the scene of confusion. His troops, re-animated by the presence of their leader, returned to the charge, and the battle became doubtful, when a blunder of General Creuk, who had been despatched by Charles to take the enemy in flank, and a successful manœuvre of Prince Menzikoff, decided the fortune of the day in favour of the Russians. Creuk's detachment was defeated, and Menzikoff, who had been sent by Peter with a strong body to post himself between the Swedes and Pultava, so as to cut off the communication of the enemy with their camp, and fall upon their rear, executed his orders with so much success as to intercept a corps de reserve of three thousand men. Charles had ranged his remaining troops in two lines, with the infantry in the centre, and the horse on the two wings. They had already twice rallied, and were now again attacked on all sides with the utmost fury. Charles in his litter, with a drawn sword in one hand, and a pistol in the other, seemed to be everywhere present; but new misfortunes awaited him. A cannon-ball killed both horses in the litter; and scarcely were these replaced by a fresh pair, when a second ball struck the litter in pieces, and overturned the king. The Swedish soldiers, believing him killed, fell back in consternation. The first line was completely broken, and the second fled. Charles, though disabled, did every thing in his power to restore order; but the Russians, emboldened by success, pressed so hard on the flying foe, that it was impossible to rally them. Renschild and several other general officers were taken prisoners, and Charles himself would have shared the same fate, had not Count Poniatowski, father of the future favourite of Catherine II., with five hundred horse, surrounded the royal person, and with desperate fury cut his way through ten regiments of the Russians. With this small guard the king arrived on the banks of the Dnieper, and was followed by Lewenhaupt with four thousand foot and all the remaining cavalry. The Russians took possession of the Swedish camp, where they found a prodigious sum in specie; while Prince Menzikoff pursued the flying Swedes, and, as they were in want of boats to cross the Dnieper, obliged them to surrender at discretion. Charles escaped with the utmost difficulty, but at length reached Otchakof, on the frontiers of Turkey.

By this decisive victory, Peter remained in quiet possession of his new acquisitions on the Baltic, and was enabled to carry on, without molestation, the improvements which he had projected at the mouth of the Neva. His haughty rival, so long and so justly dreaded, was now completely humbled, and his ally the king of Poland was again established on his throne. During the eight years that had elapsed from the battle of Narva to that of Pultava, the Russian troops had acquired the discipline and steadiness of veterans, and had at length learned to beat their former conquerors. If Peter had decreed triumphal processions for his trifling successes at Azof, it is not surprising that he should commemorate by similar pageants a victory so glorious and so important as that of Pultava. He made his triumphal entry into Moscow for the third time, and the public rejoicings on this occasion far exceeded all that had before been witnessed in the Russian empire.

An. 1711.
Dangerous situation of Peter at the Pruth.

The vanquished Charles had, in the mean time, found a valuable friend in the monarch in whose territories he had taken refuge. Achmet II. who then filled the Ottoman throne, had beheld with admiration the warlike achievements of the Swedish hero; and, alarmed at the late successes of his rival, determined to afford Charles the most effectual aid. In 1711, the Turkish emperor assembled an immense army, and was preparing to invade the Russian territories, when the czar, having intimation of his design, and expecting powerful support from Cantemir, hospodar of Moldavia, a vassal of the Porte, resolved to anticipate the

Turks, and to make an inroad into Moldavia. Forgetting his usual prudence and circumspection, Peter crossed the Dnieper, and advanced by rapid marches as far as Yassy or Jassy, the capital of that province, which is situated on the river Pruth; but his temerity had nearly cost him his liberty, if not his life. The particulars of his dangerous situation, with the manner in which he was extricated from it by the prudent counsel of his consort Catherine, and the treaty of the Pruth, which was the result of that counsel, have been already related under the head of Catherine I.

An. 1721. Advantageous peace with Sweden.

By this treaty, in which the interests of Charles had been almost abandoned, Peter saw himself delivered from a dangerous enemy, and returned to his capital to prosecute those plans for the internal improvement of his empire which justly entitled him to the appellation of Great. Before we enumerate these improvements, however, we must bring the Swedish war to a conclusion. The death of Charles, in 1718, had left the Swedish government deplorably weakened, by the continual drains of men and money occasioned by his mad enterprises, and little able to carry on a war with a monarch so powerful as Peter. At length, therefore, in 1721, this ruinous contest, which had continued ever since the commencement of the century, was brought to a conclusion by the treaty of Nystadt, by which the Swedes were obliged to cede to Russia, Livonia, Esthonia, Ingria, a part of Karelia, the territory of Vyborg, the isle of Oesel, and all the other islands in the Baltic, from Courland to Vyborg; for which concessions they received back Finland, that had been conquered by Peter, together with two millions of dollars, and the liberty of exporting duty free, from Riga, Revel, and Arensberg, corn to the annual amount of fifty thousand roubles. In consequence of this great accession to the Russian empire, Peter received from his senate the title of Emperor and Autocrat of all the Russias, and the ancient title of czar fell into disuse.

Peter's national improvements.

The improvements introduced by Peter into the internal policy of the empire must be acknowledged to have been numerous and important. He organized anew the legislative assembly of the state; he greatly ameliorated the administration of justice; he new-modelled the national army; he entirely created the Russian navy; he rendered the ecclesiastical government milder and less intolerant; he zealously patronized the arts and sciences; he erected an observatory at St Petersburg, and by publicly proclaiming the approach of an eclipse, and the precise time at which it was to take place, taught his subjects no longer to consider such a phenomenon as an omen of disaster, or an awful menace of divine judgment. He enlarged the commerce of his empire, and gave every encouragement to trade and manufactures. He formed canals, repaired the roads, instituted regular posts, and laid down regulations for a uniformity of weights and measures. Lastly, he in some measure civilized his subjects, though it is evident that he could not civilize himself.

Character of Peter.

Various have been the estimates formed of the character of Peter by those who have detailed the events of his reign. It is certain that to him the Russian empire is indebted for much of that splendour with which it now shines among the powers of Europe. As a monarch, therefore, he is entitled to our admiration; but as a private individual we must consider him as an object of detestation and abhorrence. His tyranny and his cruelty admit of no excuse; and if we were to suppose, that in sacrificing the heir of his crown he emulated the patriotism of the elder Brutus, we must remember that the same hand which signed the death-warrant of his son, could with pleasure execute the sentence of the law, or rather of his own caprice, and, in the moments of dissipation and revelry, could make the axe of justice an instrument of diabolical vengeance or of cool brutality.

An. 1725. Reign of Catherine.

Peter was succeeded by his consort Catherine, in whose favour he had, some years before his death, altered the order of succession. As the character of this princess, and the transactions of her short reign, have been fully detailed under her life, we shall here only notice in the most cursory manner the events that took place. From the commencement of her reign, Catherine conducted herself with the greatest benignity and gentleness, and thus secured the love and veneration of her subjects, which she had acquired during the life of the emperor. She reduced the annual capitation tax; ordered the numerous gibbets which Peter had erected in various parts of the country to be cut down; and caused the bodies of those who had fallen victims to his tyranny to be decently interred. She recalled the greater part of those whom Peter had exiled to Siberia; paid the troops their arrears; and restored to the Kozaks those privileges and immunities of which they had been deprived during the late reign, while she continued in office most of the servants of Peter, both civil and military. In her reign the boundaries of the empire were extended by the submission of a Georgian prince, and the voluntary homage of the Kubinskian Tartars. She died on the 17th of May 1727, having reigned about two years. She had settled the crown on Peter the son of the Czarovitch Alexei, who succeeded by the title of Peter II.

An. 1727. Reign of Peter II.

Peter was only twelve years of age when he ascended the imperial throne, and his reign was short and uninteresting. He was guided chiefly by Prince Menzikoff, whose daughter Catherine had decreed him to marry. This ambitious man, who, from the mean condition of a pye-boy, had risen to the first offices of the state, and had, during the late reign, principally conducted the administration of the government, was now, however, drawing towards the end of his career. The number of his enemies had greatly increased, and their attempts to work his downfall at last succeeded. A young nobleman of the family of the Dolgoruki, who was one of Peter's chief companions, was excited by his relations, and the other enemies of Menzikoff, to instil into the mind of the young prince feelings hostile to that minister. In this commission he succeeded so well, that Menzikoff and his whole family, not excepting the young empress, were banished to Siberia, and the Dolgorukis took into their hands the management of affairs. These artful counsellors, instead of cultivating the naturally good abilities of Peter, encouraged him to waste his time and exhaust his strength in hunting and other athletic exercises, for which his tender years were by no means calculated. It is supposed that the debility consequent on such fatigue increased the natural danger of the small-pox, with which he was attacked in January 1730, and from which he never recovered.

An. 1730. Anne duchess o Courland succeeds t the imperial throne.

Notwithstanding the absolute power with which Peter I. and the Empress Catherine had settled by will the title to the throne, the Russian senate and nobility, upon the death of Peter II. ventured to set aside the order of succession which those sovereigns had established. The male issue of Peter was now extinct; and the Duke of Holstein, son to Peter's eldest daughter, was by the destination of the late empress entitled to the crown; but the Russians, for political reasons, filled the throne with Anne duchess of Courland, second daughter to Ivan, the eldest brother of Peter, though her eldest sister, the Duchess of Mecklenburg, was still alive. Anne's reign was extremely prosperous; and though she accepted the crown under limitations which some thought derogatory to her dignity, yet she broke them all, asserted the prerogative of her ancestors, and punished the aspiring Dolgoruki family, who had imposed those restrictions, with a view, as it is said, that they themselves might govern. She raised her favourite Biren to the duchy of Courland; and was obliged to give way to many severe executions on his account. Few transactions of any importance took place during the reign of Anne. She followed the example of her great predecessor Peter, by interposing in the affairs of Poland, where she had sufficient interest to establish on the throne Augustus III. She entered into a treaty with the shah of Persia, by which she agreed to give up all title to the territories that had been seized by Peter I. on the shores of the Caspian, in consideration of certain privileges to be granted to the Russian merchants.

In 1735, a rupture took place between Russia and Turkey, occasioned partly by the mutual jealousies that had subsisted between these powers ever since the treaty on the Pruth, and partly by the depredations of the Tartars of the Crimea, then under the dominion of the Porte. A Russian army entered the Crimea, ravaged part of the country, and killed a considerable number of Tartars; but having ventured too far, without a sufficient supply of provisions, it was obliged to retreat, after sustaining a loss of nearly ten thousand men. This ill success did not discourage the court of St Petersburg; and in the following year another armament was sent into the Ukraine, under the command of Marshal Munnich, while another army under Lascy proceeded against Azof. Both these generals met with considerable success; the Tartars were defeated, and the fort of Azof once more submitted to the Russian arms. A third campaign took place in 1737, and the Russians were now assisted by a body of Austrian troops. Munnich laid siege to Otchakof, which soon surrendered, while Lascy desolated the Crimea.

No material advantages were, however, gained upon either side; and disputes arose between the Austrian and Russian generals. At length, in 1739, Marshal Munnich, having crossed the Bog at the head of a considerable army, defeated the Turks in a pitched battle near Stavutshan; made himself master of Yassy, the capital of Moldavia; and before the end of the campaign reduced the whole of that province under his subjection. These successes of the Russian arms induced the Porte to propose terms of accommodation; and in the end of 1739 a treaty was concluded, by which Russia again gave up Azof and Moldavia, and, to compensate the loss of above a hundred thousand men, and vast sums of money, gained nothing but permission to build a fortress on the Don.

. 1740.
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I n VI.

Upon the death of Anne, which took place in 1740, Ivan, the son of her niece the Princess of Mecklenburg, was, by her will, entitled to the succession; but as he was no more than two years old, Biren was appointed to be administrator of the empire during his minority. This nomination was disagreeable to the emperor's father and mother, and unpopular among the Russians. Count Munnich was employed by the princess to arrest Biren, who was tried and condemned to die, but was sent into exile to Siberia.

The administration of the Princess Anne of Mecklenburg and her husband was upon many accounts disagreeable, not only to the Russians, but to other powers of Europe; and the Princess Elizabeth, daughter of Peter the Great by Catherine, formed such a party, that in one night's time she was proclaimed empress of the Russias, and the Princess of Mecklenburg, her husband, and son, were made prisoners. The fate of this unhappy family was peculiarly severe. All but Ivan were sent into banishment, to an island at the mouth of the Dvina, in the White Sea, where the Princess Anne died in childbed in the year 1747. Ivan's father survived till 1775, and at last ended his miserable career in prison. The young emperor Ivan was for some time shut up in a monastery at Oranienburg, when, on attempting to escape, he was removed to the castle of Schlusselburg, where he was cruelly put to death.

1741.
A ession
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The chief instrument in rousing the ambition of Elizabeth, and procuring her elevation to the throne, was her physician and favourite Lestocq, who, partly by his insinuating address, and partly by the assistance of French gold, brought over to Elizabeth's interest most of the royal guards. During the short regency of Anne of Mecklenburg, a new war had commenced between Russia and Sweden; and this war was carried on with considerable acrimony and some success by Elizabeth. The Russian forces took possession of Abo, and made themselves masters of nearly all Finland. But at length, in 1743, in consequence of the negotiations that were carrying on regarding the succession to the Swedish crown, a peace was concluded between the two powers, on the condition that Elizabeth should restore the greater part of Finland.

An. 1742.
Peter duke of Holstein-Gottorp made Grand Duke of Russia.

Soon after her accession, Elizabeth determined to nominate her successor to the imperial throne, and had fixed her eyes on Charles Peter Ulric, son of the Duke of Holstein-Gottorp, by Anne, daughter of Peter the Great. This prince was accordingly invited into Russia, persuaded to become a member of the Greek church, and proclaimed Grand Duke of Russia, and heir of the empire. The ceremony of his baptism was performed on the 18th of November 1742, when he received the name of Peter Feodorovitch. He was at this time only fourteen years of age; but before he had attained his sixteenth year, his aunt had destined him a consort in the person of Sophia Augusta Frederica, daughter of Christian Augustus prince of Anhalt-Zerbst-Dornburg. This princess, on entering the Greek church, took the name of Catherine which she afterwards bore on the throne.

Elizabeth engages in the Seven Years' War.

Having thus settled the order of succession, Elizabeth began to take an active part in the politics of Europe. The death of Charles VI. emperor of Germany, had left his daughter, Maria Theresa queen of Hungary, at the mercy of the enterprising king of Prussia, till a formidable party was organized in her behalf. To this confederacy the empress of Russia acceded, and in 1747 sent a considerable body of troops into Germany, to the assistance of the empress-queen. The events of this long and bloody contest have been fully detailed in the article PRUSSIA, comprehending the greater part of those transactions in the reign of Elizabeth that do not particularly regard the internal policy of the empire. The more private transactions of the court of St Petersburg, as far as they are connected with the intrigues of her niece Catherine and the follies of the Grand Duke Peter, have also been related in our life of CATHERINE II. Elizabeth died on the 5th of January 1762, the victim of disease brought on by intemperance. With her character as a private woman we have little business here. Her merits as a sovereign are fairly estimated in the following sketch of her character by Tooke.

Character of Elizabeth.

"Elizabeth, as empress, governed but little of herself, it being properly her ministers and favourites who dictated her regulations and decrees. Of this number, besides Bestuchef, was also Razumofsky, to whom, it has been said, the empress was even privately married. At the beginning of her reign, it is true, she went a few times to the sitting of the senate; but the matters transacted there were by much too serious for her mind; and, accordingly, she very soon left off that practice altogether, contenting herself by confirming with her signature the resolutions of that assembly, and the determinations of her minister, or the conference, which supplied the place of the council.

"Her character in general was mild, as was evident from the tears it cost her whenever she received accounts from Prussia even of victories gained by her own army, on account of the human blood by which they must necessarily have been purchased. Yet even this delicate sensibility did not restrain her from prosecuting the war into which she had entered from a species of revenge, and for the purpose of humbling the king of Prussia, and, even on her death-bed, from exhorting the persons who surrounded her to the most vigorous continuation of it. It also proceeded from this sensibility, that immediately on her accession to the government she made the vow never to put her signature to a sentence of death. A resolution which she faithfully kept, though it cannot be averred to have been for the benefit of the empire; since, in consequence of it, the number of malefactors who deserved to die was every day increasing, insomuch that even the clergy requested the empress to retract her vow, at the same time urging proofs that they could release her from it. All the arguments they could use, however, were of no avail to move the conscientious monarch; she would not give effect to any sentence of death, although the commanders in the army particularly would have been glad that her conscience had yielded a little on that point. They declared that the soldiers were not to be restrained from their excesses by the severest corporal punishments they could employ; whereas such was their dread of a solemn execution, that a few examples of that nature would have effectually kept them in awe.

Her improvements in the empire.

" Commerce and literature, arts, manufactures, handicrafts, and the other means of livelihood, which had been fostered by the former sovereigns, continued their course under Elizabeth with increasing prosperity. The country products were obtained and wrought up in greater quantities, and several branches of profit were more zealously carried on. The sum appointed for the support of the Academy of Sciences founded by Peter I. at St Petersburg, was considerably augmented by Elizabeth; and she moreover established, in 1758, the academy still subsisting for the arts of painting and sculpture, in which a number of young persons are brought up as painters, engravers, statuaries, architects, &c. At Moscow she endowed a university and two gymnasia.

" The Empress Elizabeth herself having a good voice, music, which Anne had already much encouraged, found under her administration a perpetual accession of disciples and admirers; so that even numbers of persons of distinction at St Petersburg became excellent performers. The art of acting plays was now also more general among the Russians. Formerly none but French or Italian pieces were performed on the stage of St Petersburg, whereas now Sumarokof obtained celebrity as a dramatic poet in his native language, and, in 1756, Elizabeth laid the foundation of a Russian theatre in her residence. Architecture likewise found a great admirer and patroness in her, St Petersburg and its vicinity being indebted to her for great embellishments and numerous structures.

" The magnificence which had prevailed under Anne at the court of St Petersburg was not diminished during her reign, and the court establishment therefore amounted to extraordinary sums. Elizabeth, indeed, in this respect did not imitate her great father; and accordingly in the Seven Years' War the want of a well-stored treasury was already very sensibly felt.

" The population of the empire was considerably increased under her reign; and so early as 1752, according to the statement in an account published by an official person, it was augmented by one fifth.

" Elizabeth continued the practice of her predecessors in encouraging foreigners to come to settle in her empire. Emigrant Servians cultivated a considerable tract of land, till then almost entirely uninhabited, on the borders of Turkey, where they built the town of Elizabethgorod, and multiplied so fast, that in the year 1764 a particular district was formed of these improvements, under the name of New Servia. Only the Jews Elizabeth was no less resolute not to tolerate than her father had been; insomuch that, so early in her reign as 1743, they were ordered to quit the country on pain of death.

" The army was augmented under Elizabeth, but certainly not improved. There were now no longer at the head of it such men as the foreigners Munnich, Keith, or Loevendal, who, besides their personal courage and intrepidity, possessed the soundest principles of the art of war; and, what is of no less consequence in a commander, kept up a strict discipline, and took care that the laws of subordination were punctually observed. The excessive license which the regiments of guards, particularly the life company of the Preobajerskoy guards, presumed to exercise, under the very eyes of the empress in St Petersburg, afforded no good example to the rest of the army; and Elizabeth, in appointing those soldiers of that life company who had been most guilty of flagrant disorders, and the basest conduct, to be officers in the marching regiments, gives us no very high idea of what was required in an officer, but rather serves easily to explain whence it arose that such frequent complaints were made of insubordination. A great number of excellent regulations that had been introduced into the army, and always enforced by foreigners, especially by Munnich, were suffered by the Russian generals to fall into total disuse. The bad effects of this negligence were very soon perceived; and it was undoubtedly a circumstance highly favourable to the Russian troops, that for several years successively in the war which we have had occasion so often to mention, they had to engage with such a master in the military art as the king of Prussia, and by their conflicts with him, as well as by their connection with the Austrians, and in the sequel with the Prussian soldiery, had an opportunity of learning so many things, and of forming themselves into regular combatants.

She establishes a political inquisition.

" Elizabeth tarnished her reign, however, by the institution of a political court of inquisition, under the name of a secret state chancery, empowered to examine into and punish all such charges as related to the expression of any kind of displeasure against the measures of government. This, as is usual in such cases, opened a door to the vilest practices. The lowest and most profligate of mankind were now employed as spies and informers, and were rewarded for their denunciations and calumnies against the most virtuous characters, if these happened by a look, a shrug of the shoulders, or a few harmless words, to signify their disapprobation of the proceedings of the sovereign."

An. 1762. Accession of Peter III.

The grand duke ascended the throne by the name of Peter III. This prince's conduct has been variously represented. He entered on the government possessed of an enthusiastic admiration of the virtues of the king of Prussia, with whom he immediately made peace, and whose principles and practice he seems to have adopted as patterns for his imitation. He might have surmounted the effects even of these peculiarities, unpopular as they then were in Russia; but it is said that he aimed at reforms in his dominions which Peter the Great durst not attempt; and that he even ventured to cut off the beards of his clergy. He was certainly a weak man, who had no opinions of his own, but childishly adopted the sentiments of any person who took the trouble to teach him. His chief amusement was buffoonery; and he would sit for hours looking with pleasure at a merry-andrew singing drunken and vulgar songs. He was a stranger to the country, its inhabitants, and their manners; and suffered himself to be persuaded by those about him, that the Russians were fools and beasts unworthy of his attention, except to make them, by means of the Prussian discipline, good fighting machines. These opinions regulated his whole conduct, and prepared the way for that revolution which faults of a different kind tended to hasten.

His imprudences.

Becoming attached to a lady of the noble family of Vorontzoff, he disgusted his wife, who was then a beautiful woman in the prime of life, of great natural talents and great acquired accomplishments; whilst the lady whom he preferred to her was but one degree above an idiot. The Princess Dashkoff, the favourite's sister, who was married to a man whose genius was not superior to that of the emperor, being *dame d'honneur* and lady of the bed-chamber, had of course much of the empress's company. Similarity of situations knit these two illustrious personages in the closest friendship. The princess, being a zealous admirer of the French *économistes*, could make her conversation both amusing and instructive. She retailed all her statistical knowledge; and finding the empress a willing hearer, she spoke of her in every company as a prodigy of knowledge, judgment, and philanthropy. Whilst the emperor, by his buffoonery and attachment to foreign manners, was daily incurring more and more the hatred of his subjects, the popularity of his wife was rapidly increasing; and some persons about the court expressed their regret that so much knowledge of government, such love of humanity, and such ardent wishes for the prosperity of Russia, should only furnish conversations with Catharina Romanovna (the Princess Dashkoff). The empress and her favourite did not let these expressions pass unobserved, but continued their studies in concert; and whilst the former was employed on her famous code of laws for a great empire, the latter always reported progress, till the middling circles of Moscow and St Petersburg began to speak familiarly of the blessings which they might enjoy if these speculations could be realized.

Meanwhile Peter III. was giving fresh cause of discontent. He had recalled from Siberia Count Munnich, who was indeed a sensible, brave, and worthy man; but Munnich, as he was smarting under the effects of Russian despotism, and had grounds of resentment against most of the great families, did not much discourage the emperor's unpopular conduct, trying only to moderate it and give it a system. Peter, however, was impatient. He publicly ridiculed the exercise and evolutions of the Russian troops; and hastily adopting the Prussian discipline, without digesting and fitting it for the constitution of his own forces, he completely ruined himself by disgusting the army.

Ca erine fo s a party her fa r.

In the midst of these imprudences, indeed, Peter was sometimes disturbed by the advice of virtuous counsellors. But these remonstrances produced only a temporary gleam of reformation, and he soon relapsed into his accustomed sensuality. What he lost in popularity was gained by the emissaries of Catherine. Four regiments of guards, amounting to eight thousand men, were speedily brought over by the three brothers Orlof, who had contrived to ingratiate themselves with their officers. The people at large were in a state of indifference, out of which they were partially roused by the following means. A little manuscript was handed about, containing principles of legislation for Russia, founded on natural rights, and on the claims of the different classes of people, which, insensibly formed, became so familiar as to appear natural. In that performance was proposed a convention of deputies from all the classes, and from every part of the empire, to converse, but without authority, on the subjects of which it treated, and to inform the senate of the result of their deliberations. It passed for the work of her majesty, and was much admired.

While Catherine was thus high in the public esteem and affection, the emperor took the alarm at her popularity, and in a few days came to the resolution of confining her for life, and then of marrying his favourite. The servants of that lady betrayed her to her sister, who imparted the intelligence to the empress. Catherine saw her danger, and instantly formed her resolution. She must either tamely submit to perpetual imprisonment, and perhaps a cruel and ignominious death, or contrive to hurl her husband from his throne. No other alternative was left her, and the consequence was what was undoubtedly expected. The proper steps were taken. Folly fell before abilities and address, and in three days the revolution was accomplished.

Pe de-thed an ut to de .

When the emperor saw that all was lost, he attempted to enter Cronstadt from Oranienbaum, a town on the Gulf of Finland, thirty versts, or nearly twenty-six miles, from St Petersburg. The sentinels at the harbour presented their muskets at the barge; and though they were not loaded, and the men had no cartridges, he drew back. Munnich received him again, and exhorted him to mount his horse and head his guards, swearing to live and die with him. He said, "No, I see it cannot be done without shedding much of the blood of my brave Holsteiners. I am not worthy of the sacrifice."

Six days had already elapsed since the revolution, and that great event had been apparently terminated without any violence that might leave odious impressions upon the mind of the public. Peter had been removed from Peterhof to a pleasant retreat called Ropscha, about thirty miles from St Petersburg; and here he supposed he should be detained but a short time previous to his being sent into Germany. He therefore transmitted a message to Catherine, desiring permission to have for his attendant a favourite negro, and that she would send him a dog, of which he was very fond, together with his violin, a bible, and a few romances; telling her that, disgusted with the wickedness of mankind, he was resolved henceforth to devote himself to a philosophical life. However reasonable these requests, not one of them was granted, and his plans of wisdom were turned into ridicule.

In the mean time the soldiers were amazed at what they had done. They could not conceive by what fascination they had been hurried so far as to dethrone the grandson of Peter the Great, in order to give his crown to a German woman. The majority, without plan or consciousness of what they were doing, had been mechanically led on by the movements of others; and each individual now reflecting on his baseness, after the pleasure of disposing of a crown had vanished, was filled only with remorse. The sailors, who had never been engaged in the insurrection, openly reproached the guards in the tippling-houses with having sold their emperor for beer. One night a band of soldiers attached to the empress took the alarm, from an idle fear, and exclaimed that their mother was in danger, and that she must be awaked, that they might see her. During the next night there was a fresh commotion more serious than the former. So long as the life of the emperor left a pretext for inquietude, it was thought that no tranquillity was to be expected.

On the sixth day of the emperor's imprisonment at Ropscha, Alexei Orlof, accompanied by an officer named Teploff, came to him with the news of his speedy deliverance, and asked permission to dine with him. According to the custom of that country, wine glasses and brandy were brought previous to dinner; and while the officer amused the czar with some trifling discourse, his chief filled the glasses, and poured a poisonous mixture into that which he intended for the prince. The czar, without any distrust, swallowed the potion, on which he immediately experienced the most severe pains; and on his being offered a second glass, on pretence of its giving him relief, he refused it, with reproaches against him that offered it. He called aloud for milk, but the two monsters offered him poison again, and pressed him to take it. A French valet-de-chambre, greatly attached to him, now ran in. Peter threw himself into his arms, saying in a faint tone of voice, "It was not enough, then, to prevent me from reigning in Sweden, and to deprive me of the crown of Russia. I must also be put to death."

The valet-de-chambre presumed to intercede for his master; but the two miscreants forced this dangerous witness out of the room, and continued their ill treatment of the czar. In the midst of this tumult the younger of the Princes Baratinsky came in, and joined the two former. Orlof, who had already thrown down the emperor, was pressing upon his breast with both his knees, and firmly griping his throat with his hand. The unhappy monarch now struggling with that strength which arises from despair, the two other assassins threw a napkin round his neck, and put an end to his life by suffocation.

It is not known with certainty what share the empress had in this event; but it is affirmed that on the very day on which it happened, while the empress was beginning her dinner with much gaiety, an officer, supposed to be one of the assassins, precipitately entered the apartment with his hair dishevelled, his face covered with sweat and dust, his clothes torn, and his countenance agitated with horror and dismay. On entering, his eyes, sparkling and confused, met those of the empress. She arose in silence, and went into a closet, whither he followed her. A few moments afterwards she sent for Count Panin, the former governor of Peter, who was already appointed her minister, and, informing him that the emperor was dead, consulted him on the manner of announcing his death to the public. Panin advised her to let one night pass over, and to spread the news next day, as if they had received it during the night. This counsel being approved, the empress returned with the same countenance, and continued her dinner with the same gaiety. On the day following, when it was published that Peter had died of an hæmorrhoidal colic, she appeared bathed in tears, and proclaimed her grief by an edict.

The corpse was brought to St Petersburg, there to be exposed. The face was black, and the neck excoriated. Notwithstanding these horrible marks, in order to assuage the commotions, which began to excite apprehension, and to prevent impostors from hereafter disturbing the empire, it was left three days exposed to all the people, with only the ornaments of a Holstein officer. The soldiers, disbanded and disarmed, mingled with the crowd, and as they beheld their sovereign, their countenances indicated a mixture of compassion, contempt, and shame. They were soon afterwards embarked for their country; but, as the sequel of their cruel destiny, almost all of these unfortunate men perished in a storm. Some of them had saved themselves on the rocks adjacent to the coast; but they again fell a prey to the waves, while the commandant of Cronstadt despatched a messenger to St Petersburg to know whether he might be permitted to assist them. Thus fell the unhappy Peter III. in 1762, in the thirty-fourth year of his age, after having enjoyed the imperial dignity only six months.

Catherine II. ascends the imperial throne.

On her accession, Catherine behaved with great magnanimity and forbearance towards those who had opposed her elevation, or were the declared friends of the deceased emperor. She gave to Prince George, in exchange for his title of Duke of Courland, conferred on him by Peter, the government of Holstein. She reinstated Biren in his dukedom of Courland, received into favour Marshal Munnich, who had readily transferred his fidelity from the dead to the living, and even pardoned her rival the Countess Vorontzoff, and permitted her to retain the tokens of her lover's munificence. She permitted Gudovitch, who was high in the confidence of Peter, and had incurred her particular displeasure, to retire to his native country. Perhaps the most unexpected part of her conduct towards the friends of Peter, was her adhering to the treaty of peace which that monarch had concluded with the king of Prussia six months before. The death of his inveterate enemy Elizabeth had relieved Frederick from a load of solicitude, and had extricated him from his dangerous situation. He now, as he thought, saw himself again involved in a war with the same formidable power; but, to his great joy, he found that Catherine, from motives of policy, declined entering on a war at the commencement of her reign.

An. 1764. Assassination of the dethroned czar.

In one particular the empress showed her jealousy and her fears. She increased the vigilance with which the young prince Ivan was confined in the castle of Schlusselburg, from which Peter III. had expressed a resolution to release him. Not long after her accession, this unfortunate prince was assassinated, though whether this event was to be imputed to the empress or her counsellors, cannot be positively determined. But a manifesto published by the court of St Petersburg, and supposed to have been written by the empress herself, admitted that the prince was put to death by the officers of his guard, alleging that this was necessary, in consequence of an attempt to carry him off.

Chronological sket of the affairs of R sia durin the reign of Cathe rine II.

Were we to offer a detailed account of the principal transactions that took place during the long reign of Catherine, we should far exceed the limits within which this article must be confined, and should at the same time repeat much of what has already been given under other heads. As the events that distinguished the life of Catherine, however, are too important to be wholly omitted, we shall present our readers with the following chronological sketch of them, referring for a more particular account to Tooke's Life of Catherine II., and to the articles CATHERINE II., BRITAIN, FRANCE, POLAND, PRUSSIA, SWEDEN, and TURKEY, in this work.

An. 1766.

The year 1766 presented at St Petersburg the grandest spectacle that perhaps was ever seen in Europe. At an entertainment, which the empress chose to name a carousal, the principal nobility appeared in the most sumptuous dresses, sparkling with diamonds, and mounted on horses richly caparisoned, in a magnificent theatre erected for that purpose. Here all that has been read of the ancient jousts and tournaments was realized and exceeded in the presence of thousands of spectators, who seemed to vie with each other in the brilliancy of their appearance.

An. 1768. Establishment of a code of laws.

In 1768, the empress composed instructions for a new code of laws for her dominions; and the same year she submitted to the danger of inoculation, in order that her subjects, to whom the practice was unknown, might be benefited by her example.

War with the Turk

In the same year a war broke out with the Ottoman Porte. The various events of this long and important conflict, which continued for seven years, must here be only briefly enumerated, as they will hereafter be more particularly noticed under the article TURKEY. In this war our countryman Greig, then an admiral in the Russian service, highly distinguished himself by his conduct in a naval engagement with the Turks, in the harbour of Tschesme, in the Archipelago, in which the Turkish fleet was entirely defeated, and their magazines destroyed. This took place on the 4th of November 1772.

An. 1769. Progress and conclu sion of th war with Turkey.

In the beginning of the year 1769, the khan of the Crimea made an attack on the territory of Bachmut, on the river Bog, where he was several times bravely repulsed, with his army of Tartars and Turks, by Major-General Romanius and Prince Prosorofskoi. At the same time were fought the battles of Zekanofca and Soroca on the Dnieper, when the large magazines of the enemy were burned. In February the Polish Kozaks in the voyvodeship of Braclau put themselves under the Russian sceptre. In the same month the Nisovian Saparogian Kozaks gained a battle in the deserts of Krim. In March the Polish rebels were subdued, and their town taken, by Major-General Ismailof. On the 2d of April the fort of Taganrog, on the Sea of Azof, was taken. On the 15th the Russian army, under the general-in-chief Prince Galitzin, crossed the Dniester. On the 19th a victory was gained by Prince Galitzin near Chotzim. On the 21st the Turks were defeated not far from Chotzim by Lieutenant-General Count Soltikof. The 29th, an action was fought between the Russian Kalmucks and the Kuban Tartars, to the disadvantage of the latter. June the 8th, the Turks were defeated at the mouth of the Dnieper, near Otchakof. An action took place on the Dniester on the 19th, when the troops of Prince Prosorofskoi forced the Turks to repass the river in great disorder. Chotzim was taken on the 19th of September. Yassy, in Moldavia, was taken on the 27th of September. Bukarescht, in Wallachia, was taken, and the hospodar made prisoner, in November 1770. A victory was gained by the Russians under Generals Podhorilshany and Potemkin, near Fokshany. The town of Shursha was taken by Lieutenant-General Von Stoffeln, February 4. A Russian fleet appeared in the port of Maina, in the Morea, on the 17th February. Mistra, the Lacedæmon of the ancients, and several other towns of the Morea, were taken in February. Arcadim in Greece surrendered, and a multitude of Turks were made prisoners, in the same month. The Turks and Tartars were driven from their intrenchments near the Pruth, by Count Romantzof, Prince Repnin, and General Bauer, 11th–16th June. Prince Prosorofskoi gained several advantages near Otchakof, June 18. The Russian fleet, under Count Alexei Orlof, gained a complete victory over the Turks near Tschesme, 24th June; the consequence of this victory was the destruction of the whole Turkish fleet, near Tschesme, where it was burned by Admiral Greig on the 26th of June. A battle was fought on the Kagul, in which Count Romantzof defeated the Turkish army, consisting of a hundred and fifty thousand men, and took their camp, and all the artillery, July 21. The fortress Bender was taken July 22. The town of Ismail was taken by Prince Repnin, July 26; Kilia by Prince Repnin, August 21; and Akjerman in October. Brailof was taken on the 10th of November 1771; the town of Kaffa, June 29; and numberless other victories were obtained by sea and land, till peace was concluded on the 13th January 1775. By this the Crimea was declared independent of the Porte, and all the vast tract of country between the Bog and Dnieper was ceded to Russia, besides the Kuban and the isle of Taman, with free navigation in all the Turkish seas, including the passage of the Dardanelles, privileges granted to the most favoured nations, and stipulations in behalf of the inhabitants of Moldavia and Wallachia.

A 1779.
D sion of
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in vice-
ro ties.

In 1779, the empress intending to divide the empire into viceroyalties, began in January with the viceroyalty of Orlof. March 21st, a new treaty was signed at Constantinople between Russia and the Porte. May 13th, the treaty of peace between the belligerent powers in Germany and the French king was signed under the mediation of her majesty. In October, a ship built at Taganrog, named the Prince Constantine, sailed to Smyrna with Russian commodities. December 3d, the viceroyalty of Voronetsk was instituted; and the 27th, Count Romantzof Zadunaiski opened the viceroyalty of Kursk with great solemnity.

A 780-1.
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In 1780, February 28th, appeared the memorable declaration of her imperial majesty, relating to the safety of navigation and commerce of the neutral powers. In 1781, March 1st, the empress became mediatrix between England and Holland; April 5th, instituted the first public school in St Petersburg.

A 1782.
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nis d.

In 1782, by a command of her majesty, dated January the 18th, a Roman Catholic archbishop was installed in the city of Mohilef, with authority over all the Catholic churches and convents in the Russian empire. August 7th, the famous equestrian statue of Peter the Great, being finished, was uncovered to the public in presence of the empress, on which occasion she published a proclamation containing pardons for several criminals. November 22d, the order of St Vladimir was instituted. The 27th, the empress published a new tariff.

A 783.
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In 1783, May 7th, the empress instituted a seminary for the education of young persons of quality at Kursk. June 21st, a treaty of commerce was concluded with the Ottoman Porte. July, the institution of the other viceroyalties of the empire followed in succession. On July 21st, the empress published a manifesto by her commander-in-chief Prince Potemkin, in the Krim, in regard to the taking possession of that peninsula, the Kuban, and the island of Taman. The 24th, a treaty was concluded with Heraclius II. czar of Kartalinia and Kachetti, by which he submitted himself, his heirs and successors for ever, with his territories and dominions, to the sceptre of her majesty, her heirs and successors. On the 29th, accounts were received from the camp of Prince Potemkin, at Karas-Basar, that the clergy, the beys, and other persons of distinction, with the towns of Karas-Basar, Bachtshiserai, Achmetchet, Kaffa, Kosloff, with the districts of Turkanskoikut and Neubasar, and that of Perekop, in the peninsula of the Krim, together with the hordes of Edissank and Dshambolusk, the sultan Alim Giray, and his vassals, with all the Budshaks and Bashkirs there, and all the tribes dwelling beyond the river Kuban, the sultan Boatur Giray and his vassals, took the oath of allegiance to her imperial majesty, and with willing hearts submitted for ever to her glorious sway. On the 30th the hospodar of Wallachia was deposed, and Draco Sutzo set up in his place. September 22d, her majesty raised Gabriel, archbishop of Novgorod and St Petersburg, to the dignity of metropolitan. October 21st, in the great hall of the Academy of Sciences, the new institution of the Imperial Russian Academy was opened, after a most solemn consecration by the metropolitan Gabriel, and others of the clergy, under the presidency of the Princess Dashkoff. November 7th, the empress became mediatrix for accommodating the differences between the king of Prussia and the city of Dantzig. The school for surgery was opened at St Petersburg on the 18th. December 13th, a school commission was instituted for superintending all the public schools. On the 28th, an act was concluded with the Ottoman Porte, by which the possession and sovereignty of the Krim, the Kuban, and Taman, were solemnly made over to the empress.

An. 1784,
Georgia
annexed to
the Russian empire.

1784. January 1st, the senate, in a speech by Field-Marshal Count Razomofskoi, performed the ceremony, repeated annually, of most humbly thanking her majesty for the benefactions which she had graciously bestowed on the whole empire in the preceding year. October 14th, the Lesgiers, having crossed the river Alasan, and invaded the dominions of Georgia, were repulsed with great loss by a detachment of Russian troops. December 29th, Katolikos Maksim, the serdar and court-marshal Prince Zeretelli, and the chief justice Kuinichese, ambassadors from David, czar of Imeretia, were admitted to a public audience of her majesty, at which they submitted, in the name of the czar, him and his subjects to the will and powerful protection of her imperial majesty, as the rightful head of all the sons of the orthodox eastern church, and sovereign ruler and defender of the Georgian nations.

An. 1785.
Several
provincial
schools established.

1785. The 12th of January, Maurocordato, hospodar of Wallachia, was deposed, and Alexander Maurocordato, his uncle, restored to that dignity. The 21st, the empress visited the principal national school, and passed a long time in examining the classes, and the proficiency of the youth in that seminary; on which occasion a marble tablet was fixed in the wall of the fourth class, with this inscription, in gold letters: THOU VISITEST THE VINEYARD WHICH THINE OWN HAND HATH PLANTED. April 21st, the privileges of the nobility were confirmed, and on the same day the burghers of towns constituted into bodies corporate, by a particular manifesto. The public school in Voronetsk was opened. July 14th, a manifesto was issued, granting full liberty of religion and commerce to all foreigners settling in the regions of Mount Caucasus, under the Russian government. September 15th, the public school at Nishnei Novgorod was opened. October 12th, the Jesuits in White Russia, in a general assembly, elected a vicar-general of their order. November 1st, a treaty of commerce was concluded with the emperor of Germany. The 24th, the Russian consul in Alexandria made his public entry on horseback, an honour never before granted to any power; erected the imperial standard on his house, with discharge of cannon, &c. December 28th, a Russian mercantile frigate, fully freighted, arrived at Leghorn from Constantinople.

An. 1786. The roads repaired at the expense of government. A loan bank established.

1786. The 29th of January, the empress confirmed the plan of a navigation school. February 12th, by a decree, the usual slavish subscriptions to petitions were to be discontinued; and, instead of them, only the words *humble* or *faithful subject*, and in certain cases only *subject*, were ordained to be used. March 2d, the empress granted the university of Moscow a hundred and twenty-five thousand roubles, and all the materials of the palace Kremlin, for increasing its buildings. The 25th, a decree was passed for making and repairing the roads throughout the whole empire at the sole expense of the crown, and four millions of roubles were immediately allotted for the road between St Petersburg and Moscow. April 10th, a new war establishment for the army was signed; 23d, the hospodar of Wallachia was deposed, and Mavroyeni set up in his place. June 28th, the empress instituted a loan bank at St Petersburg, to the fund whereof she allotted twenty-two millions to be advanced to the nobility, and eleven millions to the burghers of the town, on very advantageous terms. August 5th, there were published rules to be observed in the public schools. October 4th, a large Russian ship, with Russian productions, from St Petersburg, arrived at Cadiz. November 24th, the empress erected public schools at Tambov. December 14th, Prince Ypsilanti was appointed hospodar of Moldavia, in the room of the deposed Maurocordato. December 31st, a treaty of commerce and navigation was concluded between Russia and France.

An. 1787. Renewal of hostilities with Turkey.

1787. March, public schools were endowed and opened at Rostof, Uglitsh, Molaga, and Romanof, in the viceroyalty of Yaroslavl; also at Ustiug and Arasovitz, in the viceroyalty of Vologda. April 21st, a manifesto was issued for promoting peace and concord among the burghers of the empire. The 25th, took place the concerted interview between the empress and the king of Poland, near the Polish town of Konief. The treaty of commerce with England being expired, the British factory were informed that they must henceforward pay the duties on imports in silver money, like the other nations who had no commercial treaty. May 7th, the empress hearing that the emperor of Germany was at Cherson, proceeded thither, and met him there on the 12th. June 28th, the twenty-fifth anniversary of her reign, she displayed various marks of her bounty. The debtors to the crown were forgiven, prisoners released, imposts taken off, soldiers rewarded, &c. The 12th July, the new-built school at Riga, called a *Lyceum*, was solemnly dedicated. August 5th, Bulgakoff, the Russian ambassador at the Ottoman Porte, was imprisoned in the Seven Towers, contrary to the law of nations, which the empress regarded as a public declaration of war. 21st, The Turkish fleet at Otchakof attacked the Russian frigate Skorui and the sloop Bitingi, but was repulsed and put to flight by the bravery of the latter. Many signal advantages were gained over the Turks; several public schools founded in various parts of the empire between this and August following, during which time the war broke out with Sweden.

An. 1788. War with Sweden.

1788. August 12th, in the expedition beyond the Kuban, the Russian troops entirely routed a company of four thousand Arutayans and Alcasinians; eight hundred of the enemy were slain, and five villages destroyed. 15th, The surrender of the Turkish fortress of Dubitsha took place. 18th, The Turks made a violent sortie from Otchakof, but were repulsed by the Russian yagers, and, after a battle of four hours, were driven back with the loss of five hundred men. 23d, A fierce battle was fought between the Russian troops and Sacubanians, in which the latter lost a thousand men. The Russian fleet kept the Swedish blocked up in Sveaborg ever since the battle of July 6th. The Swedish army left the Russian territory in Finland. September 18th, The town and fortress of Chotzim surrendered to the Russians, with the garrison of two thousand men, a hundred and fifty-three cannon fourteen mortars, and much ammunition. 19th–29th, A small Russian squadron from the fleet at Sevastopol, cruising along the coast of Anatolia, destroyed many of the enemy's vessels, prevented the transporting of the Turkish troops, and returned with great booty. 20th, Ussenier Shamanachin, chief of the Bsheduchovians, was, on his petition, admitted a subject of Russia. 26th, A numerous host of Kubanians and Turks were beaten on the river Ubin, with the loss of fifteen hundred men. November 7th, Prince Potemkin, at the head of his Kozaks, took the island Beresan, with many prisoners and much ammunition. December 6th, the town and fortress of Otchakof were taken by Prince Potemkin Tavritsheskoi; nine thousand five hundred and ten of the enemy were killed, four thousand taken prisoners, a hundred and eighty standards, three hundred and ten cannons and mortars. All the inhabitants were taken prisoners, amounting to twenty-five thousand; the Russians lost nine hundred and fifty-six killed and eighteen hundred and twenty-four wounded. December 19th, General Kamenskoy gained considerable advantages over the Turks near Gangur.

An. 1789 Numerous victories over the Turks and Swedes.

1789. April 16th, Colonel Rimskoy Korsakoff was surrounded by the Turks, who were beaten, with great slaughter, by Lieutenant-General Von Derfelden. 17th–28th, Some Russian cruisers from Sevastopol effected a landing on Cape Karakarman, burnt six mosques, and carried off great booty. 20th, General Derfelden drove the Turks from Galatch, gained a complete victory, killed two thousand, took fifteen hundred prisoners, with the seraskier Ibrahim Pasha, and the whole camp. Several skirmishes took place between the Russians and Swedes in Finland, always to the advantage of the former. May 31st, another victory was gained over the Swedes. June 5th, Sulkof was taken from the Swedes, and Fort St Michael on the 8th. July 15th, Admiral Tchitchagoff engaged the Swedish fleet under the command of the Duke of Sudermania; but no ship was lost on either side. 21st, A battle was fought at Fokshany, to the great loss of the Turks, and Fokshany was taken. August 13th, the Russian galley fleet fought the Swedish under Count Ehrenschwerdt, the former took a frigate and five other ships, and two thousand prisoners. August 21st, another sea-fight took place, and Prince Nassau Siegen made good his landing of the Russian troops in sight of the king of Sweden at the head of his army. September 7th, Prince Repnin attacked the seraskier Hassan Pasha near the river Seltska, and took his whole camp. 11th, Count Suwaroff and prince of Saxe-Cobourg engaged near the river Kymnik the grand Turkish army of nearly a hundred thousand men, and gained a complete victory; from which Count Suwaroff received the surname Kymnikskoi. 14th, The Russian troops under General Ribas took the Turkish citadel Chodshabey, in the sight of the whole of the enemy's fleet. 30th, The fortress Palanka being taken, the town of Belgorod or Akjerman surrendered to Prince Potemkin Tavritsheskoi. November 4th, the town and castle of Bender submitted at discretion to the same commander.

An. 1790. Peace wit Sweden.

1790. April 24, General Numsen gained a victory over the Swedes near Memel. May 2, a sea-fight took place off Revel, in which the Russians captured the Prince Charles of sixty-four guns from the Swedes; and in this engagement those two gallant English officers Captains Trevennian and Dennison were killed. 23d, The fleet under Vice-Admiral Kruse engaged the Swedish fleet near the island Siskar in the Gulf of Finland, without any advantage being gained on either side, though they fought the whole day. 24th, An action was fought at Savataipala, when the Swedes were forced to fly. June 6th, the Swedes were defeated by Major Buxhovden, on the island Uransari. June 22, the whole Swedish fleet, commanded by the Duke of Sudermania, was entirely defeated by Admiral Tchitchagoff and the Prince of Nassau Siegen; on this occasion five thousand prisoners were taken, amongst whom were the centre admiral and two hundred officers. 28th, General Denisoff defeated the Swedes near Davidoff. July 9th, Admiral Ushakoff obtained a victory over the Turkish fleet commanded by the capudan pasha, at the mouth of the Straits of Yenikali. August 3d, peace was concluded with Sweden, without the mediation of any other power. August 28th, 29th, an engagement took place on the Euxine, not far from Chodshabey, between the Russian admiral Ushakoff and the capudan pasha, when the principal Turkish ship, of eighty guns, was burnt, one of seventy guns and three others taken, the admiral Said Bey being made prisoner, and another ship sunk; the rest made off. September 30th, a great victory was obtained over the Turks by General Germann, with much slaughter, and the seraskier Batal Bey, and the whole camp, were taken. October 18th, Kilia surrendered to Major Ribas. November 6th, 7th, the fortress Cultsha and the Turkish flotilla were taken. December 11th, the important fortress of Ismail, after a storming for seven hours without intermission, surrendered to Count Suwaroff, with the garrison of forty-two thousand men; thirty thousand eight hundred and sixteen were slain on the spot, two thousand died of their wounds, nine thousand were taken prisoners, with two hundred and sixty-five pieces of cannon, an incredible store of ammunition, &c. The Russians lost only eighteen hundred and fifteen killed, and two thousand four hundred and fifty wounded.

A 1791. T Turks r atedly d ated, a obliged t ake p e.

1791. March 25th–31st, the campaign opened by the troops under Prince Potemkin, not far from Brailof, when the Turks were defeated in several battles, in which they lost upwards of four thousand men. June 5th, the troops under General Golenitshef Kutusoff, near Tultsha, drove the Turks beyond the Danube, and at Babada entirely routed a body of fifteen thousand men, of whom fifteen hundred were left dead upon the field. 22d, The fortress Anapuas was taken by storm, when the whole garrison, consisting of twenty-five thousand men, were put to the sword, excepting one thousand who were taken prisoners. 28th, The troops under Prince Repnin attacked the Turkish army, consisting of nearly eighty thousand men, commanded by the grand vizir Yussuf Pasha, eight pashas, two Tartar sultans, and two beys of Anatolia; and after a bloody battle of six hours, entirely routed them: five thousand Turks were killed in their flight. June 28th, Sudskuk Kale was taken. July 31st, Admiral Ushakoff beat the Turkish fleet on the coasts of Rumelia. Prince Repnin and Yussuf Pasha signed the preliminaries of peace between the Russian empire and the Ottoman Porte, by which the Dniester was made the boundary of the two empires, with the cession of the countries lying between the Bog and Dniester to Russia. August 15th, 16th, at Pilnitz, near Dresden, a congress was held by the emperor of Germany, the king of Prussia, the elector of Saxony, the Count d'Artois, &c. &c. One of the most important events in this year was the death of Prince Potemkin, at Yassy in Moldavia, on the 15th October.

A 1792. F inva- si of Po- la

1792. Early in this year Bulgakoff, the Russian minister at Warsaw, declared war against Poland; and the Polish patriots raised an army in which Thaddeus Kosciuszko soon bore a conspicuous part.

In 1788, the diet of Poland had abrogated the constitution which the empress of Russia had, in 1775, compelled that nation to adopt, and had formed an alliance with the king of Prussia, by way of defence against the further encroachments of the Russian despot. Three years after, viz. on the 3d of May 1791, the new constitution, which was intended further to destroy the ambitious hopes of Catherine, was decreed at Warsaw. (See POLAND.) These were affronts which the Russian empress could not forgive, and in one of the *conciliabula*, in which the ministers of state, and the favourite for the time being, sat to regulate the affairs of the north of Europe, and to determine the fate of the surrounding nations, the annihilation of the Polish monarchy was resolved on.

The declaration of war above mentioned was denounced by Bulgakoff at an assembly of the diet. That body received the declaration with a majestic calmness, and resolved to take measures for the defence of the nation. The generous enthusiasm of liberty soon spread throughout the state, and even the king pretended to share in the general indignation. An army was hastily collected, and the command of it bestowed on Prince Joseph Poniatowsky, a general whose inexperience and frivolous pursuits were but ill adapted to so important a charge.

In the mean time several Russian armies were preparing to overwhelm the small and disunited forces of the Poles. A body of eighty thousand Russians extended itself along the Bog, another of ten thousand was collected in the environs of Kief, and a third of thirty thousand penetrated into Lithuania. While these armies were carrying murder and desolation throughout the Polish territories, Catherine was employing all her arts to induce the neighbouring powers to join in the partition of Poland; and in this she was but too successful. A treaty was accordingly concluded between the empress and the king of Prussia, by which each appropriated to itself a share of the remains of Poland. Stanislas Augustus, the powerless head of that state, was prevailed on to make a public declaration that there was a necessity for yielding to the superiority of the Russian arms.

1793. On the 9th of April the Polish confederation of the partisans of Russia assembled at Grodno; and on this occasion the Russian general placed himself under the canopy of that throne which he was about to declare for ever vacant, and the Russian minister Sievers produced a manifesto, declaring the intention of his mistress to incorporate with her domains all the Polish territory which her arms had conquered. An. 1793.

The Russian soldiers dispersed throughout the provinces committed depredations and ravages of which history furnishes but few examples. Warsaw became especially the theatre of their excesses. Their general, Igelstrom, who governed in that city, connived at the disorders of the soldiers, and made the wretched inhabitants feel the whole weight of his arrogance and barbarity. The patriots of Poland had been obliged to disperse, their property was confiscated, and their families reduced to servitude. Goaded by so many calamities, they once more took the resolution to free their country from the oppression of the Russians, or perish in the attempt. Some of them assembled, and sent an invitation to Kosciuszko, to come and lead them on against the invaders of their freedom.

Kosciuszko had retired to Leipsig, with a few other Poles, all eminent for patriotism and military ardour. These hesitated not a moment in giving their approbation to the resolution adopted by their indignant countrymen; but they were sensible that, in order to succeed, they must begin by emancipating the peasants from the state of servitude under which they then groaned. Kosciuszko and Zagonchek repaired with all expedition to the frontiers of Poland, and the latter proceeded to Warsaw, where he held conferences with the chief of the conspirators, and particularly with several officers, who declared their detestation of the Russian yoke. All appeared ripe for a general insurrection; and the Russian commanders, whose suspicions had been excited by the appearance of Kosciuszko on the frontiers, obliged that leader and his confederates to postpone for a time the execution of their plan. In order to deceive the Russians, Kosciuszko retired into Italy, and Zagonchek repaired to Dresden, whither Ignatius Potoski and Kolontay had gone before him. On a sudden, however, Zagonchek appeared again at Warsaw, but was impeached by the king to General Igelstrom, and, in a conference with the general, was ordered to quit the Polish territory. He must now have abandoned his enterprise altogether, or immediately proceed to open insurrection. He chose the latter.

An. 1794. Attempts of the patriots to oppose the encroachments of Russia.

1794. Kosciuszko was recalled from Italy, and arrived at Cracow, where the Poles received him as their deliverer. Here he was joined by some other officers, and took the command of his little army, consisting of about three thousand infantry and twelve hundred cavalry. On the 24th of March was published the manifesto of the patriots, in which they declared the motives for their insurrection, and called on their countrymen to unite in the glorious attempt to free the republic from a foreign yoke. Kosciuszko was soon joined by three hundred peasants armed with scythes, and some other small reinforcements gradually came in. A body of seven thousand Russians had collected to oppose the movements of this little army, and a battle took place, in which the patriots were successful.

While the insurrection had thus auspiciously commenced on the frontiers, the confederates of the capital were nearly crushed by the exertions of the Russian general. Hearing at Warsaw of the success of Kosciuszko, Igelstrom caused all those whom he suspected of having any concern in the insurrection to be arrested; but these measures served only to irritate the conspirators. On the 18th of April they openly avowed their confederacy with the patriots of the frontiers, and proceeded in great numbers to attack the Russian garrison. Two thousand Russians were put to the sword, and the general, being besieged in his house, proposed a capitulation; but, profiting by the delay that had been granted him, he escaped to the Prussian camp, which lay at a little distance from Warsaw.

Wilna, the capital of Lithuania, followed the example of Warsaw; but the triumph of the insurgents was there less terrible, as Colonel Yasinsky, who headed the patriots, conducted himself with so much skill, that he made all the Russians prisoners without bloodshed. The inhabitants of the cantons of Chelm and Lublin also declared themselves in a state of insurrection, and three Polish regiments who were employed in the service of Russia espoused the cause of their country. Some of the principal partisans of Russia were arrested, and sentenced to be hanged.

Kosciuszko exerted himself to the utmost to augment his army. He procured recruits among the peasants, and to inspire them with the more emulation, he adopted their dress, ate with them, and distributed rewards among such as appeared most to merit encouragement. All his attempts to inspire the lower orders of the Poles with the ardour of patriotism were, however, unavailing. A mutual distrust prevailed between the nobles and the peasants, and this was fomented by the arts of Stanislas and the other partisans of Russia.

The empress had sent into Poland two of her best generals, Suwaroff and Fersen. For some time Kosciuszko succeeded in preventing the junction of these commanders, and several engagements took place between the Russians and patriots, in which the former were generally successful. At length, on the 4th of October, the fate of Poland was decided by a sanguinary conflict between Kosciuszko and Fersen, at Macieyovitch, a small town of Little Poland, about sixty miles from Warsaw. The talents, valour, and desperation of Kosciuszko could not prevent the Poles from yielding to superior numbers. Almost the whole of his army was either cut in pieces or compelled to surrender at discretion, and the hero himself, covered with wounds, fell senseless on the field of battle, and was made prisoner.

Final dismemberment of Poland.

The small number that escaped fled to Warsaw, and shut themselves up in the suburb of Praga. Hither they were pursued by Suwaroff, who immediately laid siege to the suburb, and prepared to carry it by storm. On the 2d of November he gave the assault, and having made himself master of the place, put to the sword both the soldiers and the peaceable inhabitants, without distinction of age or sex. It is computed that twenty thousand persons fell victims to the savage ferocity of the Russian general; and, covered with the blood of the slaughtered inhabitants, the barbarian entered Warsaw in triumph.

Thus terminated the feeble resistance of the Polish patriots. The partition of the remaining provinces was soon effected, and Stanislas Augustus, who had long enjoyed merely the appearance of royalty, and had degraded himself by becoming the instrument of Russian usurpation, retired to Grodno, there to pass the remainder of his days, on a pension granted him by the empress.

An. 179

1795. On the 18th of February, a treaty of defensive alliance between the empress of Russia and his Britannic majesty was signed at St Petersburg. The ostensible object of this treaty was to maintain the general tranquillity of Europe, and more especially of the north; and by it Russia agreed to furnish Great Britain with ten thousand infantry and two thousand horse in case of invasion; while Great Britain was, under similar circumstances, to send her imperial majesty a squadron consisting of two ships of seventy-four guns, six of sixty, and four of fifty, with a complement of four thousand five hundred and sixty men. On the 18th of March was signed the act by which the duchy of Courland, together with the circle of Pilten, all of which had lately belonged to the Duke of Courland, but had long retained only the shadow of independence, submitted themselves to the Russian dominion.

Dispute with Sweden.

In this year there took place between the courts of St Petersburg and Stockholm a dispute which threatened to terminate in a war. Gustavus III. had been assassinated by Ankerstroem at a masquerade, on the 15th of March 1791; and the young king Gustavus Adolphus being still a minor, the Duke of Sudermania, his uncle, had been appointed regent of the kingdom. The regent had determined to effect a marriage between his nephew and a princess of the house of Mecklenburg; but Catherine publicly declared that the late king had betrothed his son to one of her grand-daughters. The misunderstanding hence originating was increased by the rude and indecorous behaviour of the Baron von Budberg, the Russian minister at Stockholm; and matters seemed tending to an open rupture, when, in the year 1796, a French emigrant named Christin effected a reconciliation, and General Budberg, the baron's uncle, was sent as ambassador to Stockholm from the Russian court. In consequence of this reconciliation, the young king, attended by the regent, and a numerous train of Swedish courtiers, set out on a visit to St Petersburg, where they arrived on the 24th of August, and an interview took place between the empress and her royal visiters, for the purpose of finally adjusting the projected matrimonial alliance. Gustavus Adolphus was much pleased with the appearance of the Grand Duchess Alexandra, but informed the empress, that by the fundamental laws of Sweden he could not sign the marriage-contract before the princess had abjured the Greek religion; and as neither the solicitations nor the flatteries of Catherine could prevail on the young monarch to depart from the received custom of his country, the negotiation ended, and the next day Gustavus and his retinue quitted St Petersburg.

The last transaction of importance in the reign of Catherine was her invasion of the Persian territories, undertaken for the purpose of acquiring certain possessions on the shores of the Caspian. A Russian army entered Daghestan, and made itself master of Derbent, but was afterwards defeated by the Persians under Aga Mahmoud. The death of the empress took place, as we have elsewhere stated, on the 9th of November of this year; and the Grand Duke Paul Petrovitch ascended the throne under the title of Paul I.

An. 1796. Reign of Paul.

Paul Petrovitch had attained his forty-second year before the death of his mother placed him on the imperial throne; but for many years before her death he had lived in a state of comparative obscurity and retirement, and had apparently been considered by the empress as incapable of taking any active part in the administration of affairs. It is well known that Catherine never admitted him to any participation of power, and kept him in a state of the most abject and mortifying separation from court, and in almost total ignorance of the affairs of the empire. Although by his birth he was generalissimo of the armies, president of the admiralty, and grand admiral of the Baltic, he was never permitted to head even a regiment, and was interdicted from visiting the fleet at Cronstadt. From these circumstances, it is evident that the empress either had conceived some jealousy of her son, or saw in him some mental imbecility, which appeared to her to disqualify him for the arduous concerns of government. There is little doubt, from the circumstances which distinguished his short reign, that Catherine had been chiefly influenced in her treatment of the grand duke by the latter consideration. There were certainly times at which Paul displayed evident marks of insanity, though he occasionally gave proofs of a generous and tender disposition, and even of intellectual vigour.

It is generally believed that, a short time before her death, Catherine committed to Plato Zuboff, her last favourite, a declaration of her will, addressed to the senate, desiring that Paul should be passed over in the succession, and that on her death the Grand Duke Alexander should ascend the vacant throne. As soon as Zuboff was made acquainted with the sudden death of the empress, he flew to Pavlovsk, about twenty-three miles from St Petersburg, where Paul occasionally resided; but meeting the grand duke on the road, he, after a short explanation, delivered up the important document. Paul, charmed with his zeal and loyalty, rewarded the favourite, by permitting him to retain the wealth and honours which had been heaped on him by his mistress, while a general and rapid dispersion soon took place among the other adherents of the late sovereign. On the day following the death of his mother, Paul made his public entry into St Petersburg, amidst the acclamations of all ranks of people.

S ular fu al of P III.

One of the first measures adopted by the new emperor excited considerable surprise, and divided the opinions of the public with respect to the motives by which it had been suggested; some attributing it to his respect for the memory of his late father, and others to a culpable reflection on that of his mother. He ordered the corpse of Peter III. to be removed from the sepulchre in which it had been deposited in the church of St Alexander Nefsky, solemnly crowned it, and caused it to lie in state for three weeks, while it was watched day and night by the only two remaining conspirators who had assisted at his assassination. After this dreadful mark of his justice on the murderers of his father, surely more terrible to the guilty mind than death itself, he consigned the ashes to the sepulchre of Catherine II. in the cathedral of St Peter and St Paul, obliging the assassins to walk in the procession as chief mourners.

Few political events of any importance marked the reign of Paul previously to the year 1798, when, in consequence of a treaty between him and the emperor of Germany, a Russian army of forty-five thousand men, under Field-Marshal Suwaroff, joined the imperialists in the Austrian territories in Italy. The progress of Suwaroff, his successes over Moreau, and his final recall by his master, have already been related in the article France.

An. 799. Tr y of alli e between Rus- sia d Bri- tain

In 1799, Paul entered into a treaty of offensive and defensive alliance with his Britannic majesty. This treaty was signed at St Petersburg on the 22d of June, having been preceded by a provisional treaty between the same powers at the end of the year 1798. By the latter, which was fortified by a relative treaty with Austria, it had been stipulated that Paul should assist the king of Prussia, if the latter could be persuaded to join his arms to the allied powers against France, with forty-five thousand men, and that the king of Great Britain should pay to Russia a subsidy of L.75,000 sterling per month; and in case the king of Prussia should refuse to join the coalition, the same number of troops, in consideration of the same subsidy, should be employed, as occasion might require, to assist the common cause. By the new treaty, the emperor of Russia, instead of the forty-five thousand troops, engaged to furnish seventeen thousand five hundred and ninety-three, with the necessary artillery, to be employed in an expedition against Holland; and six ships, five frigates, and two transports, for the purpose of transporting part of the invading army from Britain to the continent. In consideration of these succours, the court of London engaged to advance to Russia a subsidy of L.44,000 sterling per month; to pay the sum of L.58,929. 10s. sterling for the expenses of equipping the fleet; and after the period of three months had elapsed from such equipment, to pay a further subsidy of L.19,642. 10s. sterling per month, as long as the fleet should remain under the command of his Britannic majesty.

In consequence of this treaty, a Russian fleet joined that of Britain in Yarmouth Roads, and took part in the unfortunate expedition to the coast of Holland, which was undertaken in the summer of 1799. The military fame of Russia was more augmented by the share which its army under Suwaroff took in the campaign of Italy during the same year, although the victories which won for the veteran his name of Italinski were far more than overbalanced by the misfortunes which ensued in Switzerland under the emperor's favourite Korsakoff. But in December 1800, Paul, after having laid an embargo on the British shipping which lay in his ports, openly abandoned his relations with our country, and proclaimed, in confederacy with Sweden and Denmark, to whom Prussia afterwards added herself, the great Northern Coalition with France against Great Britain.

An. 1801. Paul's challenge to the sovereigns of Europe.

In the beginning of the year 1801, all Europe was astonished or amused by a paragraph which appeared in the Hamburg Gazette of the 16th of January. It was dated from Petersburg, the 30th December 1800, and is as follows.

"We learn from Petersburg, that the emperor of Russia, finding that the powers of Europe cannot agree among themselves, and being desirous to put an end to a war which has desolated it for eleven years past, intends to point out a spot to which he will invite all the other sovereigns, to repair and fight in single combat; bringing with them, as seconds and squires, their most enlightened ministers and their most able generals, such as Messrs Thugot, Pitt, and Bernstorff; and that the emperor himself proposes being attended by Generals Count de Pahlen and Khutosof. We know not if this report be worthy of credit; however, the thing appears not destitute of some foundation, and bears strong marks of what he has been often taxed with."

This paragraph was immediately copied or translated into all the public papers, and it was strongly affirmed by many that it was the composition of Paul himself. This has since been confirmed by the poet Kotzebue, who was employed by the emperor of Russia to translate the original into German, for the express purpose of its being inserted in the Hamburg Gazette.[1]

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[1] This paragraph is such a curious *morceau* of witty insanity, that we shall here give the original French, as written by Paul himself, and published by Kotzebue in his account of his exile into Siberia. "On apprend de Petersbourg, que l'Empereur de Russie, voyant que les puissances de l'Europe ne pouvoient s'accorder entr'elles, et voulant mettre fin a une guerre qui la désoloit depuis onze ans, vouloit proposer un lieu où il inviteroit tous les autres Souverains, de se rendre et y combattre en champ clos, ayant avec eux pour écuyers juges de camp et heros des armes leurs ministres les plus eclairés et les généraux les plus habiles, tels que MM. Thugot, Pitt, Bernstorff; lui-même se proposant de prendre avec lui les généraux C. de Pahlen et Khutosof. On ne sçait si on doit y ajouter foi; toutefois, la chose ne paroit pas destituée de fondement, en portant l'empreinte de ce dont il a souvent été taxé."

Other marks of the emperor's derangement.

This was not the only mark of mental derangement displayed by the unhappy monarch. The army, which formed his favourite employment, was tormented by incessant caprices affecting its discipline; and the press, the native Russians, and the resident foreigners, suffered tyrannical and unaccountable restrictions. His favours and his displeasure were alternately experienced by some of his most distinguished courtiers and adherents. Stanislas, the deposed king of Poland, partook by turns of his beneficence and his severity; and at length, on the death of that monarch, Paul assisted at his funeral, commanded in person the guards that attended on the ceremony, and uncovering himself with the utmost emotion, saluted the coffin as it passed. To the memory of the aged Suwaroff, who is said to have fallen a broken-hearted victim to the distraction of his imperial master, he raised a colossal statue of bronze; and on the days when he reviewed his troops in the square where the figure had been erected, he used to command them to march by in open order, and face the monument. Notwithstanding the important service that had been rendered him by Zuboff, the emperor soon became disgusted with him; spoke of him to his friends with great asperity; at length denounced him as a defaulter to the imperial treasury of half a million of roubles; and, convinced of the justice of the allegation, proceeded to sequestrate the vast estates which belonged to him and his two brothers. Driven to desperation by such conduct, the second brother of the favourite one day walked up boldly to the emperor upon the parade, and with manly eloquence represented the injustice of his measures. Paul received him without anger, heard him without interruption, and restored the property; but soon afterwards he ordered Plato Zuboff to reside on his estate, though he again restored him to favour.

Conspiracy formed against the emperor.

It is not surprising that these instances of folly and caprice should alarm and disgust many of the nobles. In particular, Count Pahlen, the governor of St Petersburg, with some other men of rank, entered into a confederacy with Zuboff and his brothers for removing the emperor. In their conferences, which were managed with great prudence and discretion, it was resolved that Paul should die, and that the day of the festival called Maslaintza, the 11th of March O. S. 1801, should be the day for executing the awful deed. At the time of this plot, the emperor and his family resided in the new palace of St Michael, an enormous quadrangular pile standing at the bottom of the summer gardens. Paul being anxious to inhabit this palace soon after he was crowned, the masons, carpenters, and various artificers, toiled with incredible labour, by day and by torch-light, under the sultry sun of the summer, and in all the severity of a polar winter; and in three years this enormous and magnificent fabric was completed. The whole is moated round; and when the stranger surveys its bastions of granite, and numerous draw-bridges, he is naturally led to conclude that it was intended for the last asylum of a prince at war with his subjects. Those who have seen its massive walls, and the capaciousness and variety of its chambers, will easily admit that an act of violence might be committed in one room, and not be heard by those who occupy the adjoining one; and that a massacre might be perpetrated at one end, and not known at the other. Paul took possession of this palace as a place of strength, and beheld it with rapture, because his imperial mother had never even seen it. While his family were here, by every act of tenderness endeavouring to soothe the terrible perturbation of his mind, there were not wanting those who exerted every stratagem to inflame and increase it. These people were constantly insinuating that every hand was armed against him. With this impression, which added fuel to his burning brain, he ordered a secret staircase to be constructed, which, leading from his own chamber, passed under a false stove in the anti-room, and led by a small door to the terrace.

His assassination.

It was the custom of the emperor to sleep in an apartment next to the empress's, upon a sofa, in his regimentals and boots, whilst the grand duke and duchess, and the rest of the imperial family, were lodged at various distances, in apartments below the story which he occupied. On the 10th March, the day preceding the fatal night, whether Paul's apprehension, or anonymous information, suggested the idea, is not known; but conceiving that a storm was ready to burst upon him, he sent for Count Pahlen: "I am informed," said the emperor, "that there is a conspiracy on foot against me; do you think it necessary to take any precaution?" The count, without betraying the least emotion, replied, "Sire, do not suffer such apprehensions to haunt your mimd; if there were any combinations forming against your majesty's person, I am sure I should be acquainted with it." "Then I am satisfied," said the emperor; and the governor withdrew. Before Paul retired to rest, he, beyond his usual custom, expressed the most tender solicitude for the empress and his children, kissed them with all the warmth of farewell fondness, and remained with them for a considerable time. He afterwards visited the sentinels at their different posts, and then retired to his chamber. Soon after the emperor had retired, the guard that was always placed at his chamber door was, on some pretext, changed by the officers who had the command for the night, and who were engaged in the conspiracy. One man only remained. This was a hussar whom the emperor had honoured with particular marks of attention, and who always slept at night in the antechamber, at his sovereign's bed-room door. This faithful soldier it was found impossible to remove, except by force, which at that time the conspirators did not think proper to employ. Silence now reigned throughout the palace, disturbed only by the pacing of the sentinels, or by the distant murmurs of the Neva; and only a few straggling lights were to be seen, irregularly gleaming through the windows of the palace. In the dead of the night, Zuboff and his friends, amounting to eight or nine persons, passed the draw-bridge, ascended the staircase that led to the emperor's apartments, and met with no opposition till they reached the antechamber, where the faithful hussar, awakened by the noise, challenged them, and presented his fusee. Though they must have admired the brave fidelity of the guard, neither time nor circumstances would admit of an act of generosity which might have endangered their whole plan of operations. Zuboff therefore drew his sabre, and cut the poor fellow down. In the mean time, Paul, roused by the unusual bustle, sprang from his couch. At this moment the whole party rushed into his chamber. The unhappy sovereign, anticipating their design, at first endeavoured to intrench himself behind the chairs and tables; but soon recovering some share of his natural courage, he assumed a high tone, told them they were his prisoners, and required them to surrender. Finding that they fixed their eyes steadily and fiercely upon him, and continued to advance, he implored them to spare his life, declared his willingness instantly to relinquish the sceptre, and to accept of any terms which they might dictate. He even offered to make them princes, and to confer on them orders and estates. Regardless alike of his threats and promises, they now began to press on him, when he made a convulsive effort to reach the window, but failed in the attempt; and, indeed, had he succeeded in his endeavour to escape that way, the height from the window to the ground was so great, that the expedient would probably have only put a more speedy period to his existence. As the conspirators drew him back, he grasped a chair, with which he knocked down one of the assailants, and a desperate conflict now took place. So great was the noise, that notwithstanding the massive walls and double folding doors that divided Paul's apartments from those of the empress, she was disturbed, and began to call for help, when a voice whispered in her ear, commanding her to remain quiet, and threatening that if she uttered another word she should instantly be put to death.

Paul was now making his last struggle, when one of the party struck him on the temple with his fist, and laid him prostrate on the floor. Recovering from the blow, the unhappy monarch again implored his life. At this moment the heart of one of the conspirators relented, and he was observed to hesitate and tremble, when a young Hanoverian who was present exclaimed, we have passed the Rubicon; if we spare his life, we shall, before the setting of to-morrow's sun, become his victims; on saying which he took off his sash, turned it twice round the naked neck of the emperor, and giving one end to Zuboff, he himself drew the other, till the object of their attack expired.

A ession o Alexan- d Paulo- v h.

The Emperor Alexander, Paul's eldest son, was in his twenty-fourth year when he ascended the throne, and from his amiable disposition had acquired the love and respect of all his subjects. The first measure which he adopted, his proclamation, and his first imperial orders, all tended to encourage and confirm the confidence with which the people beheld him ascend the throne of his forefathers. He solemnly promised to tread in the steps of Catherine II.; he allowed every one to dress according to his own fancy; he exonerated the inhabitants of the capital from the trouble and duty of alighting from their carriages on the approach of the imperial family; he dismissed the court advocate, who was universally and justly detested; he suppressed the secret inquisition, that had become the scourge of the country; he restored to the senate its former authority, set at liberty the state prisoners, and recalled from Siberia several of the exiles. He even extended his mercy to the assassins of the late emperor. Zuboff was ordered not to approach the imperial residence, and the governor of the city was transferred to Riga.

It is not easy to explain the motives that induced Alexander to forego that vengeance which justice seemed to demand on the heads of his father's assassins. It has been attributed by one of his panegyrists to a forlorn and melancholy conviction that the murderers had been prompted to commit the bloody deed solely by a regard for the salvation of the empire. This conviction might have induced the young monarch to diminish the weight of the punishment which piety and justice called on him to inflict, but can scarcely account for his total forbearance.

A cable di sition o lexan- de owards B ain.

Alexander, on his accession to the throne, appeared desirous to cultivate the friendship of the neighbouring states, and especially that of Great Britain. His late father, among other projects, had procured himself to be elected grand-master of the knights of Malta, and had laid claim to the sovereignty of that island. This claim, which had nearly produced a rupture between the courts of London and St Petersburg, Alexander consented to abandon, though he expressed a wish to be elected grand-master of the order, by the free suffrages of the knights. A confederacy, as we have seen, had been formed among the northern powers of Europe, with a view to oppose the British claim to the sovereignty of the seas; but by the spirited interference of the British court, especially with the cabinet of St Petersburg, the good understanding between Britain and the northern states was re-established, and the embargo which had been laid on British vessels in the Russian ports was taken off. Alexander, however, earnestly desired to maintain peaceful relations with France; and expressed this wish, both in public manifestos, and in private communications addressed to the First Consul.

T ty of a and co erce wi Swe- de

Early in the same year there was signed at St Petersburg a treaty of amity, commerce, and navigation, between Russia and Sweden, to continue for twelve years, by which Sweden was allowed to import into Russia, alum, salt herrings, and salt, on the payment of one half of the duties then exacted, and into Russian Finland the produce of Swedish Finland duty free; while the importation of Russia into Sweden, of hemp, linen, and tallow, was allowed at one half of the existing duties, and of linseed at two thirds. The most remarkable part of this treaty was the recognition, by the court of St Petersburg, of the northern confederacy, which the amicable adjustment with Britain appeared to have done away. The commerce of Russia had now recovered its former splendour. The exports from the city of Riga alone, for the year ending July 1801, amounted to 6,770,638 roubles, and of these exports England alone imported to the value of 2,509,853 roubles.

An. 1802. Russia guarantees the sovereignty of Malta to the knights of St John of Jerusalem.

On the 25th of March 1802 was signed at Amiens the definitive treaty of peace between the belligerent powers of Europe, by one material article of which the islands of Malta, Gozo, and Comino, were to be restored to the knights of St John of Jerusalem, under the protection and guarantee of France, Great Britain, Austria, Spain, Russia, and Prussia; and his Sicilian majesty was invited to furnish two thousand men, natives of his states, to serve in garrisons at the different fortresses of the said islands, for one year after their restitution to the knights, or until they should be replaced by a force deemed sufficient by the guaranteeing powers. Some time after the conclusion of this treaty, disputes arose among the contracting powers relative to the sovereignty of Malta, which the emperor of Russia insisted should be yielded to Naples, otherwise he would not undertake to guarantee the order, and would separate from it the priories of Russia. The result of these disputes is well known, as they afforded a reason for renewing the bloody contest which so long desolated Europe.

Prudent regulations of the Emperor Alexander.

During the short interval of peace, the emperor of Russia made several prudent regulations in the internal administration of his empire. On the 12th of September 1801, a manifesto had been published, proclaiming the union of Georgia, or Russian Grusinia, with the empire; and on the 1st of April 1802, Alexander sent a deputation to establish the new government at Teflis, the capital of the province. On the 28th of May the emperor wrote a letter to the chamberlain Wittostoff, president of the commission for ameliorating the condition of the poor of St Petersburg, in which he recommended to the commission to follow the example of a similar establishment at Hamburg, in selecting proper objects for their charitable bequests, preferring the humble and industrious pauper to the idle and sturdy beggar. He also offered considerable premiums to persons who should introduce any new or advantageous mode of agriculture, or who should bring to perfection any old invention, open any new branch of commerce, establish any new manufacture, or contrive any machine or process that might be useful in the arts.

An. 1803. A voyage of discovery set on foot.

Early in the year 1803, the emperor fitted out, at his own expense, two vessels for a voyage of discovery round the world, under the command of Captain Krusenstern. These ships were provided with every necessary for accomplishing the object of the voyage; and several men of eminence for science and literature, among whom was Churchman the American astronomer, volunteered their services on this occasion.

An. 1804. Establishment of an university in Lithuania.

In the beginning of 1804 the emperor established a university at Kharkof, in Lithuania, for the cultivation and diffusion of the arts and sciences in that part of the Russian empire; and Mr Fletcher Campbell, a Scotch gentleman, was employed to procure masters for this new institution. Some time after, the emperor ordered that meteorological observations should be regularly made at all the universities and public schools, and the results published. It appears that at the end of this year the sums allotted by the Russian government for defraying the expenses of these institutions amounted to 2,149,213 roubles, besides a gift of nearly 60,000 roubles towards erecting the new university.

History.

Emancipation of the Jews in Russia.

About this time an imperial ukase was published, granting to the Jews a complete emancipation from the shackles under which that devoted people had long groaned, and allowing them the privileges of educating their children in any of the schools and universities of the empire, or establishing schools at their own expense.

Dispute with France.

For some time the genius of discord, which had again actuated the minds of the European sovereigns, failed to extend her baleful influence over the Russian empire; but it was scarcely possible that the emperor should long remain an impartial spectator of the renewed disputes between his more powerful neighbours. An important change had, in the latter end of 1802, taken place in the ministry of the empire; and Count Worontzoff, brother of the late ambassador at London, had been appointed great chancellor-in-chief of the department of foreign affairs, with Prince Adam Czartoryski for his assistant. How far this change in the councils of the empire influenced the political measures of the court of St Petersburg, it is not easy to determine; but in the latter end of 1803, Alexander appeared to view with a jealous eye the presumption and violence exercised by France among the German states, and the encroachments which she appeared desirous of making on the freedom of the Baltic. Alexander had offered his mediation between Great Britain and France, but without effect; and both these parties strove to bring over the Russian emperor to their alliance. France seems to have held out to the ambition of Alexander the bait of a partition of the Turkish territories, the dismemberment of which had long been a favourite object with his predecessors. At length, however, the court of London prevailed, and the Russian ambassador, by his master's orders, took leave of the First Consul of the French republic, though without demonstrating any intentions of immediate hostility. A new levy of a hundred thousand men was immediately ordered, to recruit the Russian army; and, to prevent any jealousy on the side of Turkey, assurances were given to the Sublime Porte of the amicable intentions of Russia towards that power.

An. 1805. Treaty of concert between Great Britain and Russia.

On the 11th of April 1805 a treaty of concert was concluded between Great Britain and Russia, in which the two governments agreed to adopt the most efficacious means for forming a general league of the states of Europe, to be directed against the power of France. From the terms of the treaty, its objects appear to have been, first, the evacuation of the country of Hanover and the north of Germany; secondly, the establishment of the independence of the republics of Holland and Switzerland; thirdly, the re-establishment of the king of Sardinia in Piedmont; fourthly, the future security of the kingdom of Naples, and the complete evacuation of Italy, the island of Elba included, by the French forces; fifthly, the establishment of an order of things in Europe, which might effectually guarantee the security and independence of the different states, and present a solid barrier against future usurpation.

For the prosecution of the great objects of this treaty, it was proposed by the first article that an army of five hundred thousand men should be levied; but in a subsequent separate article, the contracting parties, after observing that it was more desirable than easy to assemble so large a force, agreed that the treaty should be carried into execution as soon as it should be possible to oppose to France an active force of four hundred thousand men. It was understood and stipulated that these troops should be provided by the powers of the continent who should become parties to the league, and subsidies should be granted by Great Britain in the proportion of L.1,250,000 sterling for every hundred thousand men, besides a considerable additional sum for the necessary expense occasioned in bringing them into the field.

History.

Open rupture with France.

About this time the occupation of Genoa by the French, on the pretence that that republic was too feeble to support itself against the attacks of Great Britain, was communicated to the different courts of Europe, and excited in every quarter the highest indignation. The Emperor Alexander, in particular, was incensed at this new outrage. Such an open violation of those principles which were justly regarded as essential to the general safety, committed not only during the peace of the continent, but when passports had been delivered to his ambassador, in order that a negotiation might be commenced for the purpose of providing for the permanent security and repose of Europe, he considered as an indecent insult to his person and crown. He issued immediate orders for the recall of M. Novosiltzoff; and the messenger despatched upon this occasion was commanded to repair with the utmost diligence to Berlin. M. Novosiltzoff had not yet left that city; he immediately therefore returned his passports to the Prussian minister of state, Baron de Hardenberg, and at the same time delivered, by order of his court, a spirited memorial explanatory of the object of his mission, and of the circumstances which had led to its termination.

The recall of the Russian envoy appeared to be the signal of hostilities on the part of Russia and Austria against France. These hostilities may be said to have commenced and terminated in the autumn of this year. The military operations that distinguished this short but bloody conflict, the rapid successes of the French, the capitulation of Ulm on the 17th of October, the occupation of Vienna by the French on the 12th of the same month, and the sanguinary battle of Austerlitz on the 27th of November, have been already noticed under the head of **France**. The consequences of these disastrous events were, first a cessation of hostilities, and at length a treaty of firm alliance between France and Russia.

An. 1806.

But before Alexander finally stooped to the imperial eagles of Napoleon, he was determined to make one more effort to preserve his independence. The Russian envoy at Paris, D'Oubril, had hastily concluded a preliminary treaty of peace between his master and the emperor of the French, which he signed at Paris on the 8th of July 1806, and instantly set out for St Petersburg to procure the ratification of his master. When the terms of this convention were laid before the privy council by Alexander, they appeared so derogatory to the interests of Russia, that the emperor refused them his sanction, and declared that the counsellor of state, D'Oubril, when he signed the convention, had not only departed from the instructions he had received, but had acted directly contrary to the sense and intention of the commission with which he had been intrusted. His imperial majesty, however, signified his willingness to renew the negotiations for peace, but only on such terms as were consistent with the dignity of his crown and the interests of his empire.

Alliance with Prussia against France.

In the mean time the king of Prussia began, when it was too late, to see the folly and imprudence of the neutrality which he had so long maintained, and he at length prepared to oppose his now feeble efforts to the growing power of France. He brought together in the summer of this year an army of at least two hundred thousand men, near Weimar and Jena, while the French myriads assembled in Franconia and on the frontiers of Saxony. Previously to the commencement of hostilities, his Prussian majesty issued a spirited manifesto, in which he explained his motives for abandoning his plan of neutrality, and appealed to Europe for the justice of his cause. He entered into an alliance with the Emperor Alexander, and with the king of Sweden; and it was expected that these united forces would at length hurl the tyrant of Europe from his throne, or at least compel him to listen to equitable terms of pacification. These expectations were, however, miserably disappointed. The same extraordinary success was still to attend the arms of France, and the north of Europe was again condemned to submit in silence to her yoke.

On the 13th of October 1806, the Prussians received a dreadful check at the battle of Jena; and on the 27th of the same month Napoleon entered Berlin. While the French were thus successful, the troops of the Emperor Alexander occupied Prussian Poland, and took up their residence at Warsaw; but they were soon attacked by the French under Murat, who on the 28th entered Warsaw with his cavalry, on which the Russians retreated across the Vistula, burning the bridge over which they had passed. On the 26th of December, a dreadful engagement took place between the Russians commanded by General Benningsen, and the French under Generals Murat, Davoust, and Lannes. The scene of action was at Ostralenka, about sixty miles from Warsaw, and the fighting continued for three days. The loss was immense on both sides, though the advantage appears to have been on the side of the French. According to French accounts, the Russian army lost twelve thousand men in killed and wounded, together with eighty pieces of cannon, and all its ammunition waggons; while the Russian account states the loss of the French at five thousand men.

A[illegible]807.
Ba[illegible]e of
Ey[illegible]u.

In the beginning of February 1807, the Russians obtained a partial advantage in the battle of Eylau. According to the account of this battle, given by General de Budberg in a despatch to the Marquis of Douglas, the British ambassador at St Petersburg, the Russian general Benningsen, after having fallen back for the purpose of choosing a position which he judged well adapted for manœuvring the troops under his command, drew up his army at Preussisch Eylau. During four days successively his rear-guard had to withstand several vigorous assaults; and on the 7th of February, at three o'clock in the afternoon, the battle became general throughout the whole line of the main army. The contest was destructive, and night came on before it could be decided. Early on the following morning the French renewed the attack, and the action was contested with obstinacy on both sides; but towards the evening of that day the assailants were repulsed, and the Russian general remained master of the field. In this action Napoleon commanded in person, having under him Augereau, Davoust, Soult, Ney, and Bessières at the head of the imperial guards. The loss of the Russians in that engagement was by themselves stated at above six thousand men, while they estimated that of the French, probably untruly, at nearly double that number.

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This was the last important stand made by the Russian army. In May, Dantzig, defended by eighteen thousand Russians and Prussians, surrendered to the French. Several actions succeeded at Spanden, at Lamitten, at Guttotadt, and at Heilsberg, in all of which the French had the advantage, till at length, on the 14th of June, the Russians appeared in considerable force upon the bridge of Friedland, whither the French army under Napoleon was advancing. At three in the morning the report of cannon was first heard, and at this time Marshals Lannes and Mortier were engaged with the Russians. After various manœuvres, the Russian troops received a check, and filed off towards Königsberg. In the afternoon the French army drew up in order of battle, having Marshal Ney on the right, Lannes in the centre, and Mortier on the left, while Victor commanded a corps de reserve, consisting of the guards. At half-past five the attack began on the side of Marshal Ney; and notwithstanding the different movements of the Russians to effect a diversion, the French soon carried all before them. The loss of the Russians, according to the usual exaggerations of the French bulletins, was estimated at from ten thousand to fifteen thousand men, and twenty-five of their generals were said to have been killed, wounded, or taken. In consequence of this victory the French became masters of all the country round Königsberg, and Marshal Soult entered that city in triumph. Thus concluded the campaign in Germany, in which the Russians sustained a loss of at least thirty thousand of their choicest troops.

War declared against Russia by Turkey.

While these military operations were going forward on the continent of Europe, the emissaries of France were busily employed at Constantinople in exciting the divan to declare against their ancient enemies. They at length succeeded; for on the 30th of December 1806 war with Russia was proclaimed, and twenty-eight regiments of janissaries assembled under the command of the grand vizir. But the disturbances which broke out in the latter end of May 1807 prevented any operations of importance from taking place; and the pacification which was soon concluded between Russia and France, though it did not entirely put a stop to the war between the former power and Turkey, in some measure diminished their hostile preparations.

Treaty of Tilsit.

The defeats which the allied armies had sustained in Prussia and Poland rendered peace, on almost any terms, a desirable object; and Alexander found himself constrained to meet, at least with the appearance of friendship, the conqueror of his armies. Propositions for an armistice had been made by the Prussian general to Murat near Tilsit, and after the battle of Friedland the Russian prince Labanoff had a conference, on similar views, with the prince of Neufchatel, soon after which an armistice was concluded between the French and Russians. On the 25th of June an amicable meeting took place on the river Niemen, between the emperors of France and Russia, and adjoining apartments were fitted up for the reception of both courts in the town of Tilsit. This politic friendship was soon after cemented by the treaty of Tilsit, concluded between the emperor of the French on the one part, and the emperor of Russia and the king of Prussia (whom it despoiled of a fourth of his dominions) on the other, on the 7th and 12th of July in this year. Thenceforth, until Napoleon's star began to wane, Alexander was his firm partisan; and his faithlessness towards his former allies gave them no temptation to repose further confidence in him.

Rupture with Britain.

The conclusion of the treaty of Tilsit was notified to the court of London on the 1st of August; and at the same time a proposal was made from his imperial majesty for mediating a peace between France and Britain. This mediation, however, was declined on the part of Great Britain, until his Britannic majesty should be made acquainted with the stipulations of the treaty of Tilsit, and should find them such as might afford him a just hope of the attainment of a secure and honourable peace. This declining of the mediation of Russia was no doubt expected by the court of St Petersburg; but it served as a pretext for binding more closely the alliance between that power and France, by breaking off her connection with Great Britain. Accordingly, in October, Lord Granville Leveson Gower, who had succeeded the Marquis of Douglas as British envoy, received a note from the government, intimating that, as a British ambassador, he could no longer be received at the court of St Petersburg, which he therefore soon after quitted. An embargo was laid on all British vessels in the ports of Russia, and it was peremptorily required by Napoleon and Alexander that Sweden should abandon her alliance with Great Britain.

An additional ground of complaint against the British court was furnished by the attack on Copenhagen, and the seizure of the Danish fleet, in the beginning of September; and though Lord Gower had attempted to justify these measures on the plea of anticipating the French in the same transaction, the emperor of Russia expressed, in the warmest terms, his indignation at what he called an unjust attack on a neutral power. A considerable Russian fleet joined the French; but the combined squadrons were compelled to seek for shelter in the Tagus, where they remained blocked up by the British, till they were surrendered by the convention of Cintra; and another fleet of fifteen sail of the line that proceeded up the Mediterranean, and advanced as far as Trieste, shared a similar fate.

On the 26th of October the emperor of Russia published a declaration, notifying to the powers of Europe that he had broken off all communication between his empire and Great Britain, until the conclusion of a peace between this power and France. In a counter-declaration, published at London on the 10th of December, his Britannic majesty repels the accusations of Russia, while he regrets the interruption of the friendly intercourse between that power and Britain. His majesty justifies his own conduct, and declares, that when the opportunity for peace between Great Britain and Russia shall arrive, he will embrace it with eagerness; satisfied if Russia shall manifest a disposition to return to her ancient feeling of friendship towards Great Britain, to a just consideration of her own true interests, and to a sense of her own dignity as an independent nation.

An. 1808. Renewed negotiations with Britain.

In October 1808, a meeting took place at Erfurt between the emperors of France and Russia, and a letter was drawn up under their signature, addressed to his Britannic majesty. The object of this letter was, to induce the king of Great Britain to enter into negotiations for a general peace, and with that view it was despatched by Count Romanzoff, the Russian minister at Erfurt, to Mr Canning, the British secretary of state for foreign affairs. It was answered by an official note, requiring the emperors, as an indispensable condition of any treaty with Britain, to receive Sweden as a party, to protect the interests of Portugal and of the ex-king of Naples, and to extend the benefits of the projected arrangements to Ferdinand VII. of Spain. These requisitions were evidently quite inconsistent with Napoleon's views; the emperors refused to accede to them; and all hope of accommodation was in the mean time at an end.

War with Sweden.

The demand of concurrence in the views of France and Russia made on Sweden was formally repeated in a declaration of the Emperor Alexander, published at St Petersburg on the 10th of February in this year. In this declaration his imperial majesty intimated to the king of Sweden that he was making preparations to invade his territories; but that he was ready to change the measures he was about to take, to measures of precaution only, if Sweden would, without delay, join Russia and Denmark in shutting the Baltic against Great Britain, until the conclusion of a maritime peace. He professed that nothing could be more painful to him, than to see a rupture take place between Sweden and Russia; but that his Swedish majesty had it still in his power to avoid this event, by resolving without delay to adopt that course which could alone preserve strict union and perfect harmony between the two states.

The king of Sweden, however, determined to abide by the measures which he had for some time pursued, and to adhere to the terms of the convention which had just been concluded between him and the king of Great Britain. In consequence of this determination, a Russian army entered Finland in the beginning of March, under the command of General Buxhovden, and advanced against Helsingfors, which was occupied by a single battalion of a Swedish regiment. This small force retired into the fortress of Sweaborg, where they maintained themselves with great bravery till the 17th of April, when they were obliged to capitulate. The loss of this fortress, though inconsiderable in itself, so highly enraged the king of Sweden, that he dismissed the naval and military commanders who had been concerned in the capitulation.

On the 27th of April, some slight advantage was gained over the Russians near Rivolax, by the Swedish army under General Count Klinspor; but this was only a partial gleam of success. The Russians soon overran almost all Finland, took possession of Wasa, Old and New Carleby, and reduced under subjection the whole province of which Wasa is the capital. The army of Field-Marshal Klinspor, which originally consisted of sixteen thousand regulars, and many boors, was, by the end of the campaign, reduced to little more than nine thousand men.

The king of Sweden sent some reinforcements to his army in Finland; but the forces which should have supported Klinspor were foolishly employed in a fruitless attempt to conquer Norway; and in 1809 the Swedes were compelled to cede Finland to Russia.

Russia continued to appear in the unworthy character of Napoleon's ally; and when Austria made an effort in 1809 to recover her losses, a Russian army advanced to co-operate with the French. The diversion which this produced was one cause of the final success of Napoleon, whose situation after the battle of Aspern was extremely critical. When Austria was at last compelled to accept of peace on humiliating terms, Russia received as the reward of her services the district of Tarnopol in Galicia, with a population of four hundred thousand souls. This district was restored to Austria in 1815.

In 1811, hostilities commenced between Russia and the Porte. It is of little consequence to inquire into the causes of this rupture; a powerful and ambitious government in the neighbourhood of a weak one never wants pretexts for war. The result might have been serious, if not fatal to the Porte, had not the prospect of a more arduous struggle induced Russia to suspend her efforts in that quarter, and conclude a peace on condition of receiving a part of Moldavia and Bessarabia.

The great contest was now approaching which was to try the resources of Russia, and ultimately to raise her to unexampled greatness. The seizure by France of the territories of the Prince of Oldenburg, who was the emperor of Russia's brother-in-law, on the one hand, and the admission of British produce into the Russian harbours on the other, furnished the ostensible grounds of the quarrel. After some fruitless negotiations, Napoleon dismissed the Russian ambassador, and left Paris to join the army on the 9th of May 1812. The events of this disastrous expedition into Russia have been minutely related in the article France; and the reader does not require to be reminded of those lamentable sufferings of the French army, which were its principal result. The spirited resistance of Russia now roused Prussia and Austria; and early in 1813 a league was formed between these powers, to which Bavaria and other small states acceded. The battle of Leipsic, fought on the 18th of October, led to the final overthrow of the French domination. In all the transactions which followed, Russia bore a leading part. At the congress of Vienna in 1814, the duchy of Warsaw, consisting of part of the original conquests of Austria and Prussia in Poland, was assigned to Russia, which thus ultimately obtained about four fifths of the territory and three fourths of the population of that ancient kingdom.

Russian accessions of territory for fifty years before 1815.

In passing to the new system of foreign policy which has prevailed in Russia, as well as in the rest of Europe, since the year 1815, we must pause for a moment to remark the accessions of territory which the empire had made during the half century which preceded that epoch. The reign of Catherine II. had, as we have seen, been by far the most fertile in foreign acquisitions. Her conquests included the Crimea, which was an incorporated portion of Russia since 1783; Georgia, gained in 1785, though, as we have observed, not formally annexed till 1801; Bessarabia, with a part of Moldavia, and other Turkish possessions, finally secured to Russia by the treaty of Bukarescht in 1812; Courland, acquired in 1795; and the extensive spoils of Poland in 1793 and 1794. Paul's reign made no permanent addition of importance, except some districts within the Persian frontier. Alexander's gave to Russia in the first years of the present century several of the tribes of the Caucasus; Finland in 1809; Daghestan and other large territories ceded by Persia in 1813; and in 1814, Napoleon's grand duchy of Warsaw, which was erected into a kingdom of Poland. The total population of these new Russian provinces cannot at the very least be estimated under fifteen millions, and probably exceeds that number.

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During the ten years of Alexander's reign which succeeded the peace, and ended with his death in 1825, he acquired no new territory as a substantive addition to his dominions, but occupied himself assiduously in that indirect augmentation of Russian influence on the states around the frontier, which had before his time formed, and has since continued to form, the first step in all the schemes of conquest projected by his ambitious nation. The objects of Alexander's foreign policy after 1815 were chiefly three; the suppression of constitutional, or, as they were called by preference, revolutionary movements, in the central and southern states of Europe; the weakening of Turkey, and the gradual reduction of that power into a state of dependence on the cabinet of St Petersburg, so as to pave the way for the Russians towards the sovereignty of the Levant; and the extension of the Russian influence in Persia and those adjacent states, which must form the stepping-stones by which the Muscovites will strive to pass, if they shall ever make the attempt, to the throne of British India. For the attainment of the first of these great ends, there was formed, under the guidance and by the suggestion of Alexander, that league of princes which has been named the Holy Alliance; a confederacy whose bitter fruits have been tasted in full measure by Italy and Spain, but whose conception is in one view an encouraging tribute to the growing enlightenment of the world, since it is the earliest instance in which despots, conspiring against truth and freedom, have condescended to speak the language of Christianity and peace. In reference to Turkey, the policy of Alexander aimed at gradually detaching the Porte from its friendly relations with Great Britain and other European powers, and insidiously advancing towards a position in which the sultan should find himself powerless against his neighbours and his own subjects, until Russia should stretch forth her protecting hand; but a check was administered to this train of diplomacy, and a peculiar relation introduced between the courts of Constantinople and St Petersburg, by the insurrection of Greece in 1821. To the founder and head of the Holy Alliance the Greeks must have appeared to be mere rebels, whom it was his duty as a neighbouring sovereign to assist in punishing; while to the watchful power which desired by every available means to weaken and circumscribe the power of Turkey, such an opportunity as the Greek revolution was unusually tempting, and indeed the sultan's ministers openly alleged that the disturbances had been fomented by Russian agents. The result of the rising in Greece has been related in our article on that country; and the other misunderstandings between Russia and Turkey, the principal of which related to the appointment of the hospodars in Wallachia and Moldavia, were not sufficient to disturb the diplomatic system which was resumed after the Greek question had been settled by the interposition of the other great European powers. The designs of the emperor on the side of India chiefly exhibited themselves in intrigues among the northern neighbours of our possessions in that country; and the system scarcely came to light till after Alexander's death.

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In the internal government of the empire, Alexander introduced many salutary changes, especially in the early part of his reign; but here, not less than in his foreign policy, the last ten years of his life exhibited a marked contrast to its earlier portion. The transition in his mind from a love of liberal institutions to a distrust of every thing that seemed to threaten the stability of thrones, began almost with his alliance with Napoleon, but reached full maturity after that extraordinary man's fall. In the first year of his reign he abolished the literary censorship, and afterwards restored it with less absurd but not less severe rules than those of his father. He at one time patronized both the education of the young and the general dissemination of religious knowledge; but after the peace the missionary societies were suppressed, and very harsh measures adopted against the universities. In several particulars a better spirit prevailed. That tolerant disposition towards the various sects of Christianity, of which we have remarked more than one instance in passing, had already become systematic, and was never departed from. The emancipation of the peasants from their state of serfdom was long a favourite object with the emperor, who was able to attain it in Courland, Livonia, and one or two other provinces, and used openly to lament that private interests and prejudices had baffled his good intentions elsewhere. Another plan of his, which was connected with the scheme just mentioned, was that of the military colonies, of which Dr Lyall has published an interesting account. The advantages which this system promised to confer were these: the diminution of the expenses of the army in times of peace, and the easy training of a large agricultural population to the trade of war. For these purposes villages were built on the crown-estates along the western frontier of the empire, and in these, soon after the peace, formidable detachments of soldiers were settled with their families, and mixed among the boors who, belonging to the crown, had previously been the sole or the principal inhabitants of the districts. The whole male population of these new settlements was to occupy itself alternately in rural labour and military exercises; and while the troops who had already seen service were always in a position to take the field again, the boors were gradually to qualify themselves for acting as a corps de reserve, and for filling up vacancies. The plan excited considerable opposition; and although the obstacles were finally to appearance vanquished, and the colonies speedily mustered four hundred thousand fighting men, yet new difficulties have arisen since Alexander's death, and the present emperor has abandoned the idea of extending the principle, or making it permanent.

Alexander's death.

During the last few years of Alexander's life he appears to have been completely miserable. To family misfortunes, religious despondency, and disappointment in political schemes, was added the continual terror of conspiracies in the heart of the empire, which were said to have ramifications everywhere, and to aim at nothing less than a total revolution, and the assassination of the whole royal family. Those constant travels through the several Russian provinces in which Alexander was engaged for two or three years before his death, have been mainly attributed by some writers to his dread of poison or the dagger. In the course of one of these journeys he died at Taganrog, on the Sea of Azof, on the 1st day of December 1825.

Resignation of the Grand Duke Constantine.

Alexander's brother, the Grand Duke Constantine, whose conduct as governor of Poland has been described in our article on the history of that country, was immediately proclaimed emperor at St Petersburg; and whatever may have been the feelings of the Russians themselves, foreigners who were acquainted with the new sovereign by his general reputation, looked on his accession with pity for his subjects and alarm for the peace of Europe. But the danger had been foreseen and averted by Alexander and the rest of the family. Constantine had been induced to resign his claims to the crown by a formal deed executed in 1822. The senate, on opening the will of Alexander, found it to contain a nomination of his second brother, the Grand Duke Nicholas, as his successor in the empire. The act of resignation was at the same time discovered, and in a few days there arrived from Warsaw a communication from Constantine, in which he acknowledged the existence and validity of the deed, and anew waived his right of succession.

Accession of Nicholas I.

Accordingly Nicholas I. ascended the throne, announcing the event by a proclamation of the 23d of December 1825. The disturbance of the natural order of succession was seized by the discontented as a favourable pretext for insurrection; and the reign of the new emperor was opened by a military mutiny in St Petersburg, which, after having been suppressed with bloodshed, was followed by several executions, and many imprisonments and banishments to Siberia. Nicholas, and his spouse, the princess royal of Prussia, were crowned at Moscow in 1826, and at Warsaw in 1829. The latter of these two ceremonies did not long precede the revolution of Poland, which has been the most remarkable event of the emperor's reign. It is unnecessary to repeat the circumstances of that unfortunate struggle. The whole character and policy of Nicholas have been similar to those of his brother since 1815, with, however, an additional degree of force and boldness, which may be attributable partly to the natural progress of the political tactics which were common to both, and partly to the more energetic will and greater attachment to military principles and forms which distinguish the younger brother.

The foreign policy of Nicholas.

If we look to the three questions which were described above as forming the main business of Alexander in his foreign policy, we find the position of Russia regarding them to have remained, with slight alterations, the same since the commencement of the new reign as it was before. The anti-constitutional views of the Holy Alliance have been necessarily modified, but not abandoned; although Nicholas speedily recognised the title of Louis Philippe to the French throne, and took an active share in the conferences of the five powers at London for arranging the affairs of Belgium and Holland. On the side of Turkey, Russia has, during the last fifteen years, been rapidly gaining strength. The treaty of Akjerman between the two powers in 1826, extending the principles laid down in the peace of Bukarescht, was ill executed on both sides; and the mutual misunderstanding, being still further complicated by the emergence of the Greek question, issued first in the battle of Navarino, and afterwards in a regular war of two years between Russia and the Porte. The first campaign, in 1828, was favourable to Russia, but not completely decisive; that of 1829 was celebrated for the successful passage of the Balkan by the Russian general Diebitsch, and was closed in September by the peace of Adrianople, in which Turkey consented to several articles both humiliating and injurious. Russia received but a slight direct accession of territory, but obtained a confirmation of the right of her vessels to navigate the Black Sea, a definitive settlement of frontier towards Turkey, and a recognition of such restrictions on the Turkish government of Moldavia and Wallachia as materially weakened the sultan's power. The fortresses of these provinces were moreover to be garrisoned by Russian troops, till the Porte should have paid to Russia the expenses of the war; and accordingly the provinces were not evacuated till 1834. Diplomatic skill, and other means less justifiable, strengthened the hold of Russia on the Porte, whose weakness was completely exposed in 1832, when Russian troops appeared as its protectors against its own rebellious subject the viceroy of Egypt. Turkey, in short, has in the mean time thrown herself unreservedly under the influence of Russia, and it appears not improbable that the course of events may very soon allow that influence a yet more favourable field. The most conspicuous incident of recent Russian history on the side of India has been the war with Persia, commenced in 1826, carried on successfully by the generals Yermoloff and Paskewitsch, and terminated in 1828 by the cession of some important provinces to Russia. (See PERSIA.) Since that time, both in Persia and in the neutral countries on the frontiers of British India, there is little reason to doubt that the Russian diplomacy has been acquiring an increasing influence. The only actual accession of territory to Russia in this quarter that deserves notice was given in 1829 by the revolt of the Kirghis Tartars, formerly subject to China, who now placed themselves under the sovereignty of Russia, and brought the Russian frontier nearer by another step to our Asiatic possessions.

Invasions and insurrections.

Internally Russia has had to contend with incursions of the Caucasian hordes from beyond the frontier, with revolts of the Lesghians and other tribes nominally subject to the empire, and lately with an extensive and spirited insurrection of the Circassians, which it has not yet been possible to quell.

Internal government.

The domestic government of Nicholas has little to distinguish it from that of his brother. Education has been to some extent more favoured than it had recently been by Alexander; the Catholic and Lutheran churches continue to receive the support of the government, which has also aided missions to the Calmucks and other nomadic hordes; trade and manufactures have been furthered by regulations devised with much intelligence; and the laws have since 1826 received a tolerably complete revision and concentration.

STATISTICS.

The Russian empire is of enormous extent, of vast resources, and of great capacity of improvement. It forms a connected territory, extending from the frontiers of Germany and Prussia, and the shores of the Gulf of Bothnia, eastward to the sea which separates Asia from America, thus embracing nearly one half of Europe and all the north of Asia. Beyond Behring's Straits it extends over a portion of the north-west territory of America, embracing at the same time a number of islands situated in the ocean which washes the northern shores of Europe and Asia, and flows between Asia and America. Its most westerly point is in longitude 18° 20′ 15″, and its most easterly in 209° 14′ east from Greenwich, thus extending through about 190 degrees of longitude. Its northern and southern boundaries have deep indentations; the extreme points of the former are in 78° 4′, and of the latter in 38° 40′ of north latitude. This empire embraces about the one-ninth (some estimate it as high as the one-seventh) part of the habitable globe, the one-fourteenth part of the northern hemisphere, and above the one twenty-eighth part of the superficies of our planet. The whole of China is not equal to two thirds of Russia; and the Roman empire, at the period of its greatest extension, did not comprehend more than one fourth of the territory which now bows to the sceptre of the czar. Some have included the mountains of Caucasus, others the whole of the Caspian Sea, whilst some again have omitted the one and not the other. A very elaborate calculation of the superficies of Russia has, within these few years, been published by M. Sernoff, who has invented an improved method of computing areas, by which he can allow for the inequalities of boundaries. "Russia in Europe, including Russian Poland and the islands of the Baltic and German Ocean, contains 2,078,646$\frac{73}{100}$ English square miles, of which 151,048$\frac{61}{100}$ lie within the frigid zone, and 1,927,598$\frac{12}{100}$ within the temperate zone. Siberia (under which designation are included the islands of the North Frozen Ocean, except Nova Zembla, and of the Pacific Ocean, as well as the peninsula of Alyaska in America) contains 4,866,643$\frac{76}{100}$ English square miles, of which 1,130,495$\frac{26}{100}$ are situated within the frigid zone, and 3,786,147$\frac{81}{100}$ within the temperate zone. It is impossible to calculate the exact area of Nova Zembla, as the southern coast of that island has not been laid down; but if it be supposed to extend in the form of a circle between the promontories of Nikolskoï and Winter, the area would amount to $83,271\frac{32}{100}$ English square miles. Thus the whole superficial extent of the Russian empire is about $7,028,561\frac{81}{100}$ English square miles, of which $1,364,815\frac{81}{100}$ lie within the frozen, and $5,663,745\frac{92}{100}$ within the temperate zone." According to an estimate previously made by Kraft, Russia has a superficies of 7,023,252 English square miles, including 571,858 miles of steppes possessed by the Kirghises, which however are omitted by M. Sernoff. We are inclined to adopt the computation of the latter writer as the nearest approximation to the truth; for perfect accuracy is not to be expected where so many liabilities to error exist. In the statistical account of this great empire, we shall describe the European and the Asiatic possessions of Russia separately; its American territory, and the islands in the Polar and Eastern Oceans, coming under the latter head.

Russia in Europe.

Russia in Europe is bounded on the south by the Caucasus and the Black Sea; on the north by the Arctic Ocean, especially by its great gulf the White Sea; on the east by the river Kara Baïgarama, the Ural chain of mountains, the river Ural to its embouchure in the Caspian, and thence by the shores of this sea to the eastern extremity of the Caucasus; and on the west by the principality of Moldavia, Austria, Prussia, the Baltic Sea, and the dominions of Sweden. Excluding Nova Zembla and the archipelago of Spitzbergen, but including the part of Poland which has been absorbed by this vast empire, European Russia lies between 18° 20′ 15″ and 64° 20′ 15″ of east longitude, and between 40° and 70° of north latitude. Its extreme length, from the northern declivities of the Caucasian range, near the sources of the river Samour, to the banks of the Muonio, near Ekontekis in East Bothnia, is 1840 miles of sixty to a degree; and its breadth, from the west side of the Ural chain, near the sources of the Sylva, in the government of Perm, to the western limits of Volhynia, on a line with Loutsk, is 1300 miles. In comparison with its size, Russia has less sea-coast than any other great European power. Its line of coast on the Frozen Ocean is about 920 miles in length, on the Baltic Sea about 1230, and on the Black Sea and the Sea of Azof about 1280; forming altogether a district of sea-coast about 3430 miles in length. Thus a greatly preponderating part of the country is cut off from all maritime intercourse and influence, except by means of navigable rivers and canals, which at best are but an indifferent substitute for the ocean. Owing to this circumstance, and the interruptions occasioned by the ice in the Arctic Sea, and in a considerable portion of the Baltic for the greater part of the year, Russia has made less progress in commerce and civilization than other nations of Europe more favourably situated.

Ge ral asp.

European Russia, together with Poland, belongs entirely to that immense level plain which begins in the north of Germany, and extends over the whole east of Europe. From the Carpathian to the Ural range, a distance of five hundred leagues, all is one immense undulating plain, without a mountain to break the monotonous level of the horizon, or oppose a barrier to the winds. A great portion of it, in the south especially, consists of those immense levels called *steppes*, that, like the pampas of South America, present to the eye only a dead flat for many hundreds of miles. Here and there indeed the surface is diversified by some large ancient tumuli, supposed to be the burial-places of the ancient Scythians, and in a few places there are small tablelands; but the latter swell so gently above the surrounding level as scarcely to be perceptible. Of these, the most worthy of notice are the Valdaï Hills and the forest of Volkonskoï, situated in the governments of St Petersburg, Moscow, Tver, and Tula, the loftiest summit of which, lying between the villages of Polosehva and Mosti, and the towns of Ostasekov and Valdaï, is only 1064 French feet in height. No part of the forest of Volkonskoï is very rugged; on the contrary, it is a gently sloping plain. But the rivers and the deeply-indented lakes are encompassed by steep banks of slate, gypsum, and limestone mixed with shells. Masses and blocks of granite are scattered on the surface. This ridge, or rather plateau, is rich in iron, sulphur pyrites, vitriol, alum-earth, a species of coal, petrifactions, salt springs, and lime and gypsum quarries. Here are situated, within the distance of a hundred miles, the sources of the rivers Volga, Dvina, Dnieper, Don, Oka, Volchow, Lowat, Pola, Kolp, and others less distinguished. To the north-east, the land gradually slopes to the almost flat shores of the Baltic Sea, and is for the most part covered with immense forests, marshes, and turf-moors. Between this ocean inlet and the White Sea, on the north-north-west, lies a tract of country which is richer in water than any other in Europe. Here a multitude of lakes, large and small, are united together like a network of water, and between them extend those rocky ridges which, on the north-west, rise into the inferior Finnish chain of hills. These, however, sink again towards the lake Enara and the river Tana, without joining the Scandinavian system of mountains. Proceeding south-west from the interior hills of Voldaï, the land also gradually sinks, and becomes encumbered by immense marshes, situated between Minsk and Volhynia. Through these the river Priepetz, the great feeder of the Dnieper, takes its way, constituting their drain or outlet. The northern declivities of the Carpathian Mountains only in a few places cross the borders of the Austrian territory, and enter Russia, but not as hills of any height. Near the sources of the Oder, they proceed towards the Vistula, and along this stream, as a plateau eight hundred feet in height, which, eastwards between Pilica and the above river, rises into groups of mountains, which extend, in five parallel chains, having a breadth of about fifty miles, for a distance of ninety miles. In two places they reach about two thousand feet in height, which are the loftiest points in Poland. Upon the other side, in the east, the declivities of the Carpathian range extend as a broad plateau across the whole of Southern Russia. It thus separates the low land of the interior from the maritime country of the Black Sea. Unlike the table-land of Volkonskoï, which bears on its broad surface lakes and fens, this southern plateau consists of large steppes, penetrated by the rivers Dniester, Dnieper, and Don, which here form cataracts. Between the last-named stream and the Volga it rises as a continuation of the Lower Volga range, which, under the name of the Irgeni Hills, extends southwards to the Caucasus. On the peninsula of Crimea, a wholly insulated chain of mountains rises to a considerable height, and runs from east to west nearly a hundred and twenty miles, close to the coast of the Black Sea. In one part it attains an elevation of 4740 feet, and in another 4600 feet. Along the eastern boundary of European Russia, the Ural mountain chain extends from the shores of the Frozen Ocean southwards towards the Caspian Sea, for a distance of nearly 1500 miles, unconnected with any other mountain system of Europe. The northern portion of the Ural chain, from the Straits of Waygats to the sources of the Petchora, consists of rough, naked, limestone rocks, which in one place, Padwinski, are 6500 feet in height. This part of the country is comparatively little known. The middle portion of the chain, as far as the sources of the Oufa, called the Verchoturic Urals, forms a broad tableland of moderate elevation, overspread with morasses. Further to the south the Urals rise again in height, and become thickly wooded, whilst in the government of Orenburg they expand in broad ramifications on both sides of the river Ural. The chain, with all its branches, sinks towards the Caspian, without coming into contact on the east with the mountain systems of Asia. It is called at different points the Orenburg, Baschkir, and Kirghis Urals, and sends out an offshoot on the south-west, between the rivers Ural and Samara, the Obschtschei-Syrt, which stretches to the banks of the Volga. The Sok Mountains form a part of this spur of the Urals. There are seven defiles or passes through this great range, the most practicable of which are the roads from Perm and Orenburg into Asia. Between the southern declivities of the Urals and the Caspian Sea and Aral, there is an opening of about two hundred and eighty miles in breadth, through which, more than once, the hordes of Asia in former times have poured like a flood over Europe.

Steppes.

Steppes, or plains, are an important feature of the geography of Russia, as well as of that of Tartary, with which the term is more frequently associated. The most important of these are the following: 1. The Steppe of Petchora, which stretches along both sides of the rivers Dvina and Petchora, from the Icy Ocean and White Sea, to the northern part of the government of Vologda. It is called Tundra, and consists of turf-moor covered with moss. In the north it is destitute of wood; in the south it is thickly wooded, and has many small fresh-water lakes. 2. The little Jaroslav Steppe, situated between Koslov and Tambov, a plain rich in flowers, and fifty versts[1] in diameter. In connection with it may be mentioned the great steppe between Tambov and Kopersk, which is plentifully supplied with water, very fruitful, and rich in vegetables and pasture. 3. The Steppe of the Don, belonging to the Don Cossacks. This immense plain, wholly destitute of hills, is about 57,600 geographical square miles in extent; in some parts it is fruitful, but in general the soil is barren and uncultivated. 4. The Kuban Steppe, extending from Kuban to the Manitch. The soil is very unproductive, and rests on a bed of sandy limestone. 5. The Steppe of Azof, which extends on both sides of the Lower Manitch, to the Sea of Azof and the Lower Don; but it is as worthless as the former. 6. The Steppe of Taurida, a gentle declivity of the northerly and easterly mountains of Taurida, inclining towards Kertsch and the Bosphorus, the Putrid Sea (a branch of the Sea of Azof), and the Straits of Perekop. The soil near the mountains is poor and unproductive; but farther down it becomes claycy and fruitful, and towards the sea is impregnated with salt. Similar to the Steppe of Taurida are those of Vosnesenks and Otchakof. 7. The Steppe of Nogais on the Black Sea and the Sea of Azof, from the Lower Don to the Lower Dnieper. It is a dry unwooded tract, of some value to the wandering tribes, but nearly useless to the settled countryman. 8. The Steppe of Astracan, stretching between the Don, the Volga, and the Caucasus; and, 9. the Steppe of Kalmytz. According to Pallas, both of these immense plains must at one time have been covered with the waters of the Caspian Sea. But, in fact, the whole country appears at some period of remote antiquity to have lain beneath the tide of the ocean. Two large oases must be noticed as occurring in the midst of these steppes; they form the country of the Little Russians, and that of the Don Cossacks.

Rivers.

M. Huot, in his new edition of Malte-Brun's great geographical work, thus mentions the rivers of Russia. "The soil of Russia is so slightly undulated, that to consider the spaces traversed by its rivers as true basins, would be an abuse of terms; notwithstanding that it contains the most important water-courses in Europe. It would not perhaps be more exact to apply the same name to the Black, Caspian, and Baltic Seas, or to the Icy Ocean, in one or other of which all its waters disembogue. I prefer designating by the denomination of declivities the inclination of the soil to these several seas, and hence shall term them the Tauric, Caspian, Icy, and Baltic declivities. The Tauric, to which I give the name because all the water-courses which descend on this side have their embouchures around the peninsula of Taurida, is watered by the Dniester, the Dnieper, the Bog, and the Don; the Caspian, the waters of which fall into the sea of that name, is furrowed by the Terek, the Volga, and the Ural; the Icy declivity, formed by the tracts which incline towards the White Sea and Icy or Frozen Ocean, is watered by the Petchora, the Mezen, and the Northern Dvina; lastly, the Baltic comprehends all the streams which fall into the Baltic, the most important being the Tornéo or Tornéa, the Neva, the Southern Dvina or the Düna, and the Niemen." Some eminent German geographers have also adopted this plan of classifying the rivers according to the seas into which they discharge themselves; and as it has several advantages over the usual method of describing the streams of a country in the order of their size and importance, we shall follow it.

In the declivity which slopes to the Black Sea and the Sea of Azof, there is, 1. the Danube, whose northern arm forms part of the southern boundary between Russia and Turkey. Below Galatz it receives its last tributary the Pruth, which descends from the mountains of Gallicia or Austrian Poland, and separates Bessarabia in Russia from Moldavia in Turkey. 2. The Dniester, which rises also in Gallicia, and flows with many serpentine windings towards Russia. Below Chotzim it is broken by rapids, so that near Bender boat-navigation is interrupted, and without receiving any tributaries of importance it falls into the Black Sea at the broad but shallow estuary or Lake of Ovidovo. 3. The Dnieper, which has its source in the government of Smolensko, on the southern slope of the Volkouski Wood, and empties itself into the Black Sea below Kerson. This noble stream receives many tributaries, amongst which, on the right, flow in the Berezina, the Priepetz, and the Bug, and on the left the Soj, the Desna, the Sem, Sula, Psiol, Vorskla, and others. This river is the ancient Borysthenes. It is connected by canals with the Dvina and the Niemen. 4. The Don, which originates in the small lake of Ivanovsko, in the government of Riasan. After intersecting the Cossack territory to which it gives name, it discharges itself below Tcherkask into the Sea of Azof, by several mouths. In summer it is shallow; in spring it overflows its low banks to a great extent, and forms unhealthy morasses. By means of navigable canals it is connected with the rivers Shat, Upa, Oka, and Volga. Its principal affluents on the right are the Sosna and Donetz, and on the left the Voronej (on which stream Peter the Great built his ships for the Black Sea), the Khoper, Medveditsa, and the Manitch. 5. The Kuban, which descends from the northern side of Elburz in the Caucasus, flows first north and then west, upon the boundary between Asia and Europe. It separates into two main branches, the northern of which falls into the Sea of Azof, and the southern into the Black Sea.

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[1] As we shall have frequent occasion to mention Russian weights and measures, we here present a table, to which the reader can refer, in order to understand what the calculations are equivalent to in English.

A verst is 3520 English feet; consequently three versts are equal to two English miles.

A dessaitine is equal to $2\frac{7}{10}$ths English acres nearly.

A chetwert is equal to 5·952 Winchester bushels; consequently 100 chetwerts are equivalent to 74·4 English quarters.

A vedro is equal to $3\frac{1}{4}$th English wine gallons.

A rouble, that is, a paper rouble, the only basis of commercial calculations, is equal to $10\frac{1}{2}$d., which is very nearly the value of a French franc. But the rouble fluctuates with the exchange.

A pood or poud is always reckoned in commerce as equal to thirty-six pounds English.

On the Caspian declivity we have, 1. the Volga, the largest river in Europe. It originates in the government of Tver, near the village of Volgo Verkovie, in the forest of Volkouski, in north latitude 57° 4′ 37″. It traverses Lakes Sterj, Peno, and Volga, and on receiving the waters of Lake Seligher, it becomes navigable, and falls into the Caspian Sea by eight principal arms, which have in all sixty-five mouths, forming about seventy islands. It has a number of tributaries, the principal of which, on the left, is the Kama, or Little Volga, which has a course of about a thousand miles in length. Before the Volga receives the Kama, the rivers Tverza, Mologa, Ounja, Vetlouga, and others, join it on the left; and on the right the Oka, which descends from the water-shed where the Don and the Dnieper originate. The Soura, which flows from the mountains of Volga, is another large tributary, which joins it on the right. The Volga is nearly two thousand miles in length. Its breadth at Astracan, where it embraces many islands, is nearly five leagues at the greatest height of the water. The depth of its waters varies from seven to eighteen feet. In the winter it is covered with ice throughout its whole extent, but there are always many apertures in the south, from which currents of air escape, and hence they are termed the lungs of the Volga. During summer the Volga is crowded with thousands of boats, constructed in the well-wooded countries of Northern Russia, and bearing down from the interior all kinds of commodities. Their return being difficult, they are generally broken up and sold at Astracan. This noble river is the principal commercial road of the interior of the Russian empire. It encircles the central table-land, receiving, as we have seen, the Oka, the principal river in this fertile region. It communicates in the upper part of its course by the canal of Vichnei-Volotchock, with the Lakes Ladoga and Onega; and, lastly, the Kama conveys to it all the waters of Eastern Russia. "The town of Astracan," says Malte-Brun, "may be supposed an Alexandria on a Scythian Nile, but the river enters an inland sea; it does not communicate with the ocean, and the countries which it waters are inhabited by barbarous nations; still, however, the advantages which human industry may derive from the majestic courses of the Volga and the Danube are not as yet realized." The term "barbarous" is now scarcely merited. 2. The Ural, or Oural, so called in conformity to a decree of Catherine II. It descends from the eastern declivities of the mountains bearing the same name, and flowing in a smooth channel sufficiently deep for small vessels, traces for a considerable distance the eastern and southern frontiers of the government of Orenburg, and the eastern limits of Europe. On the right it receives the Sakmara, on the left the Ilek, and after a course of above a thousand miles falls into the Caspian near Gouriev. 3. The Terek. This stream rises at the base of the Kazbek; receives on the right the rivers Songa and Aksai, on the left the Ourong, Tcherek, Bekhar, and Malka; and enters the Caspian by three principal mouths, between the Gulfs of Kouma and Agrakhan.

On the declivity of the Frozen Ocean we have, 1. the Petchora, which rises in the Ural mountain range, and traverses the most solitary deserts of Russia, the governments of Archangel and Vologda. Its steep calcareous banks are broken by caverns and ravines; and hence its name Petchoran, which in the Russian language signifies caverns. After receiving, amongst other tributaries, the Oussa on the right and the Tyra on the left, it falls into the Arctic Ocean in north latitude 67° 10′, its mouths forming an immense estuary. The length of its course is about 670 miles. 2. The Mezen, which originates in some bogs in the government of Vologda, and after a course of five or six hundred miles discharges itself into a bay of the same name on the shores of the White Sea, almost under the polar circle. 3. The Dvina, which name the rivers Soukhona and Joug receive after their junction near Weliki-Oust-Joug. The Soukhona flows from Lake Koubinskoe, in the government of Vologda; it is united with Lake Bielo by means of a canal, and also with the rivers Volga and Neva in the same manner. The Joug rises in the same government, but is a much smaller stream. The Dvina does not assume the dimensions of a large river till after the junction of the Vychegda, which falls into it on the right. The latter is united with the Volga by means of Catherine's Canal. Near Kholmogory it divides into several arms, and after a course of above 700 miles falls into a gulf of the same name. Its mouth is greatly obstructed by a bar of mud. 4. The Onega, which is the outlet of several lakes, but not that of Onega, although it be situated in the neighbourhood. There are other rivers which fall into the White Sea and Arctic Ocean, but none of them are of any great moment.

The declivity of the Baltic Sea contains a variety of rivers. 1. The Tornéo, or Tornéa. It originates in Swedish Lapland, and, after the confluence of its great tributary the Muonio, down to its embouchure in the Baltic Sea, it forms the boundary between Russia and Sweden. The Muonio, likewise, traces for some distance the limit of the empire on this side. The Tornéa has a course of about 280 miles. 2. The Neva, in several respects a remarkable river. "The Neva," says Colonel Jackson,[1] "though it be called a river, is more properly a bosphorus or strait. Its length, from Schlusselburg, at the south-west angle of the Ladoga Lake, to its mouth, is sixty-nine versts; its direction that of a straight line from east to west; its medium breadth about 1500 feet; and its depth, in many places considerable, is generally in the channel about fifty feet. The water of the Neva is remarkably pure, and though the first use of it by strangers generally produces slight diarrhœa, yet it is very wholesome and extremely palatable. This fine river is the grand and only outlet for the superabundant waters of four great basins, each of which has an extensive natural reservoir of its own. These reservoirs are the Lakes Onega, Ilmen, Saïma, and Ladoga; the latter receiving the drains of the other three. Ten different streams flow into the Onega, whose length from north to south is 190 versts, and its breadth from east to west seventy versts. It discharges into the Ladoga by the Sveer, a river 202 versts long, and of very unequal breadth. The Ilmen is fifty-five versts long from north-east to south-west, and about thirty wide from north-west to south-east. It receives eleven streams, and has its outlet into the Ladoga by the Volkoff, 206 versts long, with a medium breadth of 1400 feet. The Saïma, which is rather a collection of lakes, of gulfs, and bays, of all shapes and sizes, communicating with each other, than a regularly-formed and single sheet of water, is estimated by Peter Friccius at 130 versts long in the direction of west-south-west to east-north-east, and 120 from north to south; but on the Swedish side it is about 280 versts more. It pays its tribute to the Ladoga by means of the Voksha or Voxa, a river about 180 versts long, and not navigable in consequence of its several cascades, of which the most considerable, that of Imatra, has a fall of upwards of thirty-two feet. Besides the Sveer, Volkoff, and the Voxa, the Ladoga receives the waters of thirteen other streams. This, the largest lake of Europe, is about 175 versts long and 105 broad, and of an oval form. The surfaces of the four lakes are thus estimated. The Onega, 430 leagues, of 25 to a degree; the Ilmen, 36; the Saïma, 210; and the Ladoga, 830 degrees." At St Petersburg the Neva di-

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[1] Journal of the Royal Geographical Society, vol. v. part i. p. 1. To this able paper the reader is referred for some interesting particulars regarding the Neva.

Statistics.

vides into several deltoid branches, the largest of which is 1260 feet across, and bears along a mass of about 74,000 cubic feet of water in a second, while the Nile in the same time furnishes but 21,800 cubic feet. It moves at the rate of about two miles and one furlong in an hour; but notwithstanding the immense mass of water which is borne along, and the speed with which it moves, taking one year with another, for five months of the year the navigation is interrupted by its being frozen over, the ice sometimes exceeding three feet in thickness. 3. The Düna, or Southern Dvina. This river originates in a fen on the western declivities of the forest of Volkonskoï, in the government of Tver, not far from the sources of the Volga. It soon becomes deep enough to be navigable, but its course is broken by falls and sand-banks; it falls into the Bay of Riga, without having received any affluents of importance on its way. 4. The Niemen, which rises in the forests of Kopislov, in the government of Minsk. It flows first in a northerly direction, and then bending to the west, enters Prussia under the name of Memel. On the right it receives the Vilia, a navigable stream; and on the left one or two others, but they are small and unimportant. 5. The Vistula. This river rises in the principality of Teschen, in Eastern Silesia, at the foot of the western Carpathian range of mountains. It flows in an easterly direction to Cracow, where it becomes navigable, and as far as Sandomir forms the boundary line between Gallicia and Poland. Amongst its confluents, the most important are, the Bug, which originates on the northern side of a chain or lofty ridge of hills separating the chalky lands of Volhynia from the rich plains of Podolia; the Priepetz, a feeder of the Dnieper, which unites the Bug and the Niemen in spring and autumn; and at Sierock it receives the Narew, a river which flows from the plains of Lithuania, and is believed by the common people to be fatal to water-snakes. Its other tributaries are the Pilica, which originates in the heights above Warsaw; the San, which rises not far from the sources of the Dniester; and the Bzura. 6. The Wartha. This river rises in a plateau near Kromolow, in Cracow, flows in a broad channel like the Vistula, and inundates the neighbouring fields. After receiving the Ner, it becomes navigable, and though not so deep as the Vistula, has the appearance of a large river. After receiving the Prosna, which for a great distance forms the boundary between Poland and Prussia, the Wartha enters the Prussian territory, and adds its waters to the Oder.

Lakes, seas, and coasts.

The Baltic, the Black Sea, and the Caspian, will be found described in this work, each under its own proper head. In the foregoing account of the rivers of Russia, we have noticed four of the most considerable sheets of water in this country. Deep in the interior are a few pretty large collections of water; but lakes are not a characteristic of Russia, except in the north-west part, where Finland is situated. Here immense numbers of winding lakes of varied form and dimensions intersect the country in all directions, giving rise to numerous rivers; but none of them irrigates a great extent of country. All these, surrounded by flat and bleak shores and frozen plains, present little that is striking in point of scenery, and afford few facilities for internal intercourse. The coasts of Russia are deeply penetrated by large arms of the sea, forming gulfs, bays, and the like. Besides the Black and Baltic Seas, we have the Sea of Kara, which is the most easterly, and bathes at once Europe and Asia. It is four hundred and fifty miles in length; but navigation is almost constantly interrupted by ice at its northern entrance. On the extreme west is the Bieloe More, or White Sea, which itself embosoms a number of bays and gulfs of considerable size. The largest of these are the Gulfs of Mezen, Dvina, and Onega, so called from the rivers which flow into them; and Kandalask, which communicates with Lake Kovdozero. The White Sea is about the same length as that of Kara, with a breadth of from sixty to seventy miles. Between these two great inlets of the Arctic Ocean occur other gulfs, the most considerable being Tcheskaïa, which is separated from the White Sea by the peninsula of Kaniskaia Zemlia, and that formed to the east of this by the estuary of the river Petchora.

Statistics.

Capes, &c.

The extensive inlets of the sea above mentioned of course form numerous promontories and other projections of land. In looking over a good map, the most striking which meets the eye is Cape Kamin or Canin, the north-western extremity of the peninsula of Kaniskaia Zemlia. This neck of land, which separates the Gulf of Tcheskaïa from the White Sea, stretches directly north into the Arctic Ocean, a distance of about 150 miles. Its breadth is between forty and fifty miles. Cape Onega projects into the White Sea near the bottom of that gulf, and forms the Bay of Archangel on the north-east, and the Bay of Onega on the south-west.

Geology.

In European Russia, the predominating kinds of rocks, or, to use the language of geology, formations, are tertiary and alluvial; those of an older date, says Professor Jameson, namely, the secondary, transition, and primitive series, occupying but comparatively small space. The two latter occur in the Ural chain, in Finland, and Russian Lapland, in some parts of Karelia, Olonetz, Crimea, Caucasus, the Valdaï plateau, and Sandomir Mountains, Revel, the country around Lake Ilmen and Vologda, and the tract extending from Brody across the Bug and the Dnieper. The secondary lands frequently appear rising like little islands in the great Russo-Polish plains. Amongst the formations of this class of rocks are found coal, lime, gypsum, chalk, and salt, which will be afterwards noticed. The tertiary rocks, which occupy vast tracts of the low country, are clay, loam, limestone, brown coal, with gypsum, and in many tracts, as in Austrian Poland, rich deposits of rock-salt. There is a tertiary limestone almost peculiar to this part of Europe, and extensively distributed throughout Poland, Podolia, and Southern Russia. "It occurs, however," says Jameson, "in the basin of Vienna, and Hungary, and in France. It is the last dépôt of that sea which covered all the country to the north of the Carpathians, from the Baltic Sea to the foot of that chain, and to the Black Sea, in the middle of which rose the mountains of Sandomir, and the plateau south-west, in the form of islands. It is covered by a marly clay, and a sand formed by the last great alluvial catastrophe, which gave to Europe its present form, and buried in its dépôts remains of unknown species of the elephant, mastodon, rhinoceros, &c." In Central Poland there is a clay, with lignite or brown coal, resting upon chalk, which is supposed by some geologists to be the oldest members of the tertiary formations. The alluvial formation consists of an old and new deposit, the former being composed of a great stratum of marly clay or loam, interspersed with numerous blocks of granite and other primitive rocks. It covers vast tracts of country in Poland, varying in thickness from thirty to a hundred feet. The soil which it forms in the south of Poland is excellent; but as it advances northward it becomes less and less productive, and more and more intermixed with sands, gravels, and primitive blocks. It is this deposit which contains such an immense quantity of fossil remains of animals, including great whales. An alluvial sand, different from the sand of rivers, is widely distributed in Poland, and connected with the great sandy plain of Northern Germany. Vast numbers of large and small primary blocks occur in this plain, and which, from their identity with the rocks of Sweden and Finland, it is believed, on good grounds, have been transported from these countries by a débâcle flowing from the north-east to the south-west. The same débâcle has also formed the marly clay or alluvial loam; it has interred the elephants and other animals of unknown antiquity; it has broken up the chalk plains of the north, and separated Denmark from Sweden, and, in general, given to the Baltic, and the Gulfs of Bothnia and Finland, their present forms.

erals. coal, cop- &c.

The great mineral repositories of this empire occur in the Ural and Altaic chains; those in European Russia are few in number, and of little importance. A tract called the central mining district of Russia extends from the Oka to near the town of Kalouga, including portions of the governments of Niznei-Novgorod, Vladimir, Tambov, Riazan, and Kalouga. But it is for the most part a poor sandy district, containing iron ore; and as the metal is manufactured in the localities where it is found, several extensive iron-works are situated at intervals along the line mentioned. The ore is described as occurring in regular beds, sixty feet below the surface. It is of several varieties, the lightest coloured producing the most iron. Few minerals occur in that large and sandy plain which we have noticed as forming the northern and central portion of Poland. The land, as in all the northern countries on our globe, is incrusted with a ferruginous deposit, and every marsh and every meadow contains iron in a greater or less proportion. The iron is of indifferent quality; and the existing veins of lead, gold, and silver, which, it appears, were once productive, lie beyond the Russian territory. At Petrozavodsk, near Lake Onega, in Finland, there are iron-works, which, it is believed, are the largest in the north of Russia. Bog-iron ore abounds in the neighbourhood; and for a long time this was the only kind smelted; but thirteen different mines are now wrought. Vast quantities are obtained by simply dragging the lakes. Another great iron-work of the same description is situated four versts from St Petersburg, on the road to Riga. Finland also yields copper and tin, but only one mine of the former is wrought. Coal is found in very inconsiderable quantities in European Russia. There is a small mine worked at Tula, another at Bakhmout in the government of Ikaterinoslav, but neither seem to be of much utility. In Southern Poland and Cracow there are numerous beds of black bituminous coal, resembling that of Great Britain, some of which are thirty feet in thickness. These occur in the secondary formation. In the tertiary districts deposits of brown coal are met with, which also yields amber, the exudation of a dicotyledonous tree. Russia possesses a great treasure in the numerous salt-lakes and marshes of the Siberian steppes, and the country to the north of the Caspian Sea. There are also mines of salt dispersed throughout the empire, and from these sources immense quantities are annually obtained, the amount increasing indefinitely with the population. There is a tract of country called the Northern Salt District, which stretches in a line parallel with the Petersburg limestone, for a thousand versts. It makes its first appearance in the island of Oesel, and is worked in several parts of the south of Livonia. Quarries of gypsum are also situated in this great tract. A central salt district is described as existing in the course of the Volga. Along the course of the river Kama there is also a rich and extensive marl, salt, and gypsum tract, probably connected on the south with that of the Volga, and on the north with that of Vologda. The principal salt-works are in the neighbourhood of Solikamsk; and the gypsum grottoes of Koungour, in the government of Perm, are of great size and magnificence. There are in Poland large mines of rock-salt, which annually yield immense supplies of the article. They form part of that enormous layer of fossil-salt which extends along the Carpathian Mountains, and is large enough to supply the consumption of all the nations of the earth for an indefinite period of time. Copper-sand is found throughout a vast tract of country extending over the governments of Perm, Viatka, and Oufa. It completely skirts the south and west sides of the Ural Mountains. The sand is of a dull red or green colour, and is usually worked for copper. It contains fossil-wood impregnated with the metal. But it is in the Asiatic territory of Russia that the most abundant mines of copper are found, as well as those of gold, silver, platina, and other metals.

Soil.

In a country of such vast dimensions, the soil must of course vary considerably in different situations. There is a vast tract of territory 65,000 geographical square leagues in extent, which possesses a peculiar and rather remarkable soil. Indeed, Ritter, in his *Erdkunde*, informs us that there is only one other place on the surface of the earth where any thing similar in soil has been discovered, and that is the north of Hindustan. It consists entirely of decomposed vegetable matter, and is deposited in a thick layer. It is situated in the south of Russia, stretching in a broad belt from Volhynia in a north-easterly direction, to the foot of the Ural chain, near Perm. It is prolonged on one side from this to the shores of the Black Sea; and on the other it stretches from Perm to Orenburg, and thence to the Caspian Sea. All this vast tract, exceeding in extent France, Spain, and Prussia united, is covered throughout with a stratum of vegetable mould, which varies in thickness from three to five feet. It is so extremely productive as to stand in no need of manure. Its fertility is shown in the large returns of grain, especially rye, which it yields, and in the excellent breeds of cattle which are reared upon it. From the thinness of the population, this vegetable mould is far from being wholly laid out in corn-fields; vast tracts still remaining unoccupied. The soils of the steppes which cover so large a portion of the surface of Russia we have already adverted to when describing these plains. What remains to be said regarding the soil of this country must be stated in reference to specific localities, a general description being impracticable.

The country between the Dniester and the Dnieper has a soil impregnated with nitre, a substance deleterious to vegetation; yet, as soon as it is removed or diminished, wheat, millet, and the arbute melon, may be cultivated with great success. The mildest and most fruitful region in all the Russian empire is that continuation of valleys arranged in natural amphitheatres at the southern base of Taurida, along the coasts of the Black Sea. Proceeding eastward, we meet the government of Astracan, only part of the soil of which is fertile. This portion includes the low districts on the banks of the Volga, the Ural, and the Terek, and is by no means large; but here vegetables attain an enormous size. The soil is impregnated with saline and bituminous substances. Higher up, the land on the Volga becomes sandy and unproductive. The soil of Little Russia and the Polish Ukraine is partly sandy and not very fruitful, partly very rich and fertile. A great part of Western Russia is sandy, and intersected by vast marshes and bogs. Large tracts are covered with immense forests, the retreat of the bear, wolf, and wild boar; whilst not an inconsiderable portion of this westerly territory ranks amongst the most fertile in the empire.

Climate.

It thus appears, with regard to the soil of Russia, taking a summary view of it along with the climate, that from the forty-fourth to the fiftieth parallel of north latitude, comprising Bessarabia, Podolia, Kherson, Ikaterinoslav, and Taurida, it is for the most part low and level, little wooded, partly very fruitful, partly arid and unfruitful, and here and there impregnated with salt. The winters are short, with little snow; but in some parts the cold is severe. The spring is early and mild; the summer is of long duration, with oppressive heat and little rain; autumn follows late in the year. In the heat of summer a dangerous disease called *jassia* is generated; it is fatal to the lower animals as well as to man. Violent whirlwinds are frequent. The south of Russia is subject to a north-easterly wind called *mitel*, often accompanied by snow, which is drifted with great violence, and much dreaded by the inhabitants. The middle or temperate district, extending from 50° to 57°, has a rough and long-continued winter, especially in the eastern territory. This district is the largest and wealthiest portion of the empire, and forms broad, open, undulating plains, over which, as far as the declivities of the Ural chain upon the east, only slight elevations break the monotonous level. The northern district, from 57° to 67°, in European Russia, has a much milder climate than the same parallels in Asia. With the exception of the wooded mountains of Finland on the west, it is, as far as the Urals, a continuation of the former flat land, upon which forests, meadows, marshes, and moor-ground, alternate with one another. The poor, meagre soil, only insures the husbandman a return as far as the sixtieth parallel. The winter here is long and severe, there being six or seven months in which travelling is prosecuted on sledges. Mercury freezes in the winter, and the autumn is foggy. Here only slow-growing wood succeeds, and beyond 67° is confined to dry, stunted shrubs. From 64° the rearing of cattle is always difficult, and agriculture is limited to roots. Under the parallel of 66° the sun does not set on the 21st of June, nor rise above the horizon on the 21st of December. According to observations by the Imperial Russian Academy of Sciences, extending over twenty years, from 1777 to 1797, the duration of winter in St Petersburg extends from the end of September to the beginning of May. Snow and ice set in about the 9th of October, and continue to the beginning of May. Upon an average, 230 days of the 365 are reckoned as belonging to winter. For 160 of these, that is, from the 27th of November till the 19th of April, the waters are bound fast with ice. In winter the east wind prevails for 113 days, and the west sixty-eight days. In summer the westerly wind prevails for 110 days, and the easterly for eighty-four days. The quantity of rain which falls is from ten to eleven French inches; the number of rainy days is reckoned at about eighty. In 1774 there were reckoned forty-eight appearances of the northern lights; but since 1782 their number has decreased in a remarkable degree, especially within the last fifteen years. In the arctic or hyperborean region, extending from 67° to 74°, the rigours of the climate tell upon man and other animals, as well as upon vegetation; for neither attain the full size nor the complete development of their members. In Archangel the sun rises on the 11th of December at twenty-three minutes past ten, and sets about our mid-day, thirty-seven minutes past one; whilst on the 10th of June it rises thirty-seven minutes past one in the morning, and does not disappear below the horizon until twenty-three minutes past ten in the evening. But beyond 67° the climate is one long summer day and long winter night. The summer, however, is much overcast with vapours, which obscure, and sometimes wholly conceal, the sun. The dark and dreary reign of winter is greatly alleviated by clear moonlight and the brilliant apparition of the aurora borealis. Trees cease entirely about 67°, only hardy shrubs being able to endure the intense cold of the climate. In St Petersburg in 1732 the cold was 33° below zero, and in Tornéa 37°. On the 12th of January 1809, quicksilver froze into a solid mass in Moscow, and was extended with a hammer like lead. As this metal becomes solid about 33°, we may reckon the degree of cold in this case as about 35° below zero. Earthquakes were almost unknown in this country till the 17th of November 1821, when Kief and other places were visited by one, which shook the buildings with violence, but did no material damage.

Vegetable productions.

From the vast extent of this empire, and the great range of its temperature, it is not surprising that the productions of every clime are found, or may be successfully cultivated, in some parts of its wide-spread surface. On the east, the great chain of the Urals separates by a bold line the northern European from the northern Asiatic botany; and over this vast expanse winter reigns with excessive severity, while the almost tropical temperature of the brief summer brings the productions of the vegetable kingdom to sudden maturity; and this rapid growth is followed by as rapid a decay in autumn.

Forests.

The forests of Russia are in several respects an important feature of the country; firstly, as a physical characteristic, from their overspreading such enormous tracts of country; secondly, in a commercial point of view, from the timber, tar, pitch, potash, and turpentine, which they afford, forming important items of trade; and, thirdly, from their supplying fuel in a country nearly destitute of coal. An able writer thus describes them: "Estimating the surface of European Russia," says M. Schnitzler,[1] "at 402,100,552 dessaitines, 156,000,000 of this number are occupied by forests; 178,000,000 by uncultivated land, water, houses, and roads; 61,500,000 dessaitines by arable, and a little more than 6,000,000 by meadow-land. On this general view of the surface, we may compute that a dessaitine of wood occurs for every two and five-ninth dessaitines without it. The forests, indeed, constitute a source of riches which may long continue inexhaustible, and which might be indefinitely increased by strict regulations for their economy and management. Seventy-six millions of dessaitines are still completely covered with pines, firs, and other cone-bearing trees, without counting the oaks, maples, beeches, poplars, and elms, which are by no means rare in the latitudes within the 52d degree, and the birch, which grows in still more northern districts.... The governments of Novgorod and Tver, in particular, are studded with forests; that of Volkonskoï, which extends to the Valdaï Hills, is one of the largest known. In the government of Perm, out of 18,000,000 of dessaitines, 17,000,000 are forest. These immense tracts, covered with wood, are a great blessing in so inclement a climate, as they form a shelter against the winds from the icy seas. The provinces to the south have not the same necessity for them, and are so destitute of wood as to occasion the burning of grass and dung for fuel." The trees furnish the inhabitants with fir-timber of the finest and most durable quality, for building, household furniture, and utensils; and for these purposes it is largely used in the interior. The same tree supplies the peasantry with torches, which they use instead of candles. The brushwood, which covers a vast extent of forest country, consists almost entirely of the hazel, dwarf birch, alder, willow, and juniper. In other places the surface of the earth is covered with wild bilberry, and the cranberry, which is extensively exported.

Grain, hemp, a flax.

Russia is as yet chiefly an agricultural country. It is so extensive, and in many parts yields such abundant crops of grain, that enough is produced not only for home consumption, but for exportation in considerable quantities. On an average of five years, the annual production of grain amounts to 180,965,000 chetwerts, or about 134,818,920 English quarters, of which quantity 50,335,864 chetwerts were reserved for seed, leaving 119,498,213 chetwerts for home consumption or exportation. The price of grain varies exceedingly in different governments. Rye-meal in 1818 was, in Revel and Mittau, twenty-six and twenty-seven roubles per chetwert, while in Viatka and Simperopol it was only about the one half. St Petersburg, Moscow, Archangel, Vologda, and Perm are the only governments that consume more than they raise; all the others produce more than they require. The grains most commonly cultivated are rye and oats. The best wheat is produced in Southern Russia, where also, along with millet, a little rice

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[1] *La Russie, la Pologne, et la Finlande*, Paris and St Petersburg, 1835. This is a valuable work on the statistics of Russia.

S istics.

is raised. Hemp and flax are very largely cultivated, and yield not only material for the manufactures of the country, but a large surplus for exportation.

V , mul- b , su- g ane, a indigo.

Whilst corn and cattle constitute the riches of the central districts, the southern abound in productions of a more precious or delicate nature. The peninsula of Crimea is adapted, by climate and soil, for all the productions of Italy and Greece, and here, indeed, many of them are indigenous. Government has taken a most lively interest in developing the resources of each district of the empire; and in consequence of this the cultivation of the vine, an indigenous plant, and the mulberry tree and sugar-cane, has been carried to a considerable extent. In 1835 there were planted in Crimea 1,454,000 feet of vines, the annual produce of which, in a few years, will be at least 75,000 vedros, or 250,000 gallons. The vine cultivation is extending with great success in the south, in the governments of Astracan, Kherson, Podolia, the country of the Don Cossacks, and especially in the Taurida. In 1837, 1,150,000 vedros of wine were produced, and 1,300,000 to be distilled; while in 1836 the whole quantity was not more than 800,000 vedros. The mulberry tree has been as carefully attended to as the vine, and the result has been, upon the whole, favourable. Vast plantations of mulberries have been formed near all the principal towns of the southern districts. Every encouragement is held out to planters by the government. In Crimea and the countries of the Caucasus, the rearing of the silk-worm is likewise rapidly advancing. Experiments have also been made to cultivate sugar-cane and indigo; but it is doubtful if they will succeed. The cork-tree was transplanted from Portugal to the Crimea in 1817, but we see no notice of it in recent works.

F s and flo rs.

In Southern Russia, a region whose climate differs little from that of Asia Minor, we find a similar abundance and variety of fruits and vegetables. The flora of Russia is very abundant in the south. As Pallas informs us, the country presents the most enchanting aspect. On the mountain side, in the valley, in the forest, everywhere, the earth is clothed with a profusion of the loveliest flowers, and aromatic herbs, whose delicate odours embalm all the surrounding atmosphere.

Ga en-stu , me-di l pla , and dy oods.

Russia further produces hops (not sufficient for home consumption), and tobacco, the *Nicotiana paniculata*, of which the young leaves are gradually removed, dried in the shade, and buried beneath hay-ricks, where they become of a brownish-yellow colour. Of garden vegetables there are the usual varieties found in Europe. Spanish pepper is raised on the Samara and Lower Volga; poppy in Charkov, where it yields a return of a hundred and sixty fold; rhubarb, which grows wild in Taurida; rhapontick, which grows wild in the Urals; and *polygonum minus*, which in the Ukraine engenders worms that yield a beautiful crimson dye used as paint by the Cossack women. Genuine turpentine might be collected to a great extent. Many plants useful for dyeing are produced in a wild state; and for tanning there are several valuable plants. In short, the Crimea presents great facilities for rendering this a lucrative branch of manufacture. It only remains to be stated with regard to the vegetation of Russia, that in the south there is abundance of excellent food for cattle, consisting not only of a great variety of grasses, but also of the best vegetables recommended for artificial meadows.

An als. Ca , she , &c.

The quadrupeds of Russia are numerous. Some appear to be peculiar to the country, but our business is chiefly with the domesticated animals. Cattle of every description are bred in vast numbers in the steppes, and they have increased with the improvement of agriculture. Black cattle and oxen are raised as far north as the sixty-fourth parallel, especially in Podolia and the Ukraine. Some of the calves of the latter territory weigh from 480 to 600 lbs. Sheep are reared to a great extent, there being supposed to be between sixty and seventy millions of these useful animals in different parts of the country. In Taurida a poor Tartar may have in his possession 1000, and a rich Tartar 50,000. The Merino breed of sheep has been naturalized in Little Russia, in the governments comprised under the name of New Russia on the south and east, and in those of the shores of the Baltic Sea. These different regions, so remote from one another, are too dissimilar to enjoy precisely the same advantages; nevertheless, the perseverance and judicious management of the cultivators have been crowned with success. Even in those districts least favoured by nature rapid improvement has been made. In 1826 the exports of wool from Odessa were only 18,000 poods, valued at ten roubles each; in 1835 they were 116,000 poods, the price being advanced to thirty roubles per pood. At Taganrog the exports have increased in the same proportion; and in Little Russia this branch of commerce is acquiring fresh activity. The wool trade is now also cultivated in Siberia, where a wool-company was established in 1832. In fine, Russia, lately so poor in this species of produce that even in 1824 her exports did not exceed annually 35,000 poods, valued at only 600,000 roubles, in 1834 sold 281,450 poods, the value of which amounted to 1,557,066 roubles. This is of course independently of the demands for the cloth manufactories in the interior, which have increased to a very great extent. The report of the minister of the interior for 1837 states the extensive advancement made in agricultural industry, and the improvement of the breeds of cattle and sheep, especially the great increase in the number of Merino sheep in New Russia, as well as in Esthonia, Livonia, and Courland. Amongst the animals are horses of very different races, to improve the breed of which, races have been instituted; goats, from the silken hair of some of which animals the celebrated Cashmere shawls are woven; camels in the warm and saline steppes of Taurida and Kherson; asses, which are especially domesticated in Taurida; swine; rein-deer, so valuable in the north; the buffalo, and others. Amongst useful insects there are bees, which yield an abundance of honey and wax for exportation. There are many wild animals, the skins or furs of which constitute important items of trade in the northern parts of Russia; and abundance of others, whose flesh is useful as food. Birds are very numerous, including field and water game of various kinds. Fish abound in the seas, lakes, and rivers; and the fisheries constitute an important branch of productive industry, as will be afterwards shown.

Statistics.

Divisions and population of the empire.

European Russia consists of a variety of countries, viz. that part improperly termed Muscovy, which is Russia strictly so called, and forms the nucleus of the empire; the country of the Cossacks of the Don and of the Black Sea; the kingdoms of Kazan and Astracan, wrested from the Tartars; Biarmia; the greater part of Lapland; Ingria, Karelia, Finland, Astrobothnia, Esthonia, Livonia, the archipelagos of Abo and Aland, and the islands of Dago, Oesel, &c., countries formerly appendages of the Swedish crown; the largest portion of the once independent kingdom of Poland, comprising the governments of Vitebsk, Moghilev, Minsk, Volhynia, Grodno, Vilna, Podolia, the province of Bialystok, and the new kingdom of Poland; the former khanate of the Crimea, with Little Tartary, Bessarabia, and part of Moldavia, territories conquered from the Ottoman empire; and the region beyond the Caucasus, wrested from the natives, Turks, and Persians. "The Russian government," says Balbi, "does not recognise the distinction made by geographers betwixt Russia in Europe, Russia in Asia, and Russia in America. The first two are blended in several governments. For instance, Perm and Orenburg, being traversed by the Urals, have one part of their territory in Europe and another in Asia. However, having determined the boundaries of Europe by the crest of the Urals and that of Caucasus, I have admitted into my table the whole of the two governments of Perm and Orenburg, although great part of their territory, lying east of the Urals, belongs in reality to Asia; and I have rejected the general government of Caucasus, although its northern portion is situated within the limits assigned by me to Europe. This was the only course I could pursue in order not to divide what the Russian government has willed to be united, and to preserve the great natural divisions which are the base of all geography." The following table is taken from M. Huot's edition of Malte-Brun's great work. Whilst its divisions correspond with those of the able geographer just named, it contains important materials which are not to be found in his work.

Governments.	Actual Population at the beginning of 1827.	Chief Towns.	Population.	Distance in Versts.		Capital declared by the Merchants.	Number of Manufactories.	Annual Harvest, in chetwerts.	Natives of each Government.
				From St Petersburg.	From Moscow.				
Baltic Provinces.									
St Petersburg	845,000	St Petersburg	448,221	...	698	26,000,000	170	1,030,000	Russians, Fins, Ijors, Germans.
Finland (Grand Duchy of)	1,364,000	Helsingfors	9,400	413	1111	....	20	700,000	Fins, Swedes, Karelians, Laplanders.
Esthonia	300,000	Revel	16,000	359	1057	4,600,000	6	800,000	Esthonians, Germans, Russians.
Livonia	700,000	Riga	41,600	565	1069	14,000,000	39	1,270,000	Letts, Esthonians, Germans, Russians.
Courland	460,000	Mitau	14,026	607	1111	4,225,000	4	1,250,000	Letts, Germans, Jews.
Great Russia.									
Moscow	1,338,000	Moscow	257,694	698	...	52,000,000	540	2,900,000	Russians, and numerous foreigners.
Smolensk	1,325,000	Smolensk	11,155	700	382	8,000,000	50	4,500,000	Russians, Poles.
Pscov	780,000	Pscov	10,000	330	721	7,500,000	75	3,000,000	Russians, Germans.
Tver	1,260,700	Tver	21,706	537	161	17,000,000	32	4,050,000	Russians, Karelians.
Novgorod	915,500	Novgorod-Veliki.	7,985	182	515	7,500,000	...	2,150,000	Russians, Karelians.
Olonetz	359,000	Petrozavodsk	5,500	459	1106	2,200,000	24	360,000	Russians, Fins, Laplanders.
Archangel	363,100	Archangel	19,262	1137	1218	1,900,000	30	230,000	Russians, Laplanders, Samoyedes.
Vologda	802,000	Vologda	12,553	710	428	4,000,000	10	1,400,000	Russians, Fins, Samoyedes.
Jaroslav	1,038,100	Jaroslav	23,860	741	241	9,000,000	85	2,800,000	Russians.
Kostroma	1,455,500	Kostroma	12,058	825	325	3,700,000	350	2,625,000	Russians.
Vladimir	1,334,500	Vladimir	7,144	870	172	11,000,000	340	3,300,000	Russians.
Niznei-Novgorod	1,380,000	Niznei-Novgorod	14,430	1139	441	4,220,000	...	4,900,000	Russians, Mordouins, &c.
Tambov	1,500,000	Tambov	15,718	1157	459	8,500,000	37	9,080,000	Russians, Tartars.
Riazan	1,308,600	Riazan	18,866	888	190	7,400,000	70	5,525,000	Russians, Tartars.
Toula	1,130,000	Toula	38,850	873	175	10,000,000	55	6,700,000	Russians.
Kalouga	1,175,000	Kalouga	25,660	866	168	12,000,000	49	2,250,000	Russians.
Orel	1,300,000	Orel	30,300	1054	355	13,800,000	145	8,100,000	Russians, Cossacks.
Koursk	1,649,000	Koursk	22,897	1204	506	10,500,000	150	8,200,000	Russians, Cossacks.
Voronej	1,500,000	Voronej	18,508	1196	498	5,500,000	55	6,500,000	Russians, Cossacks, Bohemians.
Little Russia.									
Kief	1,472,100	Kief	26,020	1251	888	1,115,000	65	5,500,000	Russians, Poles.
Tchernigov	1,410,000	Tchernigov	5,656	1104	801	6,000,000	65	2,750,000	Russians.
Pultava	1,878,000	Pultava	8,140	1437	844	2,850,000	10	7,000,000	Russians.
Slobodsk Ukraine	950,000	Kharkov	13,370	1405	707	1,700,000	7	4,135,000	Russians, Cossacks.
Southern Russia.									
Ikaterinoslav	826,100	Ikaterinoslav	7,846	1600	921	3,400,000	1	2,350,000	Russians, Cossacks, Wallachians, Greeks, and a mixture of other nations.
Kherson	459,400	Kherson	12,400	1787	1297	3,200,000	12	1,430,000	*Idem.*
Taurida	346,200	Simperopol	2,330	2067	1485	1,400,000	3	450,000	Tartars of Crimea, Nogaïs, Russians, Germans, Cossacks.
DonCossacks (country of)	369,800	Tcherkask	11,327	1720	1022	......	...	......	Cossacks, Tartars, Kalmuks.
Bessarabia (province of).	800,000	Kichiriev	4,249	1693	1419	......	...	......	Wallachians, Cossacks, Greeks, Russians, Germans, Poles.
Western Russia.									
Wilna	1,357,400	Wilna	56,379	787	874	1,000,000	70	4,300,000	Lithuanians, Jews, Poles, Russians.
Grodno	868,100	Grodno	9,237	889	1032	650,000	8	3,400,000	Rusniaks, Lithuanians, Jews, Poles.
Bialystok (province of)	224,600	Bialystok	6,535	1063	1105	......	...	......	Poles, Jews.
Vitebsk	935,000	Vitebsk	15,500	627	576	2,400,000	3	3,150,000	Rusniaks, Lithuanians, Russians, Poles, Jews.
Moghilev	945,400	Moghilev	21,080	784	563	1,100,000	25	4,800,000	Rusniaks, Russians, Jews, Poles.
Minsk	1,160,100	Minsk	14,591	911	670	1,250,000	12	3,800,000	Rusniaks, Lithuanians, Jews, Poles.
Volhynia	1,496,300	Jitomir	11,430	1248	1040	2,000,000	95	5,000,000	Rusniaks, Poles, Jews.
Podolia	1,462,100	Kamienetz	13,060	1523	1314	2,550,000	39	5,600,000	*Idem.*
Eastern Russia.									
Kazan	1,028,150	Kazan	47,704	1519	821	6,500,000	150	5,200,000	Russians, Mordouins, Tchérémiss, Tchecks.
Viatka	1,200,000	Viatka	9,147	1460	1002	2,700,000	29	4,070,000	*Idem* and Votiaks.
Perm	1,270,000	Perm	9,940	2093	1395	2,500,000	100	2,500,000	Russians, Permiaks, Mordouins, Tchecks.
Simbirsk	1,130,000	Simbirsk	12,700	1448	750	3,900,000	90	6,200,000	*Idem.*
Penza	1,035,000	Penza	13,490	1397	699	3,900,000	60	1,900,000	*Idem.*
Astraçan	222,000	Astracan	39,857	2100	1402	5,000,000	110	11,000	Cossacks, Tartars, Kalmuks, Hindus.
Saratof	1,333,500	Saratof	35,250	1596	898	11,500,000	235	6,400,000	Russians, Cossacks, Germans, Tartars.
Orenburg	1,343,500	Oufa	8,450	2043	1345	3,500,000	1	4,350,000	Russians, Cossacks, Baschkirs, Tchérémiss, Teptiars, &c.

istics.

The governments, provinces, cities, and principal towns, being described in this work under their respective names, we shall not in this article enter into details regarding them.

Statistics.

The preceding table relates solely to European Russia; but the following, which is a much more recent census, embraces the whole empire.

Census of the Russian Empire, taken in the year 1836.

Russian priests	52,331		
Deacons and sacristans	63,178		
Male children of priests, deacons, and sacristans	138,548		
Total	254,057	Wives and daughters of priests, &c.	249,748
Priests of the united Greek and Roman Church	7,823	Ditto	7,318
Catholic priests	2,497		
Armenian priests	474	Ditto	343
Lutheran priests	1,003	Ditto	955
Reformed Church	51	Ditto	37
Mahommedan mollahs	7,850	Ditto	6,071
Lamas (Tartar)	150		
Nobles:—			
Hereditary ... males	284,731	Females	253,429
By virtue of service, &c. with their sons	78,922	Wives, &c.	74,273
Petty officers who have left the army and are employed in the civil service, &c.	187,047	Ditto	237,443
Foreigners of all classes	22,114	Ditto	15,215
Military colonies	950,698	Ditto	981,467
Inhabitants of towns:—			
Merchants	131,347	Ditto	120,714
Shopkeepers, artisans, &c.	1,339,434	Ditto	1,433,982
Citizens in the eastern provinces	7,535	Ditto	6,966
Greeks of Nishnei, gunmakers of Toula, &c.	10,882	Ditto	10,940
Citizens of Bessarabia	57,905	Ditto	56,176
Inhabitants of villages:—			
Peasants (that is, slaves) the private property of the emperor and the imperial family, peasants annexed to the crown, &c.	10,441,339	Ditto	11,022,594
Peasants the property of nobles	11,403,722	Ditto	11,958,873
Wandering tribes:—			
Kalmuks, Circassians, and Mahommedans of the Caucasus	245,715	Ditto	261,982
Territory beyond the Caucasus:—			
Georgia, Armenia, Mingrelia, &c. ... nearly	689,147	Ditto ... nearly	689,150
Poland	2,077,311	Ditto	2,110,911
Finland	663,658	Ditto	708,484
Russian colonies in America	30,761	Ditto	30,292
Total of population	28,896,223		30,237,343

Grand total of both sexes .... 59,133,566.

In this number, however, the private soldiers of the army and navy, with their wives and children, are not included, so that the sum total, in round numbers, may be estimated at sixty-one millions. In addition to this must be reckoned the inhabitants of the mountains between the Black Sea and the Caspian, 1,445,000 souls. There are also wandering tribes of Circassians and others, whom it is impossible to number. In short, the population of Russia may be stated in round numbers as about sixty-three millions.

This vast population consists of a number of distinct nations, tribes, and tongues, which have been classed and calculated by different writers. The last and most complete classification is as under.

1. *Slavonians.*—These consist of six races, and comprehend the inhabitants of Russia, Poland, and Courland. They are estimated in round numbers at 44,000,000.

2. *Fins.*—These consist of twenty-two races, and comprehend the chief residents of Finland, Livonia, Lapland, and some other places. They are estimated at 2,950,000.

3. *Lithuanians* or *Lettish.*—There are three races of this people, their chief residences being the governments of Moghilev, Vitebsk, Wilna, Minsk, and Grodno. Their number is estimated at 2,000,000.

4. *Tartars* or *Tatars.*—There are no less than twenty-six or twenty-seven races of Tartars seattered over the empire. The Tartars proper are divided into fourteen branches; the Noggiers into six; besides which there are the Kirghises, Aralians, Chewensens, Bukharians, Baschkirs, Teleutes, and Jakutes, whose aggregate number amounts to 2,190,000.

5. *Caucasians.*—There are eleven races of Caucasians, comprehending amongst others the Ischerkessens, the Awcheses, Lesghies, Ossetts, and Kistenses, estimated at 1,400,000.

6. *Germans.*—One only race, which is estimated at about 450,000.

7. *Jews.*—There are 550,000 of this indestructible people in the Russian empire.

8. *Mongols.*—Under this head are comprehended the Mongols proper, the Kalmuks, Buritens, and Kuriles, supposed to amount to 330,000.

9. *Mandshurs.*—These are divided into three branches or races, viz. Mandshurs proper, Tunguses, and Lamutes, whose number may be about 40,000.

10. *Samoiedes.*—There are twelve races of this polar people, comprehending 70,000 souls in all.

11. *Kamschats.*—This is another polar people, consisting of six races and 48,000 souls.

12. *Esquimaux.*—This northern race is estimated at 20,000.

13. *Indians.*—There are three races of Indians, estimated at 30,000 souls in all.

There are, besides, in the Russian empire, 25,000 Greeks, 10,000 gypsies, 15,000 Persians, and 6000 Arabians on the river Kama. There are likewise in the empire Hindus, Osman Turks, and in the cities and towns mercantile people belonging to England, France, Italy, and other countries.

Medical statistics.

It appears from the researches of De Jonnes in the *Révue Encyclopédique* for August 1833, that the mortality of Russia and Poland has remained stationary for a great number of years. The ratio of deaths to the population is one in forty-four, the annual mortality in each million of the inhabitants being 22,700. This differs somewhat from the statements of Herrmann, from whose elaborate researches concerning the progress of population in Russia the following conclusions have been drawn, viz. 1. The proportion of births to the number of inhabitants is one to twenty-five for the whole empire. 2. The proportion of deaths to the total population is one in forty.[1] 3. The general proportion of births to deaths in the whole empire is sixteen to ten. 4. The proportion of male to female births is forty-four to forty. The following table is of a more recent date than the researches of Herrmann. It is formed from the reports published by the synod (which, however, includes only the members of the orthodox Greek church), and shows the rate of the progressive increase of the population, as far as relates to that most numerous body of the people.

	1806.	1810.	1816.	1820.
Marriages	299,057	320,389	329,683	317,805[2]
Births	1,361,286	1,374,926	1,457,606	1,570,399[3]
Deaths	818,585	903,380	820,383	917,680[4]
Deaths of persons above a hundred years old	293	350	689	807

The increase of population in Russia appears to be equal to that of any European country. It is indeed not a little remarkable, that in places where neither nature nor fortune have been lavish of their bounties, the inhabitants live one half longer than those who enjoy the sunny skies and lovely landscapes of Italy, and exactly twice as long as those who people the capital of Austria; yet very recent and elaborate investigations have proved this to be the fact. The instances of longevity in Russia are astonishing. In 1821 the deaths were reckoned at 945,088; and of these, 221 were above 105 years of age, 120 above 110 ditto, seventy-eight above 115 ditto, forty-nine above 120 ditto, sixteen above 125 ditto, five above 130 ditto; one obtained to the great age of between 145 and 150 ditto; and another had tenaciously adhered to life till he had reached the almost antediluvian term of existence, 155 years.

Government.

The government of Russia is that of an absolute hereditary monarchy, where the will of the sovereign is the supreme law of the empire. No restraint can be imposed on it; but the emperors themselves have endeavoured in some degree to qualify this unlimited power, which is likewise somwehat moderated by the rights and privileges enjoyed through long-established usage by many bodies of people in different provinces, and which claims it would be dangerous to the monarch to infringe. The emperors of the house of Holstein have more than once declared that they would wish to follow fixed laws in whatever appertains to the rights of individuals and corporations. Arbitrary enactments are partly abolished; indeed they are only enforced against the great, or courtiers less solicitous about liberty than personal aggrandisement. The highest department of government is the council of the empire, which was established in 1810, to render the laws and the administration less liable to change. In 1811 it was completely organized, and consisted of thirty-five members and four presidents. It is divided into four departments, viz. law or legislation, the supreme court of judicature in spiritual and civil affairs; war; civil and church affairs; and internal political economy, or administration of the public revenue. The emperor himself is president, and, in his absence, one of the members whom he formally appoints president every year takes his place. Each department has its president, and the whole together have a common secretary, who is principal director of chancery, and the organ through which the council of the empire makes known its decisions to the monarch. He is also the person who bears the commands of the sovereign to the directing council of the empire, or makes them known to individual departments; he expedites all the orders of the above council to the respective authorities who are to execute them; and he receives all petitions, and the like, directed to the emperor in person. Each department has its state secretary. The ministers are members of the council of the empire, but they are disqualified from being presidents of the departments. The introduction of the members to the departments takes place half yearly. The original outline, or sketch of every law, ordinance, or regulation, is laid before the council of the empire, who examine it; but the sovereign power alone can give it efficiency. There are three commissions in connection with the council of the empire; these are, commissions of law, petitions, and the chancery of the empire. Alexander gave new activity to the law commission, by which about 70,000 ukases relative to civil rights were rescued from oblivion, and arranged in proper order. The archives of the chancery of the empire contain a collection of accurate accounts of state affairs of former years; complete accounts of the present situation of the government, the protocols of the council of the empire, and the imperial decisions. Each commission has a director, and is divided into several sections, over which a head presides. Such is the constitution of the Russian council of the empire.

The directing senate is one over which the emperor also presides. It is the supreme tribunal in all affairs of a home or internal description, as distinguished from those of a foreign nature. As guardian of the law, the sovereign watches over the administration of justice, superintends the management of the income and expenditure of the state, as well as looks after the means of national instruction, the preservation of public security, and the abolition of every illegal proceeding. The minister of justice is at the same time general procurator; but the remaining members are undefined, partly consisting of the ministers, who have likewise seats in the council of the empire. The directing senate is divided into eight departments, five of which have their constant seat at St Petersburg, and three at Moscow. These two bodies being composed of individuals either directly or indirectly appointed by the emperor, and, besides, not having power to act independently, cannot be looked upon as much better than mere agents for promulgating his decrees.

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[1] The annual mortality has diminished in some localities since Herrmann drew up his tables, which in some measure accounts for the discrepancy here observable.

[2] It appears that the marriages in 1820 were fewer by 22,470 than in the year 1819.

[3] The births of 1820 exceeded those of 1819 by 48,265.

[4] The deaths of 1820 were fewer than those of 1819 by 1429.

The holy directing synod has for its object the management of ecclesiastical affairs. It watches over the interests of the established church, but its decrees are issued in the name of the emperor.

The ministries of state, whose members officiate in their several departments independently of each other, but sit in the council of the empire and the senate, and to the latter annually render an account of their stewardship, are distributed into three sections. The first section consists of the minister of foreign affairs, whose ministry comprises a vice-chancellor, vice-president of the imperial cabinet, director of the Asiatic department for the study of the oriental languages, and a superintendent of the archives of the empire; the minister of war, who takes cognizance of the departments of artillery, engineering, inspection, auditory, commissariat, provision, and medicine; the minister of marine; the minister of the interior, under whom are the departments of the administration of the public revenue, police, and medicine, the minister of spiritual matters, of public instruction; and, lastly, the minister of finance, who has supreme direction over the revenues, and yearly lays before the emperor a balance-sheet of the income and expenditure. He is also the highest authority in matters relative to the departments of trade, manufactures, the customs, mines, and the demesnes of the empire. The second section forms the treasury of the empire, into which all the revenues flow, and from which all payments are made according to the direct orders of the emperor. And to the third section belong the business of state accounts, the general direction of land and water communication, and the ministry of justice. There are likewise ministers of control, the post-office, and of the imperial household. There is, besides, a special minister of state, or secretary, for Poland, and a secretary of state for Finland.

To all the various ministers the necessary information is weekly sent from the different governments; the whole intelligence being annually laid before the monarch in a definite form. The governors and other authorities in the provinces hold their command through the ministers. Each government has a head director or civil governor, who usually has conjoined with him a military governor. Of course, there is under these the usual train of functionaries, who assist in administering justice, and protecting the peace of the country and the rights of the subject. How justice is administered it is difficult to say with certainty, for corruption prevails to a great extent. Alexander did much to put an end to it, and his successor has imitated his example with the most laudable zeal, but equivocal success.[1] Conjointly with the judges are appointed assessors, who must be of the same rank as the person tried, which is a plan somewhat similar to that of our jury. In the cities, two burgomasters and four councillors, and in the country, one justice and two plebeian proprietors, form tribunals of the first instance. From these, appeals may be made to higher courts established in the several provinces; and from them again to the supreme tribunals at St Petersburg and Moscow. A kind of court of conscience exists in most places, which hears verbal complaints, acts as arbiter in differences about smaller matters, and exercises power in behalf of minors and imbeciles. Great deviations from the general system exist in some of the less civilized provinces, that of the Cossacks, for instance, which has a sort of military administration. Siberia is also under a different system, as we shall see when we come to describe that country.

Laws.

The civil and criminal codes of Russia are very imperfect, notwithstanding the efforts which several successive sovereigns have made to introduce order and certainty. The institutions and pandects of the Russian law were published in 1819–1823, by order of the emperor, in twenty-two volumes. The Russian government has also made public a collection of all the ukases, rules, ordinances, &c. in vigour in Russia, which amounted in 1830 to forty-five volumes, systematically arranged, with copious indexes, and forming a single body of laws, divided into several codes. This measure, according to the imperial manifesto of the 31st of January 1833, guarantees the execution of the laws for the present, at the same time that it establishes a solid basis for their progressive improvement. This body of laws became the standard code of the empire in the beginning of the year 1835. Amongst the particular laws, the ukase of 1822, abolishing the practice of branding after the administration of the knout, deserves particular mention. With regard to the punishment of crime, capital punishment was nominally abolished by the licentious Empress Elizabeth; but in reality it was often inflicted. That horrible instrument the knout may be so administered as to produce death, which often happened. However, it is no longer allowed to extend so far as to take away life. Banishment to Siberia is the other extreme punishment to which the Russian is liable for such crimes as murder and robbery. The police of Russia is a political body, and all travellers complain of its regulations, as being formal and minute beyond any thing known in other European countries. A very recent traveller thus speaks of it. "The Russian police, whose business it is to perform the various essential duties of the civil government, are not, I think, more numerous than in other kingdoms on the Continent, where the system of form and routine is kept up; while the officials with whom you are brought in contact, as far as my experience goes, although grossly venal, and taking bribes without the smallest attempt at concealment, are always disposed to treat a stranger with the utmost courtesy. But, in addition to these acknowledged servants of the state, there is a body of secret police, who are everywhere, and most certainly spy out all the ways of the stranger."[2] Not only are passports necessary to any one who wishes to enter the country, but every person resident there, whether a native or a foreigner, must have one, which is regularly renewed at stated intervals at the police-office for the district in which the party resides. A fine is the consequence of neglect of this periodical renewal. Every servant applying for a place must produce a regular passport; and there are other annoying minutiæ connected with this branch of the civil service. The police of Russia is strong in numbers, and distinguished for its searching system of espionage.

Revenues and currency.

The revenues of the Russian government arise chiefly from a capitation tax of two roubles on each peasant, and five on each burgher; a tax on merchants' capital, of about $1\frac{3}{4}$ per cent.; the leases of the crown-lands, and *obrok* or rent of the crown-peasants, the customs, stamps, patents, various leases, &c.; the monopoly of spirituous liquors and salt; the mines; the purchase of exemption from military service; fines on smugglers and other delinquents; the crown-fisheries, mills, manufactories, baths, &c.; the profits of the coinage and the post-office; and the *iassac* or tribute in furs of the nomade races. But in estimating the receipts and expenditure of government, allowance must be made for numerous and large sums never carried to the account of either income or expenditure, because they are either appropriated to local purposes, or are discharged in kind by various portions of the population. This is the case with the rent of the fisheries on the Ural, which either serves as pay for specific services, or is assigned in perpetuity to certain classes of the community, so that it makes no appearance amongst the public receipts. In some districts the capitation tax is commuted, either wholly or in part, for labour or military service. According to Schubert's reckoning, the income of the Russian empire for 1836 amounted to 354,268,000 paper roubles, or about L.14,200,000 sterling. To the above may be added six millions of roubles as the produce of the gold and platina mines. The national debt, which in many other countries swallows up so much of the revenue, here absorbs but a comparatively small part of it. On the 1st of January 1834, the debt of the Russian government amounted to 933,871,673 roubles, a sum which two years and a half of revenue would pay up. It has been materially reduced since the above date, and, it is believed, will in a few years be altogether extinguished. Every year a large sum is appropriated to this purpose. In the course of 1835, there were consigned to the commission for the extinction of the national debt no less than 66,529,080 roubles 96 kopecks. For a long period the currency of the country was in a very equivocal state, from government having issued paper roubles or assignats at a gradually increasing depreciation. The assignats, or bank-notes, of Russia were established by an imperial ukase in 1768, and issued in the following year. Of course they were at first equivalent in value to silver roubles, or very nearly so, and were issued to the amount of 40,000, in notes of the value of a hundred, seventy-five, fifty, and twenty-five roubles a piece. In 1786 these assignats were exchanged for new ones, and their quantity increased to the sum of 60,000,000 roubles. Their number went on augmenting till the death of Catherine II., when the sum in circulation amounted to 157,000,000 roubles. A natural consequence of the increased issue was their proportional fall; so that, at the above-mentioned epoch, the value of a hundred roubles in assignats was equal to seventy in silver. During the reign of the Emperor Paul I. the quantity of assignats was increased by 55,000,000 more; and during the reign of Alexander the issues were carried to such an extent, that in 1817 their whole quantity amounted to 836,000,000, and their value fell in proportion to their over-issue. The Russian treasury then adopted measures for diminishing the number of its assignats; and from that year till 1822, assignats to the amount of 236,077,650 roubles were withdrawn from circulation and destroyed. In 1819 the old assignats were exchanged for new ones, issued in a much improved shape, and in notes of two hundred, one hundred, fifty, twenty-five, ten, and five. According to the report of the minister of finance on the 20th of August 1835, the whole amount of assignats in circulation was 595,776,310 roubles, and their relative value to the metallic money was as a hundred to twenty-seven. There is little gold to be seen; and the only silver coin is the rouble,[1] and its aliquot parts of halves, quarters, tenths, and twentieths. There is an immense copper circulation of kopecks, one hundred of which equal a paper rouble. Indeed the only true metallic currency may be said to be copper. A coinage of platina was made at the mint, but it is more rarely seen than even gold.

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[1] Mr Bremner, whilst he does justice to Nicholas for his strenuous efforts to reform the bribing system, says, "In spite of all his efforts, however, bribery in public offices still prevails to a degree unheard of in other countries. Even in Austria, where they understand such things very well, they are mere tyros in the science, compared with the Russians. It grinds the poor and impoverishes the rich; it is practised in every branch of the administration, from the lowest clerk to the highest minister; it paralyses industry, enterprise, and merit, in every corner of the empire."

[2] Hand-Book for Travellers in Denmark, Norway, Sweden, and Russia. London, 1839.

Army.

The amount of the Russian army in time of peace is nominally 612,332 men, of which the imperial guard contains 41,200. The most correct enumeration of the various corps of this enormous force appears to be that of Marshal Marmont. He says that "the imperial guard are six divisions, three of infantry and three of cavalry, making sixteen battalions in all. The grenadier corps has three divisions of infantry, made up of twelve regiments, and a division of light cavalry, made up of four regiments; also two batteries of horse artillery and fifteen of foot. The regiments of guards consist of three battalions of infantry and seven squadrons of cavalry. The six corps of the line are composed each of a division of light cavalry (made up of four regiments), and three divisions of infantry, each of four regiments; in all twelve regiments; besides two battalions of foot and two of horse artillery. The total six corps of the line are seventy-two regiments of infantry and twenty-four of cavalry, twelve batteries of horse and ninety of foot artillery. The corps of cavalry reserve has two divisions, each of four regiments, making a total of twenty-four regiments, and twelve batteries of artillery. The reserve of the line are three divisions, composed of twenty-four battalions. There is, in addition, the corps of the Caucasus, Siberia, and Finland; the troops of the interior, fifty battalions of horse militia, and one hundred and forty-six regiments of Cossacks." The expense of this vast force is very small; the articles for their equipment, provisioning, and arming, being of the cheapest and coarsest kind, and the pay of both officers and men being low.[2] See the article ARMY.

Navy.

The naval force of Russia, for a long time inferior both in point of numbers and character, is now placed upon a highly respectable footing. The present emperor, when he ascended the throne, resolving to render Russia a first-rate naval as well as military power, made great exertions to realize his wishes. The Baltic fleet, in 1838, consisted of the following vessels; one three-decker of a hundred and twenty guns, three three-deckers of a hundred and ten guns, seven ships of eighty-four guns, and nineteen ships of seventy-four guns; thus making in all thirty heavy line-of-battle ships. To these must be added one razee of fifty-six guns, three frigates of fifty-two guns, and eighteen frigates of forty-four guns, besides corvettes and small craft. The whole is manned by a force of 33,000 men. The fleet in the Black Sea consists of sixteen heavy ships of the line, besides a number of frigates, smaller vessels, gun-boats, &c. On the Caspian Sea there are also several ships of very considerable size, and more are in rapid progress at the building-yards recently established at favourable points. Russia possesses at least sixty steam-boats of one kind or another. This is a formidable armament, and it is admitted by unprejudiced individuals, that the navy of Russia was never in such high condition as it is at the present time. But it is quite preposterous to look upon it in the light of a rival to that of

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[1] Whenever the word rouble is used in any work relative to Russia, as well as throughout this article, the paper rouble (10½d.) is meant. The silver rouble is never made the basis of calculations of any kind, nor have the Russians any higher denomination corresponding to our pound sterling. Kopecks and roubles constitute the only practical elements of the currency throughout the whole empire, with the exception of Poland.

[2] "The military conscription in Russia," says the British and Foreign Review, October 1838, "is the most horrible thing that can be imagined. The levy of recruits is ordered almost every year, and each community is compelled to furnish one, two, three, or more recruits from every five hundred males, or, as they are officially called, *souls*. The choice of recruits is entirely left amongst peasants to their masters, and amongst the burghers to the elders of the community; and it may be easily imagined to how many abuses such a mode of levying is liable. We shall not enter into the disgusting details by which the levy of recruits is accompanied in Russia; we shall only add, that the condition of a Russian soldier is considered so wretched and so hopeless, that there are many instances of individuals, who have not only mutilated, but even destroyed themselves, in order to escape military service."

Great Britain. The expense of the navy, like that of the army, is comparatively small. "Indeed," says Mr Bremner, "it is one of the points which should never be forgotten in considering this question" [viz. the maintenance of such a large fleet], "that Russia can not only build ships cheaper than any other European power, but can also man them for less. The pay both of officers and men is so small, that the annual outlay on twenty Russian line-of-battle ships would not defray the expense of ten of ours." The Russian sailor is brave, well-trained, somewhat after a military fashion, and submissive; but he wants the activity and enthusiasm of the English seaman. To remedy a great defect under which the Russian navy has long laboured, a want of good native officers, colleges of naval cadets have been formed, where young Russians are carefully trained for the higher branches of the service.

oductive ustry. Ten or fifteen years ago the agricultural operations of the Russians were conducted in a very clumsy manner. Rotation of crops was little understood or practised, and husbandry in general was carried on in a very ignorant and unprofitable manner. In the Ukraine, so famous for its fertility, the mode of farming is very simple. They take as many crops out of the ground as it will yield, and then let it lie fallow for a year or two. But this branch of productive industry has made considerable progress within these few years; partly through the exertions of government, and partly through those of the landed proprietors, who find it for their advantage to approximate to those improved methods of cultivating the soil which are practised in most other parts of Europe. Amongst other means employed by government for encouraging agriculture, it has ordered what are called model-gardens to be formed in a number of governments. Native manufactures have likewise been greatly extended and improved.

State of the Manufactures of Russia in 1831.

Value of the Produce (estimated in roubles) of		Increase since 1821.
Cotton manufacture	104,170,481	230 per cent.
Silk ditto	16,131,373	25 ...
Woollen ditto	50,000,000	30 ...
Flax and hemp	22,615,940	45 ...
Leather	97,213,710	12 ...
Paper	6,468,968	10 ...
Hats	3,801,900	63 ...
Dyes and colours	3,000,000	55 ...
Tobacco and snuff	19,623,494	150 ...
Refined sugar	23,007,004	34 ...
Soap	6,591,690	131 ...
Tallow candles	8,095,584	62 ...
Snuff-boxes, and different kinds of japanned goods	2,000,000	0 ...
Chemical preparations	3,000,000	11 ...
China and earthenware	4,000,000	0 ...
Glass and crystal	9,000,000	11 ...
Potash	6,000,000	32 ...
Metallic Produce.		
Gold	25,905,680	5 ...
Silver		3 ...
Copper	9,620,736	13 ...
Wrought iron and steel	38,828,000	9 ...
Cast iron		26 ...
Sundry minerals	500,000	94 ...

The whole amount of the above produce is 509,574,379 roubles.[1] Russia, which formerly imported nothing but manufactured goods, now imports immense quantities of raw material for the use of her manufactures, as will be seen from our table of the imports; and the amount is yearly on the increase. In 1815 the total number of manufacturing establishments throughout the empire was estimated at 3250, at which 150,000 workmen were employed. In 1836 the number of manufacturing establishments in activity was 6045, which gave employment to 279,673 workmen. The financial agents of Russia residing at Paris, Vienna, and Berlin, as well as the consuls at the chief commercial towns of Europe, have instructions to contribute to the progress and improvement of national industry, by communicating to Russian manufacturers every information respecting new inventions made in foreign countries, forwarding to them patterns of new manufactures, models of machines, and the like, and by engaging expert workmen for them. Government holds out the greatest encouragement to persons engaging in new commercial enterprises. By a ukase dated 1827, such parties are relieved from certain taxes imposed upon them as members of one of the three city guilds, and in 1835 the land-tax and municipal imposts were also remitted in their favour. A further evidence of the advance which Russia has made in commercial enterprise is furnished by the fact, that the number of persons engaged in such pursuits is rapidly increasing, and that every year many acquire the means of passing from the inferior to the upper guilds. The following statement will make this clear.

	1835.	More than in 1834.
Merchants of the first guild	695	50
Ditto of the second	1,547	56
Ditto of the third	30,099	1,147
Peasants having permission to trade	4,992	388
Clerks	7,976	831

In 1836 thirty-five applications were made for patents for new inventions connected with manufactures, of which eleven were granted.

Brandy. The distillation of brandy is the most extensive and lucrative branch of the productive industry of Russia. This article is produced to the amount of 270,000,000 roubles annually, for which government receives an excise duty of 90,000,000 roubles. The brandy monopoly of government is productive of great mischief, as by the universal system of bribery the cost to the consumer is greatly increased. The farmer-general bribes the governor of the province, whose duty it is to see that the article is not adulterated; the farmer-general, and his secretary who grants licenses, are bribed by the retailer, so that by the time the spirit has reached the tables of the peasantry, amongst whom the use of it is universal, one gallon has multiplied itself to three or even four. A kind of beer called *braga* is likewise made to a great extent, and largely consumed.

Mines. The mines, particularly those on the Ural Mountains, were worked at a very ancient period; but it is only in modern times that the Russians have applied themselves to that branch of industry. Gold, platina, silver, and copper, are most abundant in the Asiatic governments, or along the last declivities of what is called the great central ridge. The quantities of gold and platina produced will be seen from a table at the end of the exports and imports.

Silver mines. The silver mines yield annually about 43,200 lbs., besides 1,440,000 lbs. of lead. The aggregate produce of copper from the government and private mines is 7,596,000 lbs. English. By a document published in the Russian Mining Journal for 1830, we find that there were in the Ural districts alone fifty-eight smelting works (seven belonging to the crown and fifty-one to individuals), which in 1827 produced 9,731,147 poods of cast iron. The forges, which amounted to 105 (only eight of them being crown property), sent into the markets in the same year 5,578,474 poods of wrought iron. We learn, from the same source, that the steel manufactured in all the empire in 1829 amounted only to 80,000 poods.

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[1] The above official returns are taken from a work of M. Prelezynski, on the State of the Manufacturing Powers of Russia, published in Russian at St Petersburg in 1833.

Precious stones.

Another branch of industry to which the attention of the Russian government has been for some time directed, has originated in the discovery of precious stones in the Ural Mountains. Stones of great value have from time to time been detected in that range, and scientific individuals have been employed to make researches for the purpose of obtaining extensive and accurate knowledge of these hidden treasures. Diamonds have likewise been found in the auriferous sands of the Ural. But to what amount annually any of these precious stones may be collected is still uncertain.

Iron.

The mines of Finland, particularly those of iron, are also an important branch of productive industry. Some of the hills of that country contain veins of an ore fit for the manufacture of wrought iron, while layers of a fusible ore are found buried at a small depth, in marshes and along the borders of lakes. For a long time the mines of the first description were neglected; but there are thirteen now at work. The richest ore, produced from the mines of the Gamnholm and Oïama, contains from fifty-three to fifty-four per cent. of metal; the poorest yields about thirty per cent. of cast iron. The smelting of these ores is performed in eight different furnaces, which consume more ore than Finland can at present furnish; and the deficit is supplied by Sweden. Almost the whole of the cast iron produced by them is distributed among the forges established in different parts of the country. There are sixteen of these forges, which manufacture annually about 121,350 poods of wrought iron. Those immense beds of iron ore which extend throughout the country, along the shores of lakes, and at the bottom of marshes, have been wrought from time immemorial. The number of forges and smelting-houses for working up this product is considerable; and as experience has proved that the marsh ore is preferable to any other, several other establishments of forges have recently been erected, and more are in the course of being added to the number. Next to iron, copper is the most important mineral which Finland produces. Until very lately, however, only one mine was wrought, that of Ovi-Yervi, discovered in 1758. But a patent was a short time ago obtained for the working of copper and tin mines found near Nitkaranda. Iron of the best quality is likewise found in the district of Toula, the seat of the iron manufactures. Russia possesses another treasure in the numerous salt-lakes and marshes in the Siberian steppes, and in the country to the north of the Caspian Sea. The quantity of this article obtained throughout the empire amounts to 22,000,000 poods annually. Alum is also produced to the yearly extent of 16,000 poods.

Fisheries and the chase.

“A prodigious quantity of fish,” says M. Schnitzler, “is supplied by the rivers and lakes, constituting almost the sole food of the population of extensive districts, and during the long Lents replacing the use of meat. The fisheries of the Volga and the Oka are particularly productive. Without speaking of the carp, the pike, the trout, the herring, especially that species of herring termed *reipouchki*, and of the pilchard, I shall cite the sturgeon, beluga, and salmon fisheries, and the pickled lampreys and mackerel of the Crimea. The sterlet of the Volga is a variety of the sturgeon. Caviare, the consumption of which is so great in Russia, is made from the eggs of this fish, and from those of the beluga. A single sterlet will give from ten to thirty pounds weight; and from a single beluga there may at times, it is said, be taken as much as 120 pounds. The best caviare comes from the Cossacks of the Ural. The sturgeon fishery is usually of considerable value; 1,850,500 fish of this species, caught in the year 1793 in the Volga, near Astracan, yielded 124,970 poods of caviare, 3575 poods of isinglass. The coasts, which are visited by the cachalot, the whale, and other cetaceous fish, and on which are collected a quantity of pearl-oysters and mussels, likewise furnish cod and herrings. The largest fishery of the latter is in the Sea of Kamtschatka. The net annual value of the Russian fisheries amounts to more than 10,000,000 roubles.” The chase in the Russo-North American colonies, and elsewhere, has long been a profitable branch of national enterprise. Great quantities of furs and skins, of the otter, beaver, and fox, are annually brought to market by the traders.

Internal commerce. Fairs.

The internal traffic carried on in Russia is very considerable, and yearly upon the increase. The exchange of agricultural produce, as well as of manufactures, is immense. Nineteen fairs have been established for the benefit of trade in several principal towns of the empire, and thirteen in lesser ones. A great number of bazaars have likewise been erected for the accommodation of traders. The great centre of the inland commerce of Russia is Niznei-Novgorod, the annual fair at which place is entitled, both from the amount and variety of its articles, to be considered as the first in Europe, perhaps in the world. The trade consists chiefly of three branches; namely, that of goods brought from Asia, Russian manufactures, and merchandise from Europe and America. The Asiatic trade consists principally of tea from China, of which article immense quantities are annually brought to this great emporium. Russian manufactures form the most important branch of the trade of Niznei-Novgorod, and consist chiefly of cotton, silk, and woollen goods brought from the central provinces of the empire. The merchants of Kiakhta carry back large quantities of cotton and skins; those of Bukharia and of Khiva purchase nankeens, calicoes, cambrics, cloth, and sugar; the Armenians and the Persians buy cotton and woollen stuffs. Russian and Polish cloths are sent to this market in considerable quantities, part of which are sold to the Transcaucasian provinces, and some are even exported to China.

The produce of the Russian mines and founderies forms also a considerable item of trade, consisting of iron, copper, and steel articles from Toula, and which are bought for the use of the inhabitants of the interior. Sugar is sent from St Petersburg and Archangel. Much country produce is sold for the purpose of exportation; such as wax, wool, cotton, camel-hair, hemp, feathers, and Russian leather. The superb furs of Siberia and the coast of the White Sea form also most important objects of commerce. There is likewise a smaller trade in earthenware, glass, and soap. The third branch of the commerce of Niznei-Novgorod is the produce of Western Europe and its colonies; but the amount of goods imported from these countries is scarcely one tenth of the merchandise sold at the fair. It consists of indigo, cochineal, and madder, used for the purpose of dyeing manufactures. Foreign wines form also an important article of trade. Coffee and rum are imported from the West Indies; coral is also imported and sold, chiefly to Kiakhta merchants for the Chinese markets. Foreign manufactures, consisting of silks, cotton, and woollen stuffs, are likewise sold in very considerable quantities. The value of the goods which change hands at this fair, according to Klaproth, amounts to ninety-four millions of roubles annually. Dr Lyall and Captain Cochrane raise it to double this sum; but the statement of Lord Londonderry is more to be relied upon. He says that the value of goods actually sold amounted in 1831 to 98,329,525, in 1833 to 117,210,676, and in 1835 to 117,743,300 roubles. A great deal more merchandise than is sold is always brought to market. It is supposed that this fair is visited by about 150,000 strangers. The confluence of traders from such remote countries as those mentioned is one of the most striking and picturesque spectacles that can be witnessed. The fair lasts during the months of August and September. By the official account of the minister of the interior, the value of merchandise sold at the different fairs in 1836 was 284,949,191 roubles, and in 1837 it was 277,108,436 roubles, or L.10,500,000.

The internal commerce of Russia is greatly facilitated by the vast system of inland navigation, which forms so striking a feature of that country. All the great rivers, lakes, and seas have been connected with one another by means of canals, so that a water-communication exists between the most remote parts of the empire. The Black Sea and the Baltic communicate by means of three canals; the Baltic and the Caspian Seas are united by means of the Volga and artificial cuts; and the same great river is connected with the White Sea and other lakes. Important undertakings are in progress to perfect the junction of such rivers as the Markta and the Volga, the Oka and the Don, the Priepetz, the Niemen, the Bug, and others. In 1817 the Emperor Alexander created an office of "director-general of the ways of communication," including canals, roads, and bridges. From that period the works of this description have been vigorously prosecuted. The roads of Russia are in general bad, but a number of new high roads are in progress. That from St Petersburg to Moscow, which has long been in existence, is a remarkable work. It is an elevated causeway of timber, running in one long, level, unvarying, straight line, over marsh and bog, through forest and thicket. Many other important public works have been undertaken, of which number is the construction of quays along the Oka, and from the Volga to Niznei-Novgorod, and the works upon the river Seyn. Steam-boats have been established upon some of the principal rivers, for towing barges as well as for conveying passengers and goods. (See Navigation, Inland.)

Colonies.

The colonies of Russia, that is, those southern parts of the empire in particular which have been settled by foreigners, constitute a distinct feature of the country. At the period when Catherine II. ascended the throne, that vast tract of country which now forms the government of Saratof was almost without cultivation; and in order to bring it under proper culture, the empress issued a decree, inviting colonists from European countries, where agriculture was in the most advanced state. Great numbers of German and Swiss, French and Swedish families, accordingly, flocked to the banks of the Volga, and to these foreigners Russia is indebted for what advancement she has made in the manufacture of wine and the cultivation of the silk-worm. The German colonists who have settled in New Russia, Bessarabia, and the governments of Saratof, Georgia, &c., but principally in Southern Russia, are located in four hundred and twenty villages. Their population in 1837 amounted to 270,085; the number of sheep was 1,364,840; seed sown, 289,290 chetwerts; produce, 1,736,316 chetwerts; fruit trees, 1,666,599 chetwerts; vine roots, 18,447,902 chetwerts; lands assigned to them, 5,836,771 English acres. After the peace of Adrianople, about 60,000 Bulgarians and Rumelians came to settle in Russia. Since the days of Peter the Great, the Russian government has held out great encouragement to foreigners of all professions to settle in the empire, and to such persons Russia is in no small degree indebted for her present greatness and prosperity. There is scarcely an institution, an art, a manufacture, or a department of war or peace, that has attained to excellence in the country, which is not indebted to some foreigner for its efficiency.

The foreign commerce of Russia is very considerable, as the following tables will show.

Statement of the Quantities and Value of Merchandise imported into Russia from Countries in Europe, and from America, in the year 1835.

Description.	Quantities.	Value.
Coffee……cwts.	31,302	L.123,642
Spices……value	...	42,701
Wines and liqueurs……casks	52,094	470,313
Ditto ditto……bottles	118,406	
Champagne……bottles	472,365	142,331
Fish……value	...	180,136
Salt……cwts.	1,108,955	212,216
Tobacco……cwts.	29,709	222,144
Fruits……value	...	283,468
Cotton, raw……cwts.	66,853	306,481
Ditto, twist……cwts.	168,562	1,516,709
Ditto, ditto, dyed……cwts.	2,722	63,787
Indigo……cwts.	8,816	287,637
Cochineal……cwts.	1,135	48,599
Madder……cwts.	38,619	130,311
Logwood……cwts.	139,655	106,354
Dyewoods, various……value	...	71,827
Drugs……value	...	75,647
Olive oil……cwts.	76,797	225,388
Hardware……value	...	99,006
Lead……cwts.	54,890	53,812
Sugar, raw……cwts.	441,844	1,179,889
Silk……cwts.	2,629	312,690
Manufactures, cotton……value	...	233,823
Ditto, silk……value	...	393,066
Ditto, worsted……value	...	203,453
Cloth……cwts.	1,159	85,099
Precious stones……value	...	103,115
Miscellaneous……value	...	1,388,817
Total value……	……	8,563,461

Statement of the Quantities and Value of Merchandise exported from Russia to Countries in Europe, and to America, in the year 1835.

Description.	Quantities.	Value.
Wheat……qrs.	520,181	L.521,100
Rye……qrs.	31,029	23,944
Barley……qrs.	14,651	8,793
Oats……qrs.	19,423	7,764
Wax……cwts.	7,770	46,508
Hides (Muscovy leather)……cwts.	15,351	83,115
Ditto, tanned……value	...	29,328
Ditto, raw……cwts.	117,752	267,315
Flax……cwts.	475,133	825,843
Hemp……cwts.	977,728	822,796
Timber……value	...	400,354
Potash……cwts.	135,795	135,538
Oil (hemp and linseed)..cwts.	38,515	63,965
Copper……cwts.	62,985	278,889
Iron……cwts.	416,093	246,080
Tallow……cwts.	1,075,178	1,639,122
Linseed……qrs.	463,474	815,999
Wool……cwts.	109,175	406,818
Bristles……cwts.	17,706	205,411
Cordage……cwts.	74,022	76,083
Sailcloth……pieces	81,323	157,317
Ravensduck……pieces	90,454	87,933
Flems……pieces	68,210	95,544
Cattle……value	...	136,815
Furs……value	...	75,528
Hare-skins……cwts.	3,171	21,475
Miscellaneous……value	...	1,083,321
Total value……	……	8,550,459

A Statement of the Quantities and Value of Merchandise imported into Russia from Countries in Asia during the year 1835.

Description.	Quantities.	Value.
		L.
Sugar and candy..........cwt.	5,039	15,951
Tea..........................lbs.	7,173,396	302,366
Fruits ....value	...	12,743
Cotton, raw..................lbs.	559,768	12,508
Ditto, yarn...................lbs.	1,269,468	67,044
Silk, raw ....lbs.	177,372	48,336
Leather ....pieces	92,638	6,934
Cotton manufactures.....value	...	253,306
Silk ditto...........value	...	38,291
Woollen ditto ....value	...	12,687
Cattle.........................value	...	137,746
Furs...........................value	...	58,341
Miscellaneous............value	...	61,937
Total value.........	....	1,028,190

A Statement of the Quantities and Value of Merchandise exported from Russia to Countries in Asia during the year 1835.

Description.	Quantities.	Value.
		L.
Grain...........................value	...	31,892
Iron............................cwts.	126,616	54,345
Ditto..........................picces	2,549	
Copper.........................cwts.	1,688	6,396
Russia leathcr.................cwts.	7,092	55,699
Ditto ....pieces	180,522	
Hides, tanned ....value	...	33,948
Ditto, raw.....................cwts.	379	3,033
Ditto, ditto...................pieces	19,058	
Colours ....value	...	17,656
Manufactures, cotton.......value	...	194,968
Ditto, ditto, in transit.........................value	...	10,714
Ditto, linen.........value	...	13,335
Ditto, silk..........value	...	6,624
Cloth, Russian................yards	670,740	96,690
Ditto, ditto.....................piecces	1,421	
Ditto, foreign ....pieces	22	827
Ditto, ditto.....................yards	3,238	
Ditto, ditto, in transit......yards	79	11
Ditto, Polish, in transit....yards	160,456	20,428
Hardware ....value	...	22,908
Horses ....number	5,658	3,898
Furs............................value	...	105,542
Ditto in transit...............value	...	4,118
Coral...........................value	...	1,398
Ditto in transit...............value	...	3,083
Miscellaneous................value	...	120,225
Ditto in transit...............value	...	5,947
Total value....................	....	769,481
Total value in transit.......	....	44,304
Grand total......	....	813,785

A Statement of the Value of Merchandise imported into and exported from Russia, distinguishing the Trade with each Country, in the year 1835.

	Countries.	Value of Imports.	Value of Exports.
		L.	L.
European and American Trades.	Sweden and Norway..	183,602	154,630
	Prussia..................	411,952	492,328
	Denmark......	66,260	238,651
	The Sound............	......	78,679
	Hanse Towns..........	1,155,633	268,518
	Holland.................	313,087	449,202
	Great Britain..........	3,122,025	3,950,335
	France...................	631,660	362,289
	Spain and Portugal...	201,796	142,126
	Italy......................	205,167	150,440
	Austria...................	507,061	479,174
	Turkey....................	594,314	1,004,814
	America..................	1,159,623	570,078
	Other countries........	11,281	209,195
Asiatic Trade.	Turkey, Asiatic........	44,714	37,423
	Persia....................	293,169	100,595
	Khiva.....................	30,590	17,719
	Kirghise..................	175,250	182,072
	Bukharia.................	105,675	47,309
	Tashkent................	41,154	......
	Kokhaut..................	15,800	36,222
	China......................	320,573	324,946[1]
	Other countries........	1,092	67,314
	Total.........	9,551,478	9,364,059

A Statement of the Value of Gold and Silver imported into and exported from Russia in each year from 1824 to 1834; and of the total Quantities and Value of Gold and Platina extracted from the Ural Mines, and coined, in the same period, exhibiting the apparent Increase in the Circulation of the Empire.

Years.	Value of Gold and Silver.	
	Imported.	Exported.
	L.	L.
1824	274,510	209,669
1825	506,395	70,865
1826	213,432	159,598
1827	600,962	157,985
1828	659,244	113,916
1829	1,606,496	127,327
1830	2,122,600	151,044
1831	1,965,819	198,891
1832	1,887,081	189,004
1833	2,278,512	359,753
1834	873,953	378,279
Total....	12,989.889	2,116,339

Difference..	L.10,873,550
Gold extracted from the Ural mines, and coined, in the above years; quantity, lbs. 117,564; value..................................	7,143,499
Platina extracted from the Ural mines, and coined, in the above years ; quantity, lbs. 28,125 ; value..................................	393,737
Total apparent increase of circulation..........	L.18,410,786

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[1] The trade with China being one exclusively of barter, the exports ought to balance the imports, which is not the case here. The difference, however, is not very material; and we preserve the table as given in the Parliamentary Papers.

The foregoing tables have been obtained from parliamentary papers. In the last one, no mention is made of the silver and copper mines of the Urals, which, however, are less important than those of gold and platina. The quantities which they produce have already been stated. In 1832, the latest year for which we have complete returns, the number of vessels which arrived in the different ports of Russia was as follows :—

Ports on the Baltic Sea	3601
Ditto on the White Sea	472
Ditto on the Black Sea	1446
Ditto on the Caspian Sea	201
Total	5720

It may be mentioned, that there is little difference between the commercial returns of 1834 and those of 1835. Still, taking a series of years, Russia will be found to be steadily and widely extending her commercial relations. The receipts of the custom-house in 1835 amounted to 46,763,444 roubles, and in 1836 to 48,968,790 roubles, or L.2,142,384, which is an increase of 2,205,346 roubles in one year. By far the most important of the commercial relations of Russia are those which she has with Great Britain. The interests of the two greatest empires in the world are thus pretty closely united; and there appears to us to be little cause for dreading aggressive hostility on the part of a power which draws half its custom-house revenue from British imports, and sends to Britain one half of all the raw produce which it can raise for exportation. After all, the commerce of Russia is not one third of that of France, and not one seventh of that of Great Britain.

Di rent ra or cla s. N es.

The nobles in Russia, though distinguished by the several titles of prince, count, or baron, are all upon an equal footing, and enjoy equal privileges. Their persons and lands are freed from taxation; they are exempted from the recruiting ballot; and they are not subject to bodily penalties. These exemptions are, however, more apparent than real; for though their lands and persons are not taxable, yet a capitation tax, at the will of the government, may be imposed on their slaves, who form the most valuable part of their possessions. Though not in person compelled to serve in the army, yet they are bound to furnish from their slaves a number of recruits, in proportion to the demands of the service. In some of the more recently-acquired provinces, such as Livonia, Esthonia, and in Poland, the nobles have, or rather exercise, other privileges, extending even to the power of life and death, over their vassals; but these powers arise from custom and general acquiescence much more than from the existing law. The classes of the nobility are very numerous, being fourteen in all; but, singularly enough, some of them have no members. Thus, of the eleventh and thirteenth none are alive. Although titles are hereditary, there is no rank except what the emperor confers. Most of the public employments are filled by the nobles; but no one whatever is eligible to such appointments unless he belongs to one of the fourteen classes of rank into which the civil and military services, and the clergy, are correspondingly arranged. A fixed term of service, and a prescribed form of examination, are undergone previously to acquiring rank. The right of conferring nobility rests with the emperor, and, as with us, it is hereditary.

Cl y.

The clergy are exempt from taxation, and from corporal punishment; which privileges are extended to each eldest son, who must, however, though his father is excused, take the risk of being called upon for military service.

Ci ens.

The citizens form the second grand division of the Russian nation. Every inhabitant of a town, who is neither noble, nor the property of another, is a citizen. The notables constitute the highest class amongst them, and possess privileges similar to those of the nobles. Next to these come the merchants of the three guilds. The first or highest guild corresponds with the eighth class of rank, and enjoys most of the immunities of the notables. In fact, whoever has belonged ten years to the first guild, or twenty to the second, without incurring any visitation of the law, becomes a notable. For an account of the merchants of these guilds, see the article Petersburg.

Peasants.

The next class is that of the peasants, or free inhabitants of the country. In this rank are included, first, the ancient race of proprietors, who cultivate their own lands, but do not enjoy the right of possessing slaves; second, the Tartars, the Baschkirs, and several other races, less numerous, to the south of Siberia, who are all proprietors of the lands they cultivate; and, third, the peasants of Finland. Since the acquisition of New Finland, the privileges enjoyed by the peasants of that country under the Swedish government have been continued and confirmed to them, and the same rights granted to those of Old Finland, where all are now either proprietors or renters. There is a considerable number of rent peasants, who, by paying an annual sum to their proprietors, purchase the right of carrying on trade or business on their own account. Some of these have been known to amass considerable property; but they still remain slaves. In the fourth are included the colonists, consisting of foreign families of agriculturists, who are proprietors of the lands they cultivate, and whose number is about 65,000. The fifth embraces the military colonists. These are soldiers, who, after having served a prescribed period, have had land given to them, and a capital sufficient to cultivate it, in the southern provinces. And, lastly, the free cultivators, who enjoy immunity from taxes, on condition of keeping post-horses for the public service, which they furnish at a charge regulated by government.

Serfs.

The class next below these is that of the serfs. They are chiefly peasants on the crown-lands, or of the province of Livonia. The first of these, the crown-peasants, amount to about 12,000,000, some of whom labour in the fields, and the others in the mines and manufactories. The lot of this class seems to be placed on the confines between liberty and slavery. They may rise to the rank of citizens, they may acquire property, they may enjoy the protection of the laws, and, under some restrictions, may quit their residences to obtain employment for a limited time; but they are liable to be hired to the service of the mines, or to be sold. The peasants of Livonia, amounting to about 560,000, were slaves until the year 1804, when they first obtained the rights of serfs. They are now subject to some peculiar claims; but those claims are fixed, and they cannot be removed from the soil without their own consent.

Slaves.

The last and most numerous class is that of the slaves. These amounted in 1782 to 6,678,000 males, and at present are estimated to include 23,000,000 persons. They are in law considered as *things*, not as persons; they are attached to the soil, and incapable of possessing any property in land; they may be bought, sold, or exchanged, with little more restrictions than are enacted in dealing for cattle; and they have no other protection against their masters than what is created by a regard to their pecuniary interest. They belong to the nobles, or to such civil or military officers as have acquired the right of possessing them. They are divided into agricultural, mining, manufacturing, or domestic slaves, and have their condition only improved when drawn for military service.

"A Russian proprietor," says a recent traveller, "reckons the value of his property, not by the annual income of his estate, but by the number of souls, that is, of male peasants upon it. An estate is said to be worth so many souls instead of so many roubles per annum. The footing on which the agricultural serf practically stands towards his master, is in most respects that of a small tenant; the principal difference being, that he cannot change his employment or

Statistics.

Employment of the population.

move from home without his master's leave, which is sometimes obtained for a certain annual sum, called *obrok*, in lieu of service. As a general rule, he has a house and a portion of land, for which he pays rent in labour instead of money. He works three days in the week for his master, and has the remainder of his time at his own disposal. A day's labour of a man includes that of his wife and his horse when requisite. These peasants, who are for the most part in a state of the grossest ignorance, are perfect predestinarians, or fatalists; and this doctrine serves as an excuse on all occasions for their habitual improvidence and want of forethought. Yet, though ignorant, superstitious, and a slave, the serf seems in general happy and contented, and bears about him no signs of oppression; his desires are few and easily satisfied; though his fare is coarse and poor, he seldom suffers from cold or hunger, and he is naturally gay, good-humoured, and light-hearted." The situation of domestic servants is much worse than that of the peasant, whose great dread is the conscription, and a serious evil it is when it visits him. The peasant cannot legally be sold or transferred from one master to another, excepting with the whole of his family; but this law is often broken or evaded. "There are few landed proprietors who do not carry on a manufactory of some kind or other. The riches of the Russian gentleman lie in the labour of his serfs, which it is his study to turn to good account; and he is the more urged to this, since the law which compels the peasant to work for him, requires him to maintain the peasant; if the latter is found begging, the former is liable to a fine. He is therefore a master who must always keep a certain number of workmen, whether they are useful to him or not; and as every kind of agricultural and out-doors employment is at a stand during the winter, he naturally turns to the establishment of a manufactory as a means of employing his peasants, and as a source of profit to himself. In some cases the manufactory is at work only during the winter, and the people are employed in the summer in agriculture. The alternate employment of the same man in the field and in the factory, which would be attempted in most countries with little success, is here rendered practicable and easy by the versatile genius of the Russian peasant, one of whose leading national characteristics is a general capability of turning his hand to any kind of work which he may be required to undertake." Not only are the Russian nobles manufacturers, but they carry on the business in every branch; and from the privileges which they enjoy, they have great advantages over the other classes who are not allowed to possess serfs. In almost every house some art is carried on, useful or ornamental; and women are employed in spinning, weaving, knitting, carpet-making, and the like. Mr Bremner informs us that seven shillings and sixpence a week is the general pay of a labourer in the field, and that the best hands in the manufactories can only earn nine shillings and sixpence a week. Hence no people in Europe are so plainly or coarsely fed as the Russians. Their daily fare consists of pickled cucumbers, cabbages, and mushrooms, with a piece of black bread. Fish and butcher-meat are great rarities amongst the poor; they live upon the wretched articles which we have specified.

Religion.

The established religion of Russia is that of the Greek Church, to which the great bulk of the population belongs, although all others are tolerated, no civil or political disabilities attaching to those who profess other creeds. In regard to the doctrines of this church, it may be briefly stated, that they differ in several essential particulars from those of the Roman Catholics, although there is a general accordance. The first of these particulars is, that it holds the necessity of complete submersion of the whole body at baptism; the second, that whilst it admits the doctrine of transubstantiation in regard to the eucharist, it affirms that the bread must be leavened and the wine mixed with water, and they allow both elements to be distributed to every communicant, even to children before they have any correct idea of sin; and a third important distinction relates to the marriage of the clergy, all secular or parish priests being bound to marry. The Greek Church further differs from the Roman Catholic by rejecting purgatory, predestination, works of supererogation, indulgences, and dispensations. Catechising and preaching are scarcely practised; and mass forms the chief part of the public worship. No instrumental music is allowed, but vocal music is much cultivated. Fast days are numerous, and they are kept with great strictness. In addition to the Wednesday and Friday of every week, there are four principal fasts in the year, and several festivals which are celebrated with eastern pomp and splendour. This church rejects all round or solid images of the Saviour, or of saints, as idolatrous; but pictures, mosaics, bas-reliefs, in short, whatever is represented on a flat surface, they do not consider as violations of the law which says, "Thou shalt not make unto thee any graven image." The state of religion amongst the lower orders is in general deplorable. The most important parts of public worship are, first, to pronounce distinctly and fluently the two words *Gospodi pomilui*, which mean, "God be merciful;" secondly, to make the sign of the cross on the breast a countless number of times; and, thirdly, to bow the head to the ground repeatedly. The common people have a firm belief in good and bad angels. Evil spirits are the tempters and betrayers of men, and they believe that the sign of the cross, which they are very fond of making, will not only drive them away, but avert every kind of misfortune. There are comparatively few sectarians in Russia. The following is as near an approximation as can be arrived at, of the religious diversities of the Russian empire.

Members of the Russo-Greek Church	45,000,000
Dissenters from the church, called *Razkolniks*, or Heretics	350,000
Roman Catholics, including the united Greeks and the united Armenians	3,500,000
Armenians not united	250,000
Members of the Confession of Augsburg (Protestants	2,000,000
Members of the Reformed Church	54,000
Moravians 10,000, and Mennonites 6000	16,000
Mahommedans	2,500,000
Jews	600,000
Worshippers of the Grand Lama	300,000
Indians, devotees of Fetichism	600,000
Idolaters	170,000

Greek Church.

The whole spirituality of the Greek Church is divided into priests belonging to some religious order, and secular priests. For the management of church affairs there are at present thirty-six eparchies of three different classes, only four being of the highest class, those of St Petersburg, Moscow, Novgorod, and Kief. There are nine metropolitans, thirteen archbishops, and twenty-nine bishops. All aspiring to these dignities must be members of some monastery, and unmarried. By a statement published a short time since, the number of monasteries throughout the empire would appear to be 350, with 5330 monks. There are ninety-eight nunneries, containing 4162 nuns; all of them belong to the strict order of St Basil. There are 483 cathedrals, and 28,200 parish churches (of which 853 are situated in Bessarabia), with 218,418 ecclesiastics of the orthodox Greek ritual, and 7311 ecclesiastics of the united Greek ritual. The Russian clergy may be divided into three classes; those who are in full orders, including "protopapi," or inferior priests, and "papi," or common priests; those who are only in what may be called half orders, such as deacons and readers, who are not allowed to administer the sacrament; and those who have received no ordination

St stics. at all, such as choristers and sacristans, who, strictly speaking, do not belong to the clerical order, but merely discharge the duties of attendants.

It has been justly remarked, that the members of the religious fraternities are here of more importance, compared with the other clergy, than in the west of Europe, since from them alone are the highest functionaries of the church selected. They are divided into ecclesiastical functionaries of the highest class, such as metropolitans, archbishops, and bishops; heads of religious bodies, such as archimandrites (abbots), and igumen (priors); and monks. Whoever aims at the honour of being a bishop, &c. must of necessity become a monk. On account of their higher learning and more correct life, the monks are held in much greater estimation than the secular clergy. They live a life of abstinence and strict self-denial. Many of them are men of profound learning and undoubted piety; but it is to be feared that the greater bulk of the lower orders of ecclesiastics are among the most degraded that ever assumed the priestly habit in Europe. Many of them are as ignorant as the boors with whom they associate, drinking, playing, and going to market with them like unsophisticated serfs. The general state of morals in the Greek Church, compared with those of Protestants in Russia, may be inferred from the tables of births in St Petersburg, published by the holy synod. From these it appears, that out of 8663 births, the number which took place in the year 1834, in families of the Greek Church not fewer than 1589 were illegitimate; whilst in the Protestant congregations, of 1031 infants who were baptized, only seventy-six were illegitimate.[1]

Ca olic Ch ch.

The Catholic Church comprehends eighteen different orders, who possess 113 cloisters, in which there are 2200 monks. They support sixteen circuit and thirty-one parochial schools, at which 3012 scholars receive instruction. There are 666 nuns, belonging to ten different orders, and inhabiting fifty-two nunneries. They support thirty-three female schools, fifteen hospitals for the sick, and twelve poorhouses for the aged and infirm. These educational and benevolent institutions are attached to the cloisters. The Catholic secular priesthood, comprising about two thousand individuals, superintend a number of such establishments. There are in all thirteen seminaries of a higher order, 201 parochial schools, with 7688 pupils, and 566 poor-houses, with 4449 inmates. This enumeration is exclusive of Poland, in which, in 1830, there were 1917 clergymen, 309 chapels of ease, 2369 secular priests, 156 monasteries with 1783 monks, and twenty-nine nunneries with 354 nuns. At the head of the clergy were one archbishop, eight bishops, with a chapter of 276 dignitaries, canons, and the like. The collective number of Catholic ecclesiastics in Russia and Poland is estimated at 10,772.

Pro st- ant and Lu erans.

The Protestants, consisting of Lutherans and some other sects, are divided into two synods and eight consistories, to which belong 865 places of devotion. Each of the consistories has a bishop as its president. The Razkolniks or Apostates, that is, dissenters from the Greek Church, do not compose a distinct ecclesiastical body, but exist in separate congregations, independently of one another, and each having some distinctive shade of difference from all the rest. They have a consecrated clergy, but of course no common synod or consistory. Another sect, called the Duchoborzy, differing still more widely from the Greek Church than the former, have taken refuge in the steppes beyond the Don, where they still profess their creed, but without the aid of either churches or a priesthood.

Statistics.

Mahommedans.

The Mahommedans have 4785 mosques in Russia, of which 2466 are head mosques. They have colleges, mullahs, and muftis, who regulate the religious affairs of the sect.

Worshippers of the Grand Lama.

The worshippers of the Grand Lama have their principal religious establishment at Darsan, in the province of Udinsk. They have a numerous priesthood, who are said to be very successful in making converts amongst the wandering tribes.

Bible societies.

The principal institution for the dissemination of the Holy Scriptures amongst the various tribes of the empire, in their native languages, is established at St Petersburg, and is in connection with the British and Foreign Bible Society of London. It consists of fifty-eight sections and 289 auxiliary societies, situated in Moscow, Jaroslav, Dorpat, Mittau, Revel, Riga, Orenburg, Tobolsk, Irkutsk, and other places. From the period of its institution in 1813 until June 1823, it had issued 184,851 complete Bibles, 315,928 New Testaments, and 204,052 Old Testaments, in forty-one different languages and dialects. Its further usefulness was greatly promoted by an arrangement made in 1826, by which the sale of Bibles was for the future permitted. There is always a large supply of Bibles at Moscow, where those condemned to exile in Siberia may have a copy, if they desire one, as they pass through this city on their way to their place of banishment. It is well known that all the exiles, in whatever part of the country they may have received sentence, must take Moscow in their route to Siberia.

Education.

As early as the eleventh century, public schools were founded at several places in Russia; but Peter the Great, to whom Russia is indebted for her civilization and present standing, was the first to plan a regular system of public education. Elementary schools were established throughout the country; a naval and engineering school at St Petersburg; mathematical and navigation schools at Moscow and other places; ecclesiastical schools in the bishoprics; and Latin and Greek schools were also founded in different towns of the empire. Shortly after the demise of Peter, the St Petersburg Academy of Sciences was opened; but the military schools were those which throve best under the Empresses Anne and Elizabeth.[2] This last sovereign, however, founded in 1755 an university at Moscow, and two years afterwards an academy of the fine arts at St Petersburg. Inferior public schools were not regularly organized until the year 1786, under the reign of the Empress Catherine II. Boarding schools were established by her authority in all the different governments of the empire. But a more important measure was the institution of a central authority, intrusted with the care of disseminating education. This organization underwent a complete reform under the Emperor Alexander, who substituted, for the special commission of the former reign, a minister of public instruction with more extensive powers. This sovereign re-organized the university of Wilna, and founded those of Dorpat, St Petersburg, Kazan, and Kharkov. He also established a gymnasium in the capital of every government, and district schools in every district. But on the accession of Nicholas the system underwent a total change. A few immaterial forms were preserved, but the spirit had departed. His object was to render the system of instruction religious, monarchical, and national; but as the two first terms are evidently auxiliaries of the last, we must fuse the whole into two words, *strictly national*, a term of profound import, as we shall presently see. Until the year 1835, all the civil schools of the empire throughout the se-

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[1] Bremner's Excursions in the Interior of Russia, vol. ii. p. 133.

[2] *Précis du Système, des Progrès, et de l'Etat de l'Instruction Publique en Russie, rédigé d'après des documents officiels.* Par Alexandre de Krusenstern, Chambellan de S. M. l'Empereur de Russie. Warsaw, 1837, in 8vo.

Statistics.

veral circuits were dependent, in relation to superintendence and administration, upon the universities situated in each of these circuits. By the ukase of the 25th of June 1835, they are placed under the ministry of public instruction, represented in the different circuits by sub-delegates called curators, by which education is placed under the direct and immediate control of government. The different branches of the administration also take special cognizance of the schools analogous to them. Thus, the military schools are presided over by the war-office, the ecclesiastical schools by the holy synod, and so on of the others. The whole system is divided into four distinct parts: I. The ministry of public instruction; II. Military schools: III. Ecclesiastical schools: and, IV. Special and other schools.

I. *Ministry of Public Instruction.* This department comprehends, 1. Education in public schools; 2. Education in private institutions; 3. Domestic education; 4. Establishments destined for forming professors and masters; 5. The Academy of Sciences, the Russian Academy, the other learned societies, the censorship, public libraries, museums, and collections of every description. The public schools are thus discriminated into, 1. Parish schools, intended for the lower orders, and allowed to teach only the catechism, reading, writing, and the first four rules of arithmetic; 2. District schools, having three classes intended for the children of shopkeepers, and restricted in their course of instruction to the catechism, caligraphy, drawing, the first rudiments of grammar, arithmetic, geometry, geography, and history; 3. Gymnasiums distributed by government, divided into seven classes, authorized to embrace more elevated studies, but only accessible to the children of the nobility; 4. Universities of three faculties, those of philosophy, of jurisprudence, and of medicine (the university of Dorpat has a fourth, the faculty of theology), and of which the courses last five years. The following is a table of the state of the schools in 1835 throughout the ten circuits of the Russian empire, exclusive of Poland, which has a separate administration. It may be mentioned, that another university has recently been established at Vladimir, in Volhynia; so that, including the university of Warsaw, there will be nine institutions of this description throughout the Russian empire.

	Number of			
	Universities.	Gymnasiums.	Infant Schools.	Pupils.
1. Circuit of St Petersburg...	1	8	571	11,911
2. ... Moscow..........	1	10	914	16,259
3. ... Kharkov..........	1	7	209	11,446
4. ... Kazan............	1	10	187	8,459
5. ... Dorpat...........	1	4	248	8,826
6. ... White Russia...	1	13	239	11,530
7. ... Kief..............	1	7	82	6,790
8. ... Odessa...........	0	5	59	4,647
9. ... Caucasus.........	0	1	15	1,285
10. ... Siberia...........	0	2	39	2,043
Total.........	7	67	2563	83,196

According to an official report lately issued by the minister of public instruction, the number of pupils amounted in 1837 to 95,560. The progress which the universities have made, and also their present condition, will be seen from the following table.

	1808.		1824.		1835.		Libraries. Vols. MSS.	Zoology. Specimens.	Medals.	Botany. Specimens.	Mineralogy. Specimens.
	Professors and Masters.	Pupils.	Professors and Masters.	Pupils.	Professors and Masters.	Pupils.					
St Petersburg.........	...	...	38	51	64	285	21,854	9,100	293	6,000	7,837
Moscow.................	49	135	59	820	120	419	50,712	33,266	6,289	17,627	3,800
Kharkov	27	82	43	337	56	342	31,435	6,462	19,957	11,510	...
Kazan	15	40	34	118	89	252	29,874	4,306	8,843	1,776	14,139
Dorpat	37	193	39	365	68	567	60,473	2,949	...	12,594	11,590
Kief........................	...	...	...	...	61	120	44,474	14,790	19,760	5,329	19,288
Total..............	128	450	213	1691	458	1985					

The number of schools under the minister of public instruction has likewise increased; and, viewing the general table of the march of education in Russia, there appears to be a progressive increase of the number of pupils. But, examined in detail, some parts of the empire exhibit a striking falling off. This is especially the case in some of the provinces formerly Polish, where schools were suppressed as a measure of policy.

The minister of public instruction has another important duty besides those mentioned. He exercises a jealous scrutiny of education in private and in boarding schools, as well as domestic education; no one being permitted to follow the profession of a teacher unless he has at least undergone an examination at one of the universities. Private institutions of instruction are usually conducted by foreigners, who, lest they should propagate forbidden truths, are placed under the inspection of the local authorities, and cannot make use of any books but those appointed by government. Other means are taken to shackle these private schools, and deter foreigners from settling in Russia as teachers of the people. But private or domestic tuition even by natives is discouraged. No father has the power of selecting the instructors of his children at his own pleasure; he must take them from amongst the individuals licensed by government, or furnished with an authority which gives them the character of public functionaries. No Russian subject is permitted to be educated in a foreign country under eighteen years of age; and even after that age it is the emperor alone who can grant the necessary permission. In 1829 there was founded at St Petersburg what is called an Upper Teacher's Institution, a sort of normal school, its object being the preparation of tutors for the gymnasia and lyceums of the empire. It stands next in order after the universities, and the number of pupils in 1835 was 146.

Military schools.

II. *Military Schools.* These institutions especially engage the solicitude of government; they multiply with amazing rapidity, and absorb far too much of the funds allotted to national education. The numerous establishments of this class have been arranged under the categories of, 1. Schools placed under the direction of his Imperial Highness the Grand Duke Michael; 2. Schools under the direction of the navy board; and, 3. Military schools, especially reserved for soldiers' children, and which are under the control of the minister of war. The first are pretty widely distributed throughout the empire; the second class, designated navy, battalion of pilots, and instruction for workmen, are established only at St Petersburg, Cronstadt, Nicolaief, and Sebastopol; and the third are planted in the military colonies. Their actual condition in 1835 was,

	Pupils.	Annual Budget. Roubles.
Schools under the first head...	8,733	6,255,000
Ditto under the second do.....	2,224	632,194
Ditto under the third do......	169,024	1,800,000
Total........	179,981	8,687,194

Of these, 179,500 are supported by government.

III. *Ecclesiastical Schools.* There are numerous establishments of this nature in Russia, which, as relates to their management, are divided into two heads. The first comprehends the schools of the Greek Church, under the control of the holy synod, and directed by a special commission; the second, the ecclesiastical schools belonging to other forms of worship, which schools are under the superintendence of the minister of the interior. All these schools are divided into three circuits or departments, viz. those of St Petersburg, Moscow, and Kief. Each district has a superior school, called the ecclesiastical academy; with a certain number of intermediary schools or seminaries, for the most part established in the chief provincial towns, and of inferior schools, divided into district and parochial ones. These establishments are exclusively reserved for the children of the clergy, an arrangement exactly of a piece with the system practised in the common schools. In 1835 the ecclesiastical institutions stood thus:—

	Schools.	Pupils.
Greek Church...........................	384	58,586
United or pure Greek Church.......	23	1,274
Roman Catholic Church..............	275	7,073
Catholic Armenian Church	5	137
Gregorian Armenian Church.........	14	319
Total................	701	67,389

Of this number of pupils, 41,586 pay their own expenses, 10,517 receive pecuniary aid from government, and 15,408 are educated wholly at the expense of the state.

IV. *Various Schools.* The numerous establishments which are comprehended under this head are classified according to the different ministers, or members of the imperial family, who especially superintend them. 1. Under the minister of finance. These consist of mining schools, distributed into inferior, middle, and superior seminaries, where the art of mining is taught. They are situated at St Petersburg, and in the principal manufacturing and mining districts. They are organized on the same vicious principle as the others, being confined to the children of miners, as if talents for particular arts were hereditary in families. The total number of pupils in the mining schools is 4613, who are allowed for their support by government 647,911 roubles annually. Private individuals support similar establishments, at which there may be a thousand pupils more. There are ten other various kinds of schools under the minister of finance. The Practical Institution of Technology was founded in 1828, and intended to form master manufacturers. Two mercantile-marine schools, for forming pilots, were both established in 1829 at St Petersburg and Kherson. There are, besides, the Forest Institute, the Academy of Commerce at Moscow, the Agricultural School at Gorygoretsk, schools of land-surveying and design at Tchernigov, and two schools for forest sciences, all as yet in their infancy. They are attended by 608 pupils, which, added to those attending the mine-schools, makes the number of pupils in the schools of this class amount to 6221. The annual budget is 1,032,191 roubles. 2. Schools under the minister of the interior. These are schools of medicine, surgery, and pharmacy, all independent of the university faculties; rural schools for the cultivation of the vine, and for agriculture in general; schools for the sons of persons employed in subaltern situations in public offices, who are supported by the state on condition of serving it eight years; and schools for orphans and poor children. The establishments under the minister of the interior contain 13,340 pupils, of whom 10,500 are in the hospitals. 3. Under the minister of the emperor's household are the Moscow Academy of the Fine Arts, Moscow School of Architecture, the Theatrical School of St Petersburg, and the Court School of Singers.[1] These contain in all only about 345 pupils. 4. The minister of appanages has under him some schools of agriculture, and primary schools for the peasants, but containing only 1070 pupils. 5. Under the general direction of roads and communications is a school of civil engineers and conductors, containing 665 pupils. 6. Under the minister of justice are a school of jurisprudence, and another of land-surveying, to train youth for the exclusive service of government. These two establishments contain 350 pupils. 7. Under the foreign office is an oriental institution for qualifying individuals to act as diplomatic interpreters in the Asiatic tongues. 8. Institutions under the reigning empress, comprehending the foundling hospitals of Moscow and St Petersburg, the boarding-schools for young ladies at St Petersburg, Moscow, and Odessa, which contain 52,912 pupils. The empress has further under her control several patriotic establishments, mostly appropriated to the education of children of indigent or invalid officers. In all they contain 1122 pupils. There are also a number of benevolent institutions, such as houses of industry, establishments for the deaf and dumb, the blind, and others. 9. The Archduchess Helena superintends a number of educational institutions, established in different provincial towns, and managed by the local authorities. 10. There remain to be added to the above a number of schools which are supported without any assistance from government. All the foregoing derive considerable pecuniary aid from that source. There are four German schools at St Petersburg, and 750 in the German colonies, having in all 35,746. In the same provinces are 561 Tartar schools, with 14,000 pupils; and there are two Jewish schools, with 500 pupils. At Orusk, Cossack and Asiatic schools have been instituted. The latter are intended to supply interpreters to all the frontier line of Siberia.

The following is M. de Krusenstern's estimate of the establishments of education throughout the Russian empire:

	Pupils.	Money supplied by Government. Roubles.
The ministry of public instruction	85,707	7,450,000
Military schools......................	179,981	8,687,194
Ecclesiastical schools...............	67,024	3,000,000
Divers schools.........................	127,864	9,596,947
Total......	460,576	28,734,141

This upon a population of 48,000,000, exclusively of the Asiatic population, gives about one pupil for every 104 of the inhabitants. He estimates the number of children receiving a home education at 597,424 individuals, which would give to Russia one pupil enjoying education for every fifty of the inhabitants. According to M. Ouvaroff's last report, this proportion had in 1837 become one in forty-five. The data upon which both the minister and Krusenstern make their calculations are very problematical. We greatly doubt if the proportion is so high as it is here given. Mr Bremner states[1] that "popular education is advancing but slowly; for in many of the governments of the interior, out of every four or five hundred of the population, there is not more than *one* young person attending school. The educational schemes of the government have hitherto been unsuccessful in the provinces, because the people, being ignorant of the value of instruction, seldom think of sending their children to school. In the large cities, however, public seminaries are most successfully conducted and numerously attended." With regard to the provinces, considering the character both of the country and of the peasantry, we think that there may be some truth in Mr Bremner's statement; but it cannot be of very extensive application, the discrepancy being so great between it and those of the individuals mentioned.

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[1] Travellers have remarked, that the Russians possess a singular aptitude for music; and Reicha, a very eminent musician, particularly notices the admirable accuracy with which the vocal music is performed in the churches, without the aid of any instrumental accompaniment. But in Russia the music of the church, the theatre, the concert-room, and the chamber, has been chiefly indebted for its progress to Italian and German musicians, though the native music and musical instruments of Russia are sufficiently interesting to deserve much more consideration than has hitherto been bestowed upon them. The occurrence of popular airs in Finland in the unusual measure of $\frac{5}{4}$ is vouched by continental writers. In the interior of Russia, there appear to be many native airs of an uncommon character in respect of melody and tonality. The celebrated Russian horn-music, though very remarkable in its kind,

Science and learned societies.

Independently of the institutions occupied directly in the education of youth, Russia has further her academies of science, her learned societies, her public libraries, and her museums. The number of scientific establishments in St Petersburg is very great; and the merits of the Imperial Academy of Sciences, in relation to its mathematical, astronomical, mineralogical, and geographical labours, are incontestable. The universities of Moscow and Dorpat are also highly celebrated. The institution last named would appear to be the most prosperous of all the universities in Russia, many of its professors, such as Struve the astronomer, Parrot the traveller, and others, being men of great eminence in the scientific world. Of the Russian libraries, that of St Petersburg is the richest and most considerable, containing 413,000 volumes. After it rank the Hermitage Library, consisting of 100,000 volumes; the library of the Academy of Sciences, 90,000 volumes; and those belonging to the universities of Dorpat, Moscow, Kief, Kazan, Kharkov, and St Petersburg, each being highly respectable, as will be seen from a table already given. In 1837, the total amount of books in the public libraries of Russia amounted to 858,635 volumes. It ought to be mentioned, however, that about two thirds of the scientific and literary treasure of Russia have been plundered from unhappy Poland. The number of literary and scientific institutions throughout the empire, including several purely philanthropic associations, may be estimated at fifty, of which twenty belong to St Petersburg alone.

Poor-laws.

In Russia proper, the owners of estates are under obligations to provide their peasantry with the means of support, and in times of distress to relieve them. On the estates belonging to the crown, a methodical system of parochial relief is established, each parish being compelled to supply its destitute poor, in poor-houses, with fuel, food, and clothing. In Courland, Esthonia, and Livonia, a similar compulsory system is established, the landowners and farmers contributing in proportion to their occupations or rental, and the overseers being elected by the rate-payers. Public begging is forbidden, and vagrants set to work by the overseers. Even in Siberia the authorities are under legal obligation to prevent any individual of the people committed to their charge from suffering want, or remaining without assistance when in distress. In the Russo-Polish provinces a similar system prevails as in Russia proper.

Literature and the press.

The productions of the Russian press are no index to the national cultivation. Amongst the great body of the people there is little or no taste for literature. It is only amongst the higher classes that any thing like a reading public is to be found; so that it may well be believed native authors, or translators of foreign literature, have little encouragement held out to them, at least of a public nature. It redounds, however, to the credit of the late sovereigns of Russia, and the more wealthy of the nobles, that they have done much to foster Russian literature, by the munificent favours which they have bestowed on native writers. But that ready market, a large and intelligent reading community, is alone calculated to draw forth to any great extent the talents and the genius of native writers, and to promote the interests of literature. Thus, although many eminent men have appeared in Russia as authors, such as Lomonoscoff, Muravieff, Karamzin, Pouschkin (a celebrated poet, who perished in a duel in the flower of his age, February 1837), and some others, its literature is yet in an infant or imitative state. The greater number of the books that are published are translations from the German and French, and their circulation is limited. Karamzin's History of Russia, the most popular work ever published in that country, and said to be the one most widely circulated, sold only to the extent of 1500 copies in two editions. In the Russian empire are published eighty papers and minor periodicals, and about twelve scientific and literary journals. Of course, nothing like the liberty of the press is known in Russia. Indeed there cannot be said to exist a press at all in the common acceptation of the term, as the newspapers are published by the government, and no periodical literature of a political character exists in the Russian language. In 1837, the printing establishments in the empire were 171, of which ninety-four were maintained by government, and seventy-seven by private persons. There were seventy-four lithographic establishments, nine of which were supported by government. A strict censorship of the press has been instituted, and its jealous vigilance is particularly directed to English newspapers, all but the *Morning Post* being absolutely prohibited from entering the capital. The censorships of the press are conducted according to the precepts of a new regulation, which is due to the solicitude of the Emperor Nicholas, and was issued in 1828. In university towns it is intrusted to committees, and everywhere else committed to censors appointed *ad hoc*. The censorship of works relating to religion rests with the ecclesiastical authorities. Every book hostile to the creed of the Greek church, to monarchical or autocratical authority, to decency, to morality, to the honour of individuals, is prohibited. The first duty of the censors in examining a book, is "to consider what is the object that the author has proposed to himself." These rules apply alike to national and to foreign works. Literary property is a vested interest during the life of the author, and for twenty-five years after his death. Literary piracy is punished by a fine equivalent to double the cost of an edition of twelve hundred copies. In 1835, seven hundred and eight works were printed in Russia, and three thousand foreign volumes were imported. Mr Bremner informs us, that in spite of all restrictions, "Russian literature is advancing with great rapidity."

Russian language.

Under this head two languages are to be distinguished: 1. The Russian language, originally the dialect of the Sclavi,

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must be considered as of foreign introduction, and as the result of great musical aptitude, and of most careful and laborious training. About the middle of the eighteenth century, J. A. Maresch, a Bohemian, and a very skilful horn-player, who was settled at St Petersburg, invented there the famous Russian horn-music. For a brief account of it, see the Appendix to Graham's Essay on Musical Composition; and for minute details regarding the notation and the mode of performance of this kind of music, consult J. C. Heinrich's work, *Entstehung, Fortgang und jetzige Beschaffenheit der Russischen Jagdmusik*, published at St Petersburg in 1796.

[1] Excursions in the Interior of Russia, in two vols. 8vo, 1839.

who founded the empire. It underwent various changes along with the empire itself, the Scandinavian, Mongolian, Tartar, and German, also the Polish and French languages, being all by degrees incorporated with it to a greater or less extent. This improvement is continually advancing by means of the national literature. 2. The Sclavonian language, or that of the Sclavonian Bible. It was fixed by the translation of the Holy Scriptures, and so settled that it has since experienced but few alterations. From the combination of these two a mixed language arose, which was used in sermons, rhetorical prose, and the higher species of poetry. The following extract presents a concise view of the way in which the Russian language began to assume its present form. "From the thirteenth to the fourteenth century," says the celebrated Karamsin, "our language generally became more pure and more correct. Our scrupulous authors gave up the use of the Russian language, as yet too rude, in order to attach themselves more strongly to that which had been employed in composing the books of our church, namely, the ancient Servian, in which our Bible is written. They followed its rules, not only in the declensions and conjugations, but even in the pronunciation and orthography; nevertheless, as may be seen in Nestor, the force of habit made them often recur to their natural idioms, a circumstance which has introduced into our literature a mixture consecrated by antiquity, and so deeply rooted amongst us, that often in the same book, and in the same page, we write *zláto* and *zoloto* (gold), *glad* and *golod* (hunger), *mladost* and *molodost* (youth). The time had not yet arrived for giving to the Russian language that energy, that flexibility, that grace and delicacy, which in the days of peace and prosperity are coupled with the rapid progress of the intellectual faculties, with richness of ideas, and variety of knowledge, as well as with the formation of taste and the sense of the beautiful. We see, however, that our ancestors endeavoured to express their thoughts with more distinctness; that they sought to soften the still too rude sound of words, and to give less stiffness to their style. In short, putting aside all national pride, we may say that though, compared with other Europeans, the Russians might appear very ignorant, they were nevertheless far from having lost all the fruits of civilization; they proved how much force it has to resist the rudest assaults of barbarism."[1] The study of the Russian language is extremely difficult; and from the fact of its not yet being in a state which would entitle it to be called fixed, it is an arduous study, even for the natives.

Cha cter of t Russian

The accounts of the Russian character in the works of those who have resided or travelled in the country, are extremely conflicting. He who impartially weighs the evidence of Coxe, Tooke, Clarke, Porter, Wilson, Cochrane, Holman, Londonderry, Bremner, and others, will arrive at the conclusion, which might have been suspected before the investigation began, that whilst there are not a few dark stains on the national character, many of them are attributable to the peculiar political system under which the people live, to their general ignorance hitherto, and to the low character and unclerical behaviour of the secular clergy; and that under a proper system of government, instruction, and religious discipline, the Russians would not be far behind some of their continental neighbours who hold a much higher place in the scale of civilization and morals. The opinion which generally prevails in this country regarding the Russians as a people does them injustice. If, as Dr Lyall asserts, they are "insinuating and cunning, deceitful and perfidious, sensual and immoral," it must not be forgotten, that any natural tendency to these vices not only remains unchecked by proper secular and religious instruction, but is fostered, as in a hot-bed, by a state of slavery, or semi-vassalage, which is little better. Amongst all the nations of Europe, in Russia alone is one half of the population a marketable commodity, or something not very far removed from it. But we question much if the natural bias to the crimes and vices mentioned by Dr Lyall and others be very strong. From circumstances, however, they have received a powerful development; and from the statements of more recent travellers, it would seem that they are gradually becoming less conspicuous. They are fond of novelties, amusements, and gambling, particularly of card-playing. They are extremely partial to singing, and their talents for imitation and the acquisition of languages are universally allowed to be remarkable. With regard to the former, Dr Clarke observes, "their surprising powers of imitation exceed all that has been hitherto known."

The foregoing observations apply to the bulk of the community. With regard to the Russian nobles, it may be briefly stated, that the style of living of the wealthy greatly resembles that of the higher ranks in other parts of Europe. With the exception of a few traits of a national cast, there is little distinction between the majority of the Russian nobility and those who move in the polite circles in Paris or in London. French and German are spoken with as much facility as the Russian language. French is the court language, and in spite of the invasion of 1812, and the loss of Moscow, the manners and literature of France are held in universal esteem. The wealthy nobles expend enormous sums on their entertainments, and many a goodly estate is mortgaged to gratify this passion for display.

Dress, &c.

The national dress of Russia consists of a long coat reaching to the calves of the legs, with numerous tucks at the bottom of the waist; a waistcoat of coloured linen, having the neck bare; and thin boots and shoes of the bark of the linden tree. In winter a sheep-skin pelisse is substituted for the coat. The dress of the higher ranks is now formed studiously on the European model, though no other part of Europe can rival the gorgeous robes worn by the nobles and bishops on public occasions, or the profusion of diamonds which emblazon their persons. The national amusements are chiefly those afforded by the ice. A favourite diversion is the ice-hill, or mountain, as the Russians call it, on whose sides are formed steep inclined planes, down which the adventurer throws himself, seated on a machine, which he guides with surprising skill. Swinging is another Russian diversion; to which may be added the common ones of dancing, and of a national music, which, with the songs and ballads to which it is sung, is very plaintive and pleasing.

Miscellaneous.

There are ten orders of knighthood or of merit in this empire, three of which were established by Peter the Great, the parent of Russian civilization. They are both of a civil and military description; and many of them are divided into several classes, some having five, others three and four. But the indiscriminate manner in which these marks of distinction are bestowed greatly lessens their value. Even private soldiers have frequently half a dozen bits of ribbon strung in a line across the breast, and common policemen are sometimes bedecked in the same manner. A general officer in the Russian service is usually covered with orders of one kind or another. It is a fact worthy of remark, that the calendar has not yet been reformed in Russia. The reason assigned by the Russians for thus remaining twelve days in arrear of all other nations, is partly the fear which the emperor has of any serious innovations giving offence to his nobles, and partly the unwillingness of the clergy to accede to any change which would so materially disarrange the present order of their numerous feasts or saints' days. Without the sanction of the priesthood, such an important reform could not be completely carried into effect.

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[1] *Histoire de l'Empire de Russie*, par M Karamsin, traduite par MM. St Thomas et Jauffret, tome v. Paris, 1819–1826.

Asiatic Russia.

Russia in Asia comprehends the whole northern portion of it, extending from latitude 38° 40′ to 78° north, and from longitude 37° 14′ to 190° 22′ east from Greenwich. It is bounded on the west by European Russia and the Black Sea; on the south by Asiatic Turkey, Persia, the Caspian and Aral Seas, the territories of the Turkomans and Kirghises,[1] and China; on the east by the Pacific Ocean and Behring's Straits; and the Frozen Ocean extends along the whole of its northern limits. Its greatest extent from west to east is about 4142 miles, and its greatest breadth from north to south is about 1933 miles. This vast dominion is calculated to be spread over twenty-seven ninetieths of the land of the globe.

General aspect.

The Ural Mountains, already described, run along the western limits of Asiatic Russia. On the south-west extends the Caucasus, and on the west the Altai range. The eastern division of the Russian territory, from the river Yenisei or Ienessi, has on its southern and eastern parts vast mountain ranges; and on its interior there are several chains that run to the Arctic Ocean in gigantic masses. This portion of Siberia is covered with woods, large lakes, or extensive and elevated plains, and terminates towards the shores of the Frozen Ocean, in vast fields of eternal ice. The western division, with the exception of the mountain ranges mentioned, taken as a whole, may be described as a vast level plain, partially watered, but by its climate and soil ill adapted for the increase or the comfort of human beings.

Rivers.

The rivers of Asiatic Russia that empty themselves into the Arctic Sea are amongst the most considerable of the ancient world. The most remarkable of these are, 1st, the Obe, whose course is 2170 miles in length, during which it receives the great rivers the Tom, the Kek, the Irtysh, the Tyda, and all their tributary streams. 2d, The Yenisei, which has a course of 3115 miles, with fewer sinuosities than are usually observed in other great rivers. It receives the waters of fourteen large streams, and all their tributary collections. 3d, The Piasana, whose course is 300 miles. 4th, The Taimurskoe, a short stream issuing from a lake of the same name. 5th, The Khatanga, which empties itself into the Bay of Khatangaskoi, on the Frozen Ocean. 6th, The Anabara, an arctic stream. 7th, The Olenk, whose waters only become considerable after entering the arctic circle. 8th, The Lena, one of the largest of the Asiatic Russian rivers. It rises in the Baikal Mountains, to the north of China, in latitude 52° 30′, and empties itself into the ocean in latitude 70° 40′, and longitude 164° 26′, after receiving the waters of fourteen large rivers and their numerous tributary streams. 9th, The Omoloi; 10th, the Jana; 11th, the Indigirka; 12th, the Alazeja; 13th, the Kolyma; 14th, the Tchauna; and, 15th, the Amgonia. The streams whose courses have been traced to fall into the sea of Kamtschatka, between Asia and America, are the Anadyr, the Katirka, the Kamtschatka, the Penshena, the Tilcha, the Ischiga, the Tauna, the Okhota, the Uda, the Argun, and the Shilka. The rivers which descend from the Asiatic side into the Black Sea and Caspian have already been noticed.

Lakes.

The lakes in Russian Asia are very numerous, and some of them very extensive. One of the largest is the Baikal, in Siberia, between latitude 52° and 55°, and longitude 104° 26′ and 109° 56′, extending over 11,180 square miles. Its water is clear and bright, and the depth varies from eighteen to five hundred feet. It is covered with ice from the middle of December till April. The river Angara, which runs to the Yenisei, issues from it. It contains a great number of rocky islands, the largest of which is called Olchon. The lakes next in extent are the Tchani and the Piasenskoe, both in the government of Tomsk. Every province has one or more lakes, several of which are of salt water, and on whose banks a natural crystallization prepares culinary salt for the use of the inhabitants.

Steppes.

There are several plains or steppes of great extent in Asiatic Russia, the most remarkable being the Kirghis Steppe, between the Irtysh and Orenburg boundary line. It is a very dry and barren district, with some lakes whose water is saline. The few rivers have copious streams in the spring from the melted snows, but in summer become dried up. There is also the Steppe of Bolschei; of Jettish, to the eastward of the Ural; of Ischim, on both sides of the river of that name, between Tobol and the Irtysh; and the Baraba or Barbinska, between the Irtysh and the Ob or Obe. It is about two hundred miles in breadth, and its surface is by no means dry and arid, as is commonly thought, but, on the contrary, rather suffers from an abundance of water, being chiefly covered with large and small lakes and extensive swamps, and also traversed by several small rivers, which partly fall into the Om, an eastern tributary of the Irtysh, and partly into the Irtysh and Obe. Some portions of it present a perfect level, like the ocean in a calm; others are slightly undulating, and covered with grass, some birch, and poplar. Some lakes are salt, and occasionally the surface of the ground is covered with saline efflorescence. In this steppe a peculiar disease is prevalent, called the Siberian plague. To these may be added the Arctic Plain, between the 67th degree of latitude and the Frozen Ocean, whose whole surface is little more than morasses, mixed with rocks, and bound up by frost between ten and eleven months in the year. These extensive plains are sometimes passed by the wandering tribes, who find subsistence on the less sterile spots which are to be met with on the banks of the rivers that bound them. The southern districts, however, possess a great deal of land equally adapted for tillage and for pasture. The forests abound with game; and the rivers are well stocked with fish.

Climate and productions.

The climate differs little from that of European Russia. The principal productions are wheat, rye, barley, oats, and buck-wheat, which grows wild in the middle of Siberia. The return is small, but the crops have increased with the introduction of more improved methods of cultivating the soil. The southern territory along the upper part of the Irtysh, as well as along the Tobol, the Izet, and others of its tributaries, which are covered with luxuriant pastures, might be made to yield very rich crops, if the inhabitants would change their taste for a pastoral life, and till the ground. For some time past indeed the Kirghises have shown indications of commencing agriculture, especially the poorer classes, who cultivate, upon the borders of the lakes and rivers, fields of corn, rye, barley, and millet. But notwithstanding the general neglect of agriculture, the produce is in some parts extremely plentiful. Immense crops are raised without the aid of manure, so that living is very cheap. In many parts the goats and sheep, and in some the oxen, furnish food for the inhabitants; whilst in others they derive subsistence from the fish with which the seas, lakes, and rivers abound. The rearing of sheep for wool is a branch of industry lately introduced into Siberia, and is likely to thrive.

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[1] This part of the Russian frontier, known by the name of "the line of the Cossacks of Siberia," traverses the extensive plains which separate Ural from Altai. The direction of this line, from the redoubts of Siberia to the village of Finalka, situated at the foot of the Altai, is in length 1707 versts, and is marked by four towns, eleven fortresses, fifteen fortified advanced posts, and eighty-four redoubts.

Fr iers.

The territory which stretches along the Asiatic frontier deserves particular mention, as the most favoured district of Siberia. This vast space is chiefly inhabited by Cossacks, colonised warriors, divided into several regiments; and although other colonists, as peasants, shopkeepers, &c. have established themselves there, the population does not at present exceed 45,000. The Cossacks are privileged to trade with the Kirghises, without paying the taxes of either of the three guilds; in their military capacity they mount guard in turn at the different posts; their leisure time is employed in the rearing of cattle, gardening, hunting, and fishing. The territory they occupy is for the most part very fertile, especially between the forty-ninth and fifty-first degrees of latitude, where the soil spontaneously produces fruit-trees, melons, tobacco, &c.; whilst in the most eastern part, the solitary but picturesque and fruitful valleys of Altai, rich in every description of odoriferous flowers and aromatic herbs, enable the inhabitants to rear innumerable swarms of bees, and to furnish the greatest part of Siberian honey. Several manufactories, especially that of leather, have been established in the towns; but trade is yet in its infancy, and scarcely developed. Its progress and improvement will doubtless hereafter enhance the value of the natural productions of these regions, amongst which must be reckoned the lakes of salt water so numerous in the steppes. Important as they are in relation to trade and commerce, these lakes likewise present to the naturalist a series of interesting phenomena. Their waters hold so great a quantity of salt in solution, that the action of the summer heat is of itself sufficient to convert it into crystals, which, carried towards the banks by the action of the waves, form there shoals of salt of an immense extent. Magazines have been formed upon the borders of Lake Koriak, the only one situated on the right bank of the Irtysh, and the salt therein preserved generally amounts to several millions of poods. Large quantities of this article are annually carried across the Irtysh to Tobolsk. But however rich this lake may be, it is less so than three others, the Karashack, the Kalkaman, and the Djémantons, situated in the steppes on the right bank of the Irtysh. Each of these basins is from twenty to twenty-five versts in circumference; and the action of the solar rays produces in them, during the summer season, crystals of salt so numerous, that by mutual contact they at length form thick and solid arches, which, like winter ice, cover the surface of the lakes. These masses are frequently nine inches thick; the action of the air whitens the upper layers; the lower ones preserve a bluish tint, which in some places assumes a beautiful violet hue; and the solidity of these crystal fields is such that horses, chariots, and even camels, pass over them with the greatest safety. Ten other lakes are also found between the Irtysh and Redoubt of Siberia.

Mine

The mines of Russian Asia are by far more productive than those of any other portion of the empire, as from them is extracted the whole of the gold, silver, platina, and lead, nine tenths of the copper, and eleven twelfths of the iron which is brought into use. Zinc, arsenic, and bismuth, together with precious stones, are also found. These mines are situated in the Uralian and Altaian ranges of mountains. It is in those parts of these chains which face Siberia, that is, the eastern slope of the Ural, and the northern declivities of the Altai, with its secondary branches, that are found the veins of precious metal. The best account of these mines is that contained in a recent book of travels by Gustav Rose.[1] "The sand containing small particles of gold occurs along the eastern declivity of the Uralian range, in numerous places north of 56° north latitude, and extends beyond 60° north latitude. It occurs in the western declivity likewise, but only in a few places, and contains less gold. On the Siberian side of the range, the sand from which the gold is extracted contains about one and a half or two solotnik of gold in a pood, or from $\frac{1}{2280}$ to $\frac{1}{1920}$; that which contains less is at present not worked." But Mr Rose says that even sand containing only $\frac{1}{7080}$ of gold can still be washed with profit. "The expenses in washing sand containing between $\frac{1}{2280}$ and $\frac{1}{1920}$ of gold amount commonly to two fifths of its net produce. Sometimes sand is found of which $\frac{1}{600}$ and even $\frac{1}{300}$ is gold. A small quantity of silver is always mixed with the gold; it amounts to between two and eleven parts in one hundred. Near the Altai Mountains, likewise, gold sand has been discovered in some places, and they have begun working it. The first establishment for working this sand in the Ural was made in 1814, at Beresowsk, near Ikaterineburg, and since that time they have been increasing in number and extent. Last year (1836) the produce of all the Russian mines gave 27,885 marcs of gold, of which more than two thirds were derived from the washing of the sand." The platina mines are situated on the western declivity of the Ural, about the parallel of 57° 40′ north. They are six in number, and lie at a short distance from one another. "In the most northern, called Sukhowissimokoi, the discovery of the sand containing platina was made in 1825, and at the other places it was found soon afterwards. The proportion of platina is much larger than that of gold, as it amounts on an average to $\frac{1}{142}$ of the whole mass. Sometimes pieces are found weighing some ounces, and even half a pound and upwards. A small quantity of gold is united with platina. In 1834 platina was discovered in layers of serpentine. The produce of platina in 1836 amounted to 8270 marcs."[2]

The field opened for researches is so vast, that years of methodical and persevering examination have not yet been sufficient to explore all the valleys and summits of these immense chains, a vast extent not having yet been visited by the officers of the Mining Board. The examination of these parts, as yet almost unknown, is pursued with the greatest regularity. The two chains, the Ural and the Altai, are divided into several mining districts. In each of them the officers to whom is confided the direction of the works, send out every summer detachments of discovery, whose duty it is to examine in detail the mountains assigned to them, the point at which the expedition stopped the preceding year being generally that of departure for the new one. We have already stated the quantities of metal which these mines produce annually. With regard to the diamonds, Mr Rose states that only small stones are found, their number up to July 1833 amounting only to thirty-three.

Manufactures and commerce.

The manufactures are few and unimportant, with the exception of spirits and leather, which are made to a considerable extent at Tobolsk, and the towns in the neighbourhood. There are here 114 tanneries, besides a number of establishments for soap-boiling and the melting of tallow. Cotton and woollen are begun to be manufactured into coarse stuffs in one or two parts. The breweries, but especially the distilleries, are more numerous than any other manufacturing objects. Making corn-spirits is a royal monopoly, but in some of the Asiatic cities it is let to farm by the government. The chief commerce is internal, between the several provinces whose productions are most different from each other. Trade is carried on to a great extent at Tobolsk, the capital of the country. With the exception of the clergy and persons employed in the service of government, almost all are engaged in it, exchanging the produce of European Russia, corn, meal, and iron, tools and utensils, for the skins, cattle, caviare, fish salted and fresh, and game brought to them from the interior by the Ostiaks or Tartars. Every year the merchants of Tobolsk, Tumene, and the other towns, send boats laden with flour up the Irtysh and the Obe to Berezoff, and the other small towns situated farther to the north; and these boats return freighted with fish. The clerks and agents belonging to these merchants, and who are established in the small towns upon the banks of the Obe, purchase of the Ostiaks valuable furs, which, together with soap, tallow, and leather, they afterwards export, partly to the fair of Niznei-Novgorod, and partly to the Kirghises of the steppes, who pay them in horses, cattle, and cotton stuffs, purchased by themselves of the Bukharians; the remaining produce of the government of Tobolsk is exported by the way of Kiakhta into China, whence are brought in exchange silks and tea. Kiakhta is the solitary point of commercial intercourse between the two great empires of Russia and China. Almost all the principal houses in Russia have an agent at Kiakhta; while the Chinese traffickers consist chiefly of temporary visiters without their families. The Russians here receive the staples of China, for which they give the productions of their own country in return. The nature and extent of the commerce of Kiakhta will be seen from the following statement.

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[1] *Reise nach dem Ural, dem Altai, und dem Kaspischen Meere*, von Augustav Rose, vol. i. Berlin, 1837.

[2] Journal of the Royal Geographical Society, vol. vii. p. 399.

Exportation of Russian Merchandise in 1835.

	Roubles.
Skins to the amount of	2,229,377
Leather	742,481
Linen	203,115
Cottons	933,876
Cloths 718,221 archines	1,799,691
Corn, iron, steel, copper, glass, and other articles	1,446,148
Polish cloths, 206,301 archines	466,950
Transit merchandises	545,731
Total	7,427,369

Importation of Chinese Merchandises during the same year.

	Roubles.
Tea, 199,233 poods, to the amount of	6,909,149
Silks	208,599
Cottons	122,726
Drugs, &c	186,895
Total	7,427,369

Or L.324,947.

In 1825 the total exports amounted to 5,501,815 roubles, or L.239,697, so that in ten years there has been an increase in the commercial intercourse between Russia and China to the extent of nearly two millions roubles. The Russians chiefly transport by water the merchandise which they send in summer, or oftener in spring, from Kiakhta to Europe.[1]

Another great commercial line is that which branches from Irkutsk down the Lena, into the heart of the frozen regions and the shores of the Arctic Ocean. Yakoutsk, situated about eight hundred miles down the Lena, is the emporium where the furs and other products of these desolate regions are collected. They are brought from the remotest extremities of the land which borders Behring's Straits, from Kamtschatka, and from the American territory, as well as from the northern wastes. A considerable proportion consists of the tribute which is paid to government; and the wandering traffickers exchange tobacco, spirits, cutlery, beads, and toys, for the remainder.

Governments. Asiatic Russia, like the European portion of the empire, is divided into governments or provinces, which are further partitioned into circles, all being under the same species of civil government which we have described as characterising the rest of the empire. The names of the governments of Siberia, with the number of the inhabitants, are as follow.

Yenisei	193,486
Irkutsk	505,118
Tobolsk	662,650
Tomsk	394,136
Province of Omsk	72,545
Total	1,827,935

There can be little doubt that in this census, which has been recently taken, the wandering tribes have been merely estimated, and that it is only an approximation to the truth. The population consists of two very distinct portions, the foreign rulers and the native tribes. The Russian inhabitants consist chiefly of the unfortunate persons who have been banished to these remote regions for various crimes, more especially those of a political nature. A basis was formed by the Swedish officers who fell into the hands of Peter the Great on “ sad Pultawa's day,” and a regular succession of recruits has subsequently been furnished by the empire itself. Amongst those who have been thus expatriated by a jealous and absolute government, were of course many individuals belonging to the higher ranks of society, men of polished manners and accomplished minds, so that at Tobolsk, where they were chiefly stationed, there is a far higher degree of refinement and intelligence to be found than might have been expected in a settlement of convicts. This great capital of Western Siberia has to a considerable extent acquired the polish of a European city. In 1835 it contained 15,379 inhabitants, two ecclesiastical schools, about twenty churches, and a monastery. The lowest class of exiles are condemned to the mines, where, being closely watched, and with hard work and harder fare, they drag out a miserable existence. A class whose offences are of a milder character are distributed amongst the distilleries. A third class receive grants of land, for which a trifle is paid to government. The individuals composing this class are formed into villages, under the superintendence of a strict police. The native races have been enumerated in our general statement of the various tribes who inhabit the Russian empire. Siberia is under the same system of national education as European Russia, and has its schools, gymnasia, and other institutions of the kind. Public instruction is making some progress at Tobolsk, notwithstanding the many obvious difficulties which obstruct it. There are in this government eleven ecclesiastical schools, with thirty-four masters, and 686 pupils.

Transcaucasian Provinces.

The Transcaucasian territory of Russia is a vast tract of country situated between the Black and Caspian Seas, and bounded by Turkey and Persia on the south. It has been entirely incorporated with the empire since the commencement of this century. Relations had been established with Georgia a long time previously, but it was not till 1801 that it was declared a Russian province. The district of Elizabethpol was seized in 1803; Imeretia in 1805; Persia ceded the Khanats of Sheki, Shirvan, Karabagh, Talish, Bacoo, Cooba, and Derbend, in 1813; the treaty of Turkmanschay, concluded with Persia in 1828, gave to Russia the Armenian provinces of Erivan, Nanhischevan, and Ordubat, and fixed as its frontier the course of the Araxes; and, lastly, by the treaty of Adrianople Turkey surrendered istics.

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[1] Tour in the North of Europe, vol. ii. p. 215.

to her great enemy the pashalik of Akhalzik. These acquisitions altogether comprehend a superficies of 154,000 square versts, which is about twice the size of England without Wales. The whole is considered an integral part of the empire, and as such is administered by Russian authorities. But besides these provinces, Russia claims a protectorate over Mingrelia, Abassa or Abhasia, the Lesghian tribes, and several principalities of Daghestan. Some of these countries are entirely under Russian influence; but in Abhasia, even according to Russian writers, it is merely nominal. The following statistical table is from a work composed and published in St Petersburg in 1836 by supreme authority.

	Houses.	Male Inhabitants.
1. Grusia or Georgia proper contains	63,801	225,395
2. The military district of nominal provinces	71,565	202,951
3. Military district of Daghestan............	19,971	68,121
4. Pashalik of Akhalzik, and the Armenian provinces..........................	36,771	102,016
5. Imeretia..	21,787	81,014
6. The province of Djuree and Belakani...	13,389	46,680
Total............	227,284	726,177

Small as this territory is compared with the vast extent of Russia, it is of no trifling importance to her in a commercial, financial, and political point of view. Its geographical position appears to us the happiest possible for such a power, prosecuting gigantic schemes of commercial intercourse or territorial aggrandisement. Climate, soil, natural capabilities, situation, and political relations, all prove that, whatever it has cost Russia to acquire and maintain her Transcaucasian dominions, their value, which as yet is only developed to a small extent, justifies her policy. A commission was appointed in 1828 to draw up a statistical account of these provinces, the labours of which body terminated in 1835. The following is a brief abstract of the results of their investigations, derived from the official sources.

1. *Silk.* The cultivation of mulberry trees is in a very backward state, although the tax levied upon them was abolished in 1830. The whole annual export does not exceed 15,530 poods.

2. *Cotton.* The natural capabilities of the country offer a possibility of increasing the production of this valuable commodity to an immense extent; but its cultivation has greatly decreased since the district where it is chiefly raised passed from the hands of Persia to those of Russia. The whole export amounts annually only to 36,000 poods, of very inferior quality.

3. *Wine.* The vine is indigenous to these regions, and presents a great variety of kinds. The vineyards are numerous and rich, the country being well adapted for the cultivation of the plant. There are produced annually about 3,888,000 vedros of wine, and 140,000 vedros of brandy. The district of Telav alone furnishes to this quota 2,000,000 vedros of wine, and 140 vedros of brandy. Imeretia is not included in this estimate. This quantity of wine and brandy is entirely absorbed by the internal consumption, which is immense. The production of wine of various kinds and most excellent quality might be prosecuted to an extent which might render Russia independent of foreign importations of the article.

4. *Rice.* The cultivation of this plant has not improved since the establishment of the Russians in the country. There is an annual produce, however, of about 130,000 chetwerts.

5. *Saffron.* The province of Bacoo alone produces yearly 1000 poods of saffron, which shows to what an extent this valuable branch of agricultural industry might be carried. The article has hitherto been very ill prepared, but efforts are making to improve the management of it.

Statistics.

6. *Madder.* This article is produced in great quantities at Derbend, and other places along the shores of the Caspian Sea.

7. *Cochineal.* The Armenian or southern parts of the Transcaucasian provinces produce a kind of cochineal, which is said to yield a dye equal to that of Mexico. The Russian government is doing every thing in her power to extend this new and profitable branch of productive industry.

8. *Live Stock.* Extensive herds might be reared in these provinces, which afford great facilities for their maintenance. Great numbers of sheep and cattle are indeed raised, but the wool of the one is bad, and the breed of the other is inferior. But there can be little doubt that Merino sheep will be successfully introduced into this quarter. There is a fine race of horses, and an abundance of camels, asses, mules, and swine.

The natural capabilities of these provinces are very great, affording facilities for the production of the most valuable commodities, which are exclusively furnished by southern climates. These have only been developed to a partial extent; but the Russian government is displaying such laudable zeal to encourage such branches of industry as are peculiarly adapted for the various districts of her vast possessions, that by and by she will be independent of what are called colonial goods, silk, cotton, and the like. The provinces, however, are greatly depressed by a system of most vexatious and unequally levied imposts. These have not been laid on by Russia; they owe their origin to the rapacity of the various petty tyrants who formerly ruled the different parts of this region. Free commerce was permitted to the provinces in 1821, and they soon began to reap great advantages from this liberal system. But it was abolished in 1832, probably because the additional revenue which accrued from it was not a sufficient compensation for such an interference with the general system of Russian policy.

This is not the place to enter into the great and important question relative to the influence which Russia is likely to exercise over the East, by thus firmly establishing her dominion beyond the Caucasus. Although the maintenance of the provinces costs her yearly L.16,000, the revenue being about L.216,000 and the expenditure about L.232,000, yet, by placing the resources of the country under proper management, the former might be increased to a vast extent. But this is of comparatively little moment compared with two other objects of her far-sighted policy, which will be promoted by rendering the Caucasian isthmus a commercial country, securely incorporated with the rest of the empire. These are the creation of a manufacturing industry, which will make her independent of other countries, particularly of England, and the establishment of her power in Asia, whence great advantages are not unreasonably expected. Now these provinces will at once supply the raw material necessary for manufactures, and at the same time open a market for them in the east. It is true, that the Caucasian Mountains almost totally sever this limb from the great body of the empire, the passes of Mozdac being difficult, and the country at the same time infested with predatory hordes. But there are other and much more eligible means of communication, viz. the Caspian Sea on the east, and the Black Sea on the west. Over the former Russia reigns paramount, no other vessels of war but her own being allowed to navigate its waters. Into this vast reservoir the Volga, which is the great artery of Russia, pours its waters, collected during a navigable course of two thousand miles, through some of the most fertile regions of the empire, and, including its tributaries, those most distinguished for manufacturing industry, which is the main object. There is also a communication between this noble stream and the

Baltic Sea. Thus, then, there is an easy transport of goods insured from the remotest governments of the empire to the Caspian Sea, and thence to the Transcaucasian territory. There is also on the other side a communication by the Black Sea, but it does not present so many advantages as that by the Caspian. Our space, however, will not allow us to pursue the subject further.

Islands in the Polar and Eastern Oceans.

In the Polar Ocean are the groups of New Siberia and of the Bear's Island. The first consists of four large and many smaller islands. They are covered with snow during the greater part of the year; their surface is generally rocky, and on some of them there are marks of volcanoes. They are chiefly remarkable for the bones and teeth of the mammoth, rhinoceros, buffalo, and other animals, which are found upon and beneath the surface of the ground. It was the search for this ivory which originally induced the Russians to visit these islands; and their first expedition for exploring them was equipped in 1820. These islands do not appear to be inhabited, though traces of human beings have been occasionally discovered by the Russians engaged in the fisheries. The Bear's Island group consists of six small islands, with several kinds of plants and shrubs on them, but no trees, although their shores are found to be covered with large drift-wood. The southernmost point of these islands is in latitude 69° 5′, and they extend to latitude 76° 20′. Their longitude is between 154° and 183° 50′ east from Greenwich.

In the Eastern Ocean the islands are thus classed:

1*st*, The islands of Gevosbewy and Nelken, in Behring's Straits, in latitude 65° 4′, with about 400 people.

2*d*, St Lawrence, latitude 63° 40′, and longitude 190° 26′, and three smaller islands on the south-east of it.

3*d*, St Mathew's, in latitude 60°, in the Sea of Kamtschatka, consisting of three islands, one of which was named by some early British navigators Pinnacle Island.

4*th*, The Prebelow Islands, in latitude 57°. Two of them have been named St Paul and St George. The former is about twenty-eight miles long and twenty broad, and both are well stocked with animals whose furs are valuable.

5*th*, The Aleutian Islands. This is a chain of islands extending from the peninsula of Kamtschatka to the American peninsula of Alaschka, between 51° and 55° 10′ north latitude, and 167° and 197° east longitude. (See ALEUTIAN ISLANDS.)

6*th*, The Kurile Islands. This chain extends from north latitude 43° 48′ to 50° 56′, and from longitude 145° 5′ to 156° 30′ east. They are evidently of volcanic origin. In some of them good water is found, but others are utterly destitute of it. The few inhabitants are of Japanese origin. Many of these islands have hitherto obtained no European names; but nineteen of the most considerable have been named by the Russians.

American Russia.

Russian America comprehends the north-west angle of the North American continent, as far as the 141st degree of longitude west from London, with a narrow stripe of coast reaching as far south as 55½° of north latitude. It occupies a surface of about 500,000 square miles, of which the useful soil forms but a very small proportion. Thick fogs continually brood over these shores. Some parts of the country, bristling with mountains of difficult access, present at every step impenetrable forests and extensive morasses; others, wholly without vegetation, offer to the eye nothing but sterile rocks. In short, the nature of the climate, and that of the soil itself, equally oppose prodigious obstacles to agriculture. The Russians have therefore been obliged to imitate the aborigines, in renouncing all attempts to form permanent establishments in the interior, and in fixing their abode upon the borders of the sea; it being there only that the chase, fishing, and trade, could furnish them with the means of subsistence.

The Russians who inhabit this remote part of the empire consist either of officers in the imperial navy or civil *employés*, who again quit these shores after a service of five years; or else of mechanics and workmen sent by the American Company. These latter, whose engagement is for seven years, also return home upon that term having expired; and even during the time of their sojourn in the colonies their names still remain upon the registers of their district, and the class to which they originally belonged. Exempted only from the conscription, they still continue to pay taxes; in short, the place of their birth is still regarded as their legal abode. The aborigines of the continent, with the exception of three tribes, are exempted from taxes; but they show a great reluctance to come under the restraints of civilization. On several of the numerous islands, as well as along the shores of the mainland, the Russian Company have hunting and fishing stations. The otter chase is the chief occupation in summer, together with the pursuit of aquatic birds and sea-calves. In winter, snares are laid for the white foxes; and dogs regularly trained for the purpose track the zizel to its subterranean abodes.

Novo Arkhangelsk or New Archangel, situated in latitude 57° 3′ and longitude 135° 20′, is the head establishment. It has a fortress with a small garrison and forty pieces of cannon. Hospitals and schools are established at the company's expense, which also takes upon itself the maintenance of the orphans and children of those among the tribes whose family is numerous. In these schools the children are taught reading, writing, arithmetic, and the precepts of religion. The priests attached to the churches of these colonies occasionally traverse the remotest regions, for the purpose of making converts; but, as may well be believed, their success is not in proportion to their zeal. On the 1st of January 1836 there were in American Russia 711 Russians, 1110 Creoles, 9101 Aleutians, and 99 Kuriles, being 11,021 inhabitants in the various settlements.

(R. R. R.)

RUSSOOA, a village of Thibet, on the northern face of the Himalaya Mountains, which marks the frontier of the Nepaul dominions in this direction. Long. 85. 40. E. Lat. 28. 3. N.

RUSSOOLPOOR, a town of Hindustan, belonging to the nabob of Oude, in the province of Allahabad, forty miles north-west from the city and fortress of Allahabad. Long. 81. 25. E. Lat. 25. 57. N.

RUST, the calx or oxide of a metal, iron, for instance, formed by exposure to the air, or by corroding and dissolving its superficial parts by some menstruum. Water is the great instrument or agent in producing rust; and hence oils and other fatty bodies secure metals from rust, water being no menstruum for oil, and therefore not able to make its way through it. Almost all metals are liable to rust. The rust of iron is not merely an oxide of that metal; it contains, besides, a portion of carbonate.

RUSTIC, in *Architecture*, implies a manner of building in imitation of nature, rather than according to the rules of art.

RUSTIC GODS, or *dii rustici*, in *Antiquity*, were the gods of the country, or those who presided over agriculture. Varro invokes the twelve *dii consentes*, as the principal amongst the rustic gods, viz. Jupiter, Tellus, the Sun, Moon, Ceres, Bacchus, Rubigus, Flora, Minerva, Venus, Lympha, and Good Luck. Besides these twelve arch-rustic gods, there were an infinity of lesser ones; as Pales, Vertumnus, Tutelina, Fulgor, Sterculius, Mellona, Jugatinus, Collinus, Vallonia, Terminus, Sylvanus, and Priapus. Struvius adds the Satyrs, Fauns, Sileni, Nymphs, and even Tritons, and gives the empire over all the rustic gods to the god Pan.

Rustic Work, is where the stones in the face, &c. of a building, instead of being smooth, are hatched, or picked with the point of a hammer.

RUSTRE, in *Heraldry*, a bearing of a diamond shape, pierced through in the middle with a round hole.

RUTH, a canonical book of the Old Testament, being a kind of appendage to the book of Judges, and an introduction to those of Samuel, and having its title from the person whose story is there principally related. In this story are observable the ancient rights of kindred and redemption; and the manner of buying the inheritance of the deceased, with other particulars of great note and antiquity. The canonicalness of this book was never disputed; but the learned are not agreed about the epoch of the history which it relates. Ruth the Moabitess is found in the genealogy of our Saviour. (Matt. i. 5.)

RUTHERGLEN, or by contraction Ruglen, the head burgh of the nether ward of Lanarkshire, in Scotland, is situated about two miles south-east of Glasgow, and nine west of Hamilton. Few towns in Scotland can lay claim to greater antiquity than Rutherglen. It was erected into a royal burgh by King David I. about the year 1126.

The territory under the jurisdiction of the burgh was extensive, and the inhabitants enjoyed many distinguished privileges, which were, however, gradually wrested from them by political influence in favour of Glasgow, which in latter times rose into consequence by trade and manufactures. The ancient dimensions of the place are now unknown; but in the fields and gardens towards the east, the foundations of houses are occasionally discovered.

About a hundred and fifty yards to the south of the main street is a kind of lane, known by the name of *Dins-dykes*. This place has acquired an opprobrious celebrity, from the circumstance which befell the unfortunate Queen Mary when her forces were routed at the battle of Langside. Her majesty, who, during the battle, stood on a rising ground about a mile from Rutherglen, no sooner saw her army defeated, than she took her precipitate flight to the south. Dinsdykes unluckily lay in her way. Two rustics, who were at that instant cutting grass hard by, seeing her majesty flying in haste, rudely attempted to intercept her, and threatened to cut her in pieces with their scythes if she presumed to proceed a step further. Neither beauty nor royalty would have secured her escape, had not some of her followers come to her relief.

Adjoining to a lane called the *Back-row* stood the castle of Rutherglen, originally built at a period coeval, it is reported, with the foundation of the town. This ancient fortress underwent several sieges during the unhappy wars in the days of King Robert Bruce, and it remained a place of strength until the battle of Langside; soon after which it was destroyed by order of the regent, to revenge himself on the Hamilton family, in whose custody it then was. The foundations of the buildings are now erased, and the site converted into dwelling-houses and gardens.

Rutherglen, in conjunction with Renfrew, Dumbarton, Kilmarnock, and Port-Glasgow, sends a member to the British parliament. The fairs of this town are generally well attended, and have long been famous for a great show of horses, of the Lanarkshire breed, which are esteemed the best draught-horses in Britain. The inhabitants of this borough still retain some customs of a very remote antiquity. One of these is the making of *Rutherglen sour cakes*. The operation is attended with some peculiar rites, which lead us to conclude that the practice is of Pagan origin. In 1821 the population of Rutherglen was about 1800, and including the parish it was 4640; in 1831 that of the town and parish was 5503.

RUTHIN, a borough and market town of the county of Denbigh, within the parish of Ruabon. It was formerly surrounded with walls, which are dilapidated; but it now consists of only one long street. It has still a corporation, consisting of two aldermen; and has markets, which are held on Mondays and Saturdays. The population amounted in 1801 to 1115, in 1811 to 1292, in 1821 to 1294, and in 1831 to 3376. The apparent increase on the last census arises from the parish of Llanfurog being then, but not before, included in that of the town.

RUTLAMGUR, a town of Hindustan, in the Mahratta territories, and province of Malwah, forty-seven miles north-north-west from Oojain. Long. 75. 26. E. Lat. 28. 46. N.

RUTLANDSHIRE, an English county, nearly in the centre of the kingdom, and the smallest of all the divisions so denominated. It is bounded by Lincolnshire on the east and north-east, by Leicestershire on the north-west and west, and by Northamptonshire on the south. Its length from north to south is sixteen, and its breadth from east to west is twelve miles. The square contents are 149 square statute miles, or 95,360 acres. It is divided into five hundreds, and contains two market-towns, Uppingham and Okeham, and forty-nine parishes; being a greater number, in proportion to its extent, than any other county in the kingdom.

It gives only one title at present, that of duke, to the family of Manners; two former peerages, that of Ferrars of Okeham, and Noel of Exton, being extinct. Only two members are returned to the House of Commons from the county, and none from either of the towns. In judicial affairs it is on the midland circuit of the judges; and in ecclesiastical matters it has formed, since the year 1541, a portion of the bishopric of Peterborough.

The appearance of this small county is pleasing to the traveller. It is much diversified by ranges of moderate hills running from east to west, in some parts well timbered. Between these ranges of hills, the valleys, of about half a mile in breadth, are luxuriant and verdant. The principal vale, called Catmose, is in the centre of the county, having to the north a tract of table-land overlooking the well-wooded plains of Leicester, Lincoln, and Nottinghamshire. The eastern part is more diversified; the southern division of it consisting of a beautiful valley, stretching towards Northamptonshire, and the western, bordering on Leicestershire, being abundantly wooded.

The soil on the eastern and south-eastern parts is chiefly shallow, resting upon a basis of limestone, composed of clays and loams. The other parts consist principally of a tenacious but fertile loam; but the vale of Catmose enjoys a most fertile soil of good clay, or red loam, or a grateful mixture of both these earths. A peculiarity of the soil is a redness, which generally prevails, and which tinges all the waters of the country.

Mr Parkinson, surveyor for the Board of Agriculture, estimates the land of the county in the following manner, viz. pasture land, 34,861 acres; arable land, 42,536; wastes, 30; woods, 2815; meadows, 9356; commons, 693; plantations, 65; lakes and ponds, 44 acres.

The woods of this county were far more extensive in former ages than they are at present. The ancient forest of Leafield, and the chase of Beaumont, though now under the plough, once occupied a great portion of the surface. The climate is generally accounted peculiarly soft and healthy; and the elevation is of that medium kind which equally exempts it from the pernicious effects of moist exhalations and cold mountain fogs.

The agriculture, though it has partaken of some modern improvements, is not, upon the whole, conducted in the best manner. In some parts, the reprobated system of two corn crops succeeding a fallow is still continued. In other parts, after a fallow, barley is sown with clover; the clover is mowed in two years, or sometimes fed the second year, and then, after one ploughing, the land is sown with wheat. In some cases, on the lighter lands, the four-course system of turnips, barley, clover, and wheat, is followed. The wheat of Rutlandshire is highly valued for seed, and is much in request in even very distant counties. Nearly two thirds of the land are tithe free, and in all the late enclosures, provisions to that end have been inserted in the acts of parliament for effecting them. The cows of Rutlandshire are remarkable for the richness of their milk, though they yield but a small quantity. The rich cheese commonly known as Stilton is chiefly made in the dairies of this county. As many oxen are brought from the more northern countries, and fattened in Rutlandshire, as are bred within it, the annual number of each being from 2700 to 3000. The sheep are more numerous in proportion than horned cattle. Mr Parkinson calculated them to be about 80,000; consisting of old and new Leicesters, of Southdowns, and a few Lincolnshires. It has been remarked, that though the quality of the wool has increased in fineness, the diminution in the weight of the fleeces has of late years more than counterbalanced that advantage.

The small rivulets that water this district run into the two rivers, the Guash, or Wash, which passes through it, or the Walland, which forms its southern boundary. The latter river is navigable only to Stamford, on the confines of Rutlandshire; but is useful in opening a communication with the ocean. A canal has been constructed from Okeham to Melton-Mowbray, by which a supply of coals has been drawn from the mines of Leicestershire.

Rutlandshire is neither a manufacturing nor a mineral district, but depends exclusively on its agriculture. By the returns of 1801 the inhabitants were 16,356, viz. 7978 males, and 8378 females; in 1811 the numbers were 16,380, viz. 7931 males, and 8449 females; in 1821 they were 18,487, viz. 9223 males, and 9264 females; and in 1831 the numbers were 19,385, viz. 9721 males, and 9664 females. Of these there were 2299 families chiefly employed in agriculture; 1102 families chiefly employed in trade, manufactures, and handicraft; and 790 not comprised in any of these classes.

RUTNAGIRI, a town of Hindustan, in the territories of the Nagpoor Mahrattas, and province of Bejapoor, on the east coast of the Concan district. Long. 78. 3. E. Lat. 17. 1. N.

RUTTUNPORE, a town of Hindustan, the capital of a small district of the same name, in the province of Gundwana, and district of Choteesgur, of which it is the capital. It is only a straggling village of about a thousand huts, many of which are uninhabited. It is situated in a remarkably productive and fertile country compared with the rest of the province, which is desolate and barren. This place is said to have been in possession of a family of Rajpoot Hindus from time immemorial. Their last independent chief, Sindar Sing, was, after a severe contest, subdued by Ragogee Bounsla, the founder of the Nagpoor dynasty. It was here that a number of French troops, who were endeavouring to effect a retreat from Bahar through the country into the Deccan, halted, when they were entertained for a few days by Bombajee, the Mahratta sovereign, and at the end of that time treacherously murdered. The travelling distance from Calcutta by Chuta Nagpoor is 493 miles, from Nagpoor 220 miles, from Delhi 633, from Poonah 706 miles. Long. 82. 35. E. Lat. 22. 16. N.

RUYSCH, Frederick, one of the most eminent anatomists of which Holland can boast, was born at the Hague in 1638. After making great progress at home, he repaired to Leyden, and there prosecuted the study of anatomy and botany. He next studied at Franeker, where he obtained the degree of doctor of physic. He then returned to the Hague, and marrying in 1661, dedicated his whole time to the study of his profession. In 1665 he published a treatise entitled *Dilucidatio Valvularum de variis Lymphaticis et Lacteis*, which raised his reputation so high that he was chosen professor of anatomy at Amsterdam. This honour he accepted with the more pleasure, because his situation at Amsterdam would have given him easy access to every requisite help for cultivating anatomy and natural history. After he settled in Amsterdam, he was perpetually engaged in dissecting, and in examining with the most inquisitive eye, the various parts of the human body. He improved the science of anatomy by new discoveries; and, in particular, he found out a way to preserve dead bodies many years from putrefaction. His anatomical collection was curious and valuable. He had a series of fœtuses of all sizes, from the length of the little finger to that of a new-born infant. He had also bodies of full-grown persons of all ages, and a vast number of animals of almost every species on the globe, besides a great many other natural curiosities. Peter the Great of Russia, in his tour through Holland in the year 1698, visited Ruysch, and was so charmed with his conversation, that he passed whole days with him; and when the hour of departure came, he left him with regret. He set so high a value on Ruysch's cabinet of curiosities, that when he returned to Holland in 1717, he purchased it for thirty thousand florins, and sent it to St Petersburg.

In 1685 he was made professor of medicine, an office which he discharged with great ability. In 1728 he got his thigh-bone broken by a fall in his chamber. The year before this misfortune happened, he had been deprived of his son Henry, a youth of talents, and well skilled in anatomy and botany, who had been created a doctor of physic, and was supposed to have assisted his father in his discoveries and publications. Ruysch's family now consisted only of his youngest daughter. This lady had been early inspired with a passion for anatomy, the favourite science of her father and brother, and had studied it with success. She was therefore well qualified to assist her father in forming a second collection of curiosities in natural history and anatomy, which he began to make after the emperor of Russia had purchased the first. Ruysch is said to have been of so healthy a constitution, that though he lived to the age of ninety-three, yet during that long period he did not labour above a month under the infirmities of disease. From the time he broke his thigh he was indeed disabled from walking without a support; yet he retained his vigour both of body and mind without any sensible alteration, until in 1731 his strength at once deserted him. He died on the 22d of February the same year. His anatomical works are printed in four vols. 4to.

The style of his writings is simple and concise, but sometimes inaccurate. Instruction, and not ostentation, seems to be his only aim. In anatomy he undoubtedly made many discoveries; but from not being sufficiently conversant with the writings of other anatomists, he published as discoveries what had been known before. The Academy of Sciences at Paris in 1727 elected him an honorary member, in place of Sir Isaac Newton, who had lately deceased. He was also a member of the Royal Society of London.

RUYSSELEDE, a town of Belgium, in the province of West Flanders and circle of Bruges. It contains 5400 inhabitants, who are employed in making linen and some woollen goods.

RUYTER, Michael Adrian, a distinguished naval officer, was born at Flushing, a town of Zealand, in the year 1607. He entered on a seafaring life when he was only eleven years old, and was first a cabin-boy. Whilst he advanced successively to the rank of mate, master, and captain, he acquitted himself with ability and honour in all these employments. He repulsed the Irish, who attempted to take

Dublin out of the hands of the English; he made eight voyages to the West Indies, and ten to Brazil; he was then promoted to the rank of rear-admiral, and sent to assist the Portuguese against the Spaniards. When the enemy came in sight, he advanced boldly to meet them, and gave such unquestionable proofs of valour as drew from the Portuguese monarch the warmest applause. His gallantry was still more conspicuous before Salee, a town of Barbary. With a single vessel he sailed through the roads of that place, in defiance of five Algerine corsairs who came to attack him.

In 1653 a squadron of seventy vessels was despatched against the English, under the command of Admiral Van Tromp. Ruyter, who accompanied the admiral in this expedition, seconded him with great skill and bravery in the three battles which the English so gloriously won. He was afterwards stationed in the Mediterranean, where he captured several Turkish vessels. In 1659 he received a commission to join the king of Denmark in his war with the Swedes; and he not only maintained his former reputation, but even raised it higher. As a reward of his services, the king of Denmark ennobled him and gave him a pension. In 1661 he run ashore a vessel belonging to Tunis, released forty Christian slaves, made a treaty with the Tunisians, and reduced the Algerine corsairs to submission. His country, as a testimony of her gratitude for such illustrious services, raised him to the rank of vice-admiral and commander in chief. To the latter dignity, the highest that could be conferred upon him, he was well entitled by the signal victory which he obtained over the combined fleets of France and Spain. This battle was fought in 1672, about the time of the conquest of Holland. The battle was maintained between the English and Dutch with the obstinate bravery of nations which were accustomed to dispute the empire of the ocean. Ruyter having thus made himself master of the sea, conducted a fleet of Indiamen safely into the Texel; thus defending and enriching his country, whilst it had become the prey of hostile invaders. The next year he had three engagements with the fleets of France and England, in which, if possible, his bravery was still more distinguished than ever. D'Estrées, the French vice-admiral, wrote to Colbert, "I would purchase with my life the glory of De Ruyter." But he did not long enjoy the triumphs which he had so honourably won. In an engagement with the French fleet off the coast of Sicily, he was defeated and received a mortal wound, which in a few days put an end to his life. His corpse was carried to Amsterdam, and a magnificent monument to his memory was there erected by the command of the states-general. The Spanish council had bestowed on him the title of duke, and transmitted a patent investing him with that dignity; but he died before it arrived. When Louis XIV. was congratulated upon De Ruyter's death, he replied, "Every one must be sorry at the death of so great a man."

RYACOTTA, a town and celebrated fortress of the south of India, added to the Baramuhl district by the Marquis Cornwallis, in virtue of a treaty he concluded with Tippoo. The fort is very strong by nature, and it has been further fortified by art, as this place is the chief key to Karnata. The air is so temperate here, from the elevation of the ground, that even in the hot season the thermometer scarcely ever rises higher than 82° of Fahrenheit. Ryacotta was besieged in 1791 by Major Gowdie; and though it was of such strength, yet the garrison were intimidated by the spirited attacks of the besiegers, and surrendered, though amply supplied with guns, ammunition, and provision for its defence. It is ninety-eight miles east by north from Seringapatam. Long. 78. 1. E. Lat. 12. 33. N.

RYAGUDD, a town of Hindustan, possessed by independent zemindars, in the province of Orissa. It is sixty miles north-west from Cicacole. Long. 83. 27. E. Lat. 19. 1. N.

RYCHOOR, a town of Hindustan, in the nizam's territories, and the province of Bejapoor. It is the capital of a district of the same name, and is 130 miles south-west from Hyderabad. It is an irregularly-built town, being an old fort with some new works. It is commanded by a hill, and by some rising grounds near it. Long. 77. 17. E. Lat. 15. 59. N. The district extends along the north bank of the Toombuddra river, between the 15th and 16th degrees of north latitude.

RYDE, a hamlet within the parish of Newchurch, in the Isle of Wight. It has become a place of some importance, from having of late years been the resort of numerous families for the purpose of sea-bathing. It is opposite to Portsmouth, and from its vicinity to Spithead has some trade in supplying fresh stock and vegetables to the ships of war. It is finely situated, and the bathing is good. The population in 1801 amounted to 2039, in 1811 to 2847, in 1821 to 3945, and in 1831 to 4928.

RYDROOG, a town and district of Hindustan, in the Balaghaut ceded territories. The town is 170 miles north by east from Seringapatam. Long. 77. 2. E. Lat. 14. 49. N. The district is situated principally between the 14th and 15th degrees of north latitude. The Hoggry is the chief river, and the principal towns are Rydroog and Mulkamarroor. This district was ceded to the Company in 1800, and a pension allowed to the polygar's family, to whom it belonged.

RYE, a borough and seaport of the county of Sussex, in the hundred of Gostrow and rape of Hastings, 63 miles from London. It is a member of the Cinque Ports, but of a later date than the others. The harbour has been nearly choked up, partly by the recession of the sea, though it has been recently somewhat improved by a new cut. It was once fortified, but is ill built. It has a corporation, and returned two members to the House of Commons till 1832, since which it elects but one; and its corporation, by the late law, consists of four aldermen and twelve councillors, but no justice of the peace. It has markets, which are held on Wednesday and Friday. The population in 1801 amounted to 2187, in 1811 to 2681, in 1821 to 3599, and in 1831 to 3715.

RYEPOOR, a town of Hindustan, in the province of Gundwana, and district of Choteesgur. This town, from its population and commerce, may be ranked amongst the first in the Choteesgur district. It contains 3000 huts, and has a stone fort on the north-east side of the town. It is sixty-nine miles from Ruttunpoor. Long. 82. 26. E. Lat. 21. 17. N.

RYLST, a city of Russia, in the government of Kursk, and the capital of a circle of the same name. It is built at the junction of the river Ryla with the Gem, and contains four stone and fourteen wooden churches, 840 houses, with 6300 inhabitants, who have considerable trade. It is 847 miles from St Petersburg. Long. 35. 3. E. Lat. 51. 35. N.

RYMER, Thomas, the author of that well-known and important work the *Fœdera*, was born in the north of England, and educated at the grammar-school of Northallerton. He was admitted a scholar at Cambridge, then became a member of Gray's Inn, and at length was appointed historiographer to King William in place of Mr Shadwell. He wrote a View of the Tragedies of the last Age, and afterwards published a tragedy named Edgar. For a critic he was certainly not well qualified, for he wanted candour; nor is his judgment much to be relied on, who could condemn Shakspeare with such rigid severity. His tragedy will show that his talents for poetry were by no means equal to those whose poems he has publicly censured. But though he has no title to the appellation of poet or critic, as an antiquarian and historian his memory will long be preserved. His *Fœdera*, which is a collection of all public documents of the kings of England with foreign princes, is esteemed one of our most authentic and valuable records, and is oftener referred to by the best English historians than any other book in the language. It was published at London in the beginning of the eighteenth century, in seventeen volumes folio. Three volumes more were added by Sanderson after Rymer's death. The whole were reprinted at the Hague in ten vols., 1739. They were abridged by Rapin in French, and inserted in Le Clerc's *Bibliothèque*, a translation of which was made by Stephen Whatley, and printed in four vols. 8vo, 1731. Rymer died on the 14th of December 1713, and was buried in the parish church of St Clement Danes. Some specimens of his poetry are preserved in the first volume of Mr Nichol's Select Collection of Miscellaneous Poems, 1780.

RYNABAD, a small village of Hindustan, in the province of Bengal, and district of Jessore. For a long time rumours were circulated that extensive ruins existed in the Sunderbunds, and particularly in the vicinity of Rynabad. But though repeated investigations have been made, none have been discovered.

RYOTS, in the policy of Hindustan, the name by which the renters of land are distinguished. They hold their possessions by a lease, which may be considered as perpetual, and at a rate fixed by ancient surveys and valuations. This arrangement has been so long established, and accords so well with the ideas of the natives concerning the distinction of castes, and the functions allotted to each, that it has been invariably maintained in all the provinces subject either to Mahommedans or Europeans; and to both it serves as the basis on which their whole system of finance is founded. Respecting the precise mode, however, in which the ryots held their possessions, there are many different opinions, for which we refer to Robertson's Historical Disquisition concerning India.

RYSWICK, a village of the province of Holland, in the circle of the Hague, and near that city, which is pleasantly situated, and contains some good country-houses and pleasure-gardens, and 1820 inhabitants. Near to it is the palace of Niewmburg, where was signed the general treaty of peace in 1697, which bears this name.

RZESZOW, a city of the Austrian province of Gallicia, and the capital of a circle which extends over 1782 square miles. It comprehends four cities, thirteen market-towns, and three hundred and thirty-three villages, with 251,500 inhabitants. The city stands on the river Wisloch, and contains 388 houses, with 4850 inhabitants. It has some trade in making linen and woollen goods, and some goldsmiths' work.

S.

S, or s, the eighteenth letter and fourteenth consonant of our alphabet. The sound of it is formed by driving the breath through a narrow passage between the palate and the tongue elevated near it, together with a motion of the lower jaw and teeth towards the upper, the lips being a little way open, with such a configuration of every part of the mouth and larynx as renders the voice somewhat sibilous and hissing. Its sound, however, varies; being strong in some words, as *this, thus*, and soft in words which have a final *e*, as *muse, wise*. It is generally doubled at the end of words, by which they become hard and harsh, as in *kiss, loss*. In some words it is silent, as *isle, island, viscount.*

In abbreviation, S. stands for *societas* or *socius;* as R. S. S. for *regiæ societatis socius*, fellow of the royal society. In medicinal prescriptions, S. A. signifies *secundum artem*, according to the rules of art. And in the notes of the ancients, S. stands for *Sextus;* S. P. for *Spurius;* S. C. for *senatus consultum;* S. P. Q. R. for *senatus populusque Romanus;* S. S. S. for *stratum superstratum*, one layer above another alternately; S. V. B. E. E. Q. V. for *si vales bene est, ego quoque valeo*, a form used in Cicero's time in the beginning of letters. Used as a numeral, S. anciently denoted seven; in the Italian music, S. signifies *solo;* and in books of navigation, S. stands for south, S. E. for south-east, S. W. for south-west, S. S. E. for south-south-east, S. S. W. for south-south-west, &c.

SAADE, a town of the mountainous district of Yemen, in Arabia, and the most important in the district. It is the residence of an imam or chief, whose power is limited, and his territories small; and he is often so hard pressed by his highland neighbours that he finds it difficult to maintain his ground. He imposes a duty on all goods passing from Yemen into the interior of Arabia, and from this source his revenue chiefly arises. It is 368 miles north-north-east of Mocha.

SAARBRUCK, a city of the Prussian government of Treves, the capital of a circle of the same name, and 215 square miles in extent. It stands on the river Saar, over which is a bridge connecting it with the large suburb of St John's. It is old and strongly built, and the suburb contains 1070 houses, with 6740 inhabitants, who carry on some iron-works, and have barges navigating the river, which is navigable up to the bridge.

SAAR-LOUIS, a city of the Prussian government of Treves, and the capital of a circle of the same name, of 189 square miles in extent. It is situated on the river Saar, and celebrated for the strength of its fortifications, which were constructed by Vauban, under Louis XIV. It is well and regularly built, and contains three churches, 550 houses, and 5800 inhabitants, who are employed in iron-works, chiefly in making weapons. Long. 6. 43. E. Lat. 49. 14. N.

SAASA, a village of Palestine, in the district which is said, on the authority of tradition, to have been the burial-place of Nimrod. It is forty miles north-west of Sarchad.

SAATZ, a city of the Austrian kingdom of Bohemia, the capital of a circle of the same name, which extends over 921 square miles, and contains 126,500 inhabitants. The river Eger runs by the town. It has a collegiate church, a gymnasium, and 640 houses, with 4180 inhabitants. Long. 14. 10. E. Lat. 50. 18. 35. N.

SAAVEDRA, Michael de Cervantes, a celebrated Spanish writer, and the inimitable author of Don Quixote, was born at Madrid in the year 1541. From his infancy he was very fond of books; but he applied himself wholly to books of entertainment, such as novels and poetry of all kinds, especially Spanish and Italian authors. From Spain he went to Italy, either to serve Cardinal Aquaviva, to whom he was chamberlain at Rome, or else to follow the profession of a soldier, as he did for some years under the victorious banners of Marco Antonio Colonna. He was present at the battle of Lepanto, in the year 1571; in which he either lost his left hand by the shot of an harquebus, or had it so maimed that he lost the use of it. After this he was taken by the Moors, and carried to Algiers, where he continued a captive five years and a half. Then he returned to Spain, and applied himself to the writing of comedies and tragedies; and he composed several, all of which were well received by the public, and acted with great applause. In the year 1584 he published his Galatea, a novel in six books, which he presented to Ascanio Colonna, a man of high rank in the church, as the first fruits of his wit. But the work which has done him the greatest honour, and will immortalize his name, is the history of Don Quixote, the first part of which was printed at Madrid in the year 1605. This is a satire upon books of knight-errantry, and the principal if not the sole end of it was to destroy the reputation of those books which had so infatuated the greater part of mankind, and especially those of the Spanish nation. This work was universally read; and the most eminent painters, tapestry-workers, engravers, and sculptors, have been employed in representing the history of Don Quixote. Cervantes, even in his lifetime, obtained the glory of having his work receive a royal approbation. As Philip III. was standing in a balcony of his palace at Madrid, viewing the country, he observed a student on the banks of the river Manzanares reading in a book, and from time to time breaking off, and beating his forehead with extraordinary tokens of pleasure and delight; upon which the king remarked to those about him, "That scholar is either mad or is reading Don Quixote." The latter proved to be the case. But *virtus laudatur et alget.* Notwithstanding the vast applause his book everywhere met with, he had not interest enough to procure a small pension, for he could scarcely keep himself from starving. In the year 1615 he published a second part; to which he was partly moved by the presumption of some scribbler, who had the year before published a continuation of this work. He wrote also several novels, and amongst the rest the Troubles of Persiles and Sigismunda. He had employed many years in writing this novel, and finished it just before his death; for he did not live to see it published. His sickness was of such a nature that he himself was able to be, and actually was, his own historian. At the end of the preface to the Troubles of Persiles and Sigismunda, he represents himself on horseback upon the road, and a student, who had overtaken him, engaged in conversation with him. "And happening to talk of my illness," says he, "the student soon let me know my doom, by saying it was a dropsy I had got; the thirst attending which, all the water of the ocean, though it were not salt, would not suffice to quench. Therefore Señor Cervantes, says he, you must drink nothing at all, but do not forget to eat; for this alone will recover you without any other physic. I have been told the same by others, answered I; but I can no more forbear tippling, than if I were born to do nothing else. My life is drawing to an end; and from the daily journal of my pulse, I shall have finished my course by next Sunday at the farthest. But adieu, my merry friends all, for I am going to die; and I hope to see you ere long in the other world, as happy as heart can wish." His dropsy increased, and at last proved fatal to him; yet he continued to say and to write bon mots. He received the last sacrament on the 18th of April 1616; yet the day after, he wrote a dedication of the Troubles of Persiles and Sigismunda to the Conde de Lemos. The particular day of his death is not known.

SABAGAN ISLANDS, a group of small islands in the Red Sea. Long. 41. 54. E. Lat. 14. 55. N.

SABAZIA, in Greek antiquity, were nocturnal mysteries in honour of Jupiter Sabazius. All the initiated had a golden serpent put in at their breasts, and taken out at the lower part of their garments, in memory of Jupiter's ravishing Proserpina in the form of a serpent. There were also other feasts and sacrifices distinguished by this appellation, in honour of Mithras, the deity of the Persians, and of Bacchus, who was thus denominated by the Sabians, a people of Thrace.

SABBATARIANS, or SEVENTH-DAY BAPTISTS, a sect of Anabaptists, so called because they observed the Jewish or Saturday-Sabbath, from a persuasion that it was never abrogated in the New Testament by the institution of any other.

Definition.

SABBATH, in the Hebrew language, signifies *rest*. The seventh day was denominated the *Sabbath*, or *day of rest*, because in it God rested from all his works which he had created. From that time the seventh day seems to have been set apart for religious services; and, in consequence of a particular injunction, it was afterwards observed by the Hebrews as a holiday. They were commanded to set it apart for sacred purposes in honour of the creation, and likewise in memorial of their own redemption from Egyptian bondage.

Importance of the institution, and early ceremonies.

The importance of the institution may be gathered from the different laws respecting it. When the ten commandments were published from Mount Sinai in tremendous pomp, the law of the Sabbath held a place in what is commonly called the first table; and by subsequent statutes the violation of it was to be punished with death. Six days were allowed for the use and service of man; but the seventh day God reserved to himself, and appointed it to be observed as a stated time for holy offices, and to be spent in the duties of piety and devotion. On this day the ministers of the temple entered upon their week; and those who had attended on the temple service the preceding week went out at the same time. New loaves of shew-bread were placed upon the golden table, and the old ones were taken away. Two lambs were offered for a burnt-offering, together with a certain proportion of fine flour, mingled with oil, for a bread-offering, and wine for a libation. The Sabbath, like all other festivals, was celebrated from evening to evening. It began at six in the evening on Friday, and ended at the same time the next day.

Time of its institution.

Concerning the time at which the Sabbath was first instituted, different opinions have been held. Some have maintained, that the sanctification of the seventh day, mentioned in Genesis ii., is only there spoken of as *δια προλεψιν*, or by anticipation; and is to be understood of the Sabbath afterwards enjoined the children of Israel at the commencement of the Mosaic dispensation. But without entering into a particular examination of all the arguments produced in support of this opinion, a few observations, it is presumed, will be sufficient to show that it rests upon no solid foundation.

It cannot easily be supposed that the inspired penman would have mentioned the sanctification of the seventh day amongst the primeval transactions, if such sanctification had not taken place until 2500 years afterwards. Writers, ambitious of that artificial elegance which the rules of criticism have established, often bring together in their narrative events which were themselves far distant, for the sake of giving form to their discourse; but Moses appears to have despised all such flimsy refinements, and to have constructed his narrative in conformity to the series of events.

Religious service in the patriarchal age.

From the accounts we have of the religious service practised in the patriarchal age, it appears that, immediately after the fall, when Adam was restored to favour through a Mediator, a stated form of public worship was instituted, which man was required to observe, in testimony, not only of his dependence on the Creator, but also of his faith and hope in the promise made to our first parents, and seen by them afar off. Of an institution, then, so grand and important, no circumstance would be omitted that is necessary to preserve it, or that contributes to render the observance of it regular and solemn.

That determined times are necessary for the due celebra-

Necessity of stated days for the performance.

tion of divine service, cannot be denied. Such is the constitution of man, that he must have particular times set apart for particular services. He is doomed to toil and labour, to earn his bread with the sweat of his brow; and is capable of performing religious duties only in such a manner as is consistent with his situation in the world. If stated times for religious solemnities had not been enjoined, the consequence would have been, that such solemnities would have been altogether neglected; for experience shows, that if mankind were left at liberty when and how often they should perform religious offices, these offices would not be performed at all. It is the observation of holy times that preserves the practice of holy services; and without the frequent and regular returns of hallowed days, man would quickly forget the duty which he owes to God, and in a short time no vestige of religion would be found in the world.

Objections to the early institution of the Sabbath considered.

Among the ordinances which God vouchsafed his ancient people, we find that the pious observation of holidays was particularly insisted upon; and the Sabbath was enjoined to be kept holy, in the most solemn manner, and under the severest penalties. Can it then be supposed that He would suffer mankind, from the creation of the world to the era of Moses, to remain without an institution so expedient in itself, and as well fitted to answer the end proposed by it under the one dispensation, as ever it could be under the other? No. We have every imaginable reason to conclude, that when religious services were enjoined, religious times were appointed also; for the one necessarily implies the other.

It is not an objection to the early institution of the Sabbath that there is no mention of it in the patriarchal age. It would have swelled the Bible to a most enormous size had the sacred historian given a particular account of all the transactions of those times; and, besides, it would have answered no end. When Moses wrote the book of Genesis, it was unnecessary to relate minutely transactions and institutions already well known by tradition. Accordingly we see that his narrative is everywhere very concise, and calculated only to preserve the memory of the most important facts. However, if we take a view of the church-service of the patriarchal age, we shall find that what is called the legal dispensation, at least the liturgic part of it, was no new system, but a collection of institutions observed from the beginning, and republished in form by Moses. The Scriptures inform us that Cain and Abel offered sacrifices; and the account which is given of the acceptance of the one, and the rejection of the other, evidently shows that stated laws respecting the service had then taken place. "In process of time," at the end of the days, "Abel brought an offering." Here was priest, altar, matter of sacrifice, appointed time, motive to sacrifice, and atonement made, and accepted. The distinction of animals into clean and unclean before the Flood, and Noah's sacrifice immediately after his deliverance, without any new direction, is an unanswerable proof of the same truth. It is testified of Abraham, by God himself, that he kept his charge, his commandments, his statutes, and his laws. These expressions comprehend the various branches into which the law given at Sinai was divided. They contain the moral precepts, affirmative and negative, the matter of religious service, a body of laws to direct obedience, and to which man was to conform his conduct in every part of duty. Agreeably to this, we find that sacrifices were offered, altars and places of worship consecrated, and the Sabbath also mentioned as a well-known solemnity, before the promulgation of the law. It is expressly taken notice of at the fall of manna; and the incidental manner in which it is then mentioned is a convincing proof that the Israelites were no strangers to the institution. For had it been a new one, it must have been enjoined in a positive and particular manner, and the nature of it must have been laid open and explained, otherwise the term would have conveyed no meaning.

Argument from the general division of time into weeks.

The division of time into weeks, or periods of seven days, which obtained so early and almost universally, is a strong indication that one day in seven was always distinguished in a particular manner. *Week*,[1] and *seven days*, are in scripture language synonymous terms. God commanded Noah, seven days before he entered the ark, to introduce into it all sorts of living creatures. When the waters of the Flood began to abate, Noah sent forth a dove, which, finding no rest for the sole of her foot, returned to him. After seven days he sent forth the dove a second time, and again she returned to the ark. At the expiration of other seven days he let go the dove a third time; and a week is spoken of (Gen. xxix.) as a well-known period of time.

This septenary division of time has, from the earliest ages, been uniformly observed over all the eastern world. The Israelites, Assyrians, Egyptians, Indians, Arabians, and Persians, have always made use of a week, consisting of seven days. Many vain attempts have been made to account for this uniformity; but a practice so general and prevalent could never have taken place had not the septenary distribution of time been instituted from the beginning, and handed down by tradition.

From the same source also must the ancient heathens have derived their notions of the sacredness of the seventh day. That they had such notions of it is evident from several passages of the Greek poets quoted by Aristobulus, a learned Jew, by Clement of Alexandria, and Eusebius.

———ἑβδομη, ἱερον ἡμαρ.
The seventh, the *sacred* day.

Ἑβδοματη δ' ἐπειτα κατηλυθεν, ἱερον ἡμαρ.
Afterwards came the seventh, the *sacred* day.

Again:

Ἑβδομον ἡμαρ ἐην, και τω τετελετο παντα.
On the *seventh* day all things were *completed*.

Ἑβδοματη δυοι τετελησμενα παντα τετυκται.
All things were made *perfect* on the *seventh* day.

That they likewise held the number *seven* in very high estimation, has been shown by a learned, though sometimes fanciful author,[2] with such evidence as to enforce conviction. The Pythagoreans call it the venerable number, σεβασμου ἀξιος, worthy of veneration, and held it to be perfect and most proper to religion. They denominated it fortune, and also styled it voice, sound, muse, because, no doubt, seven distinct notes comprehend the whole scale of music, beyond which neither voice nor instrument can go, but must return from the seventh, and begin again anew. They likewise designed it τελεσφορος, leading to the end. Seven, in the Hebrew language, is expressed by a word that primarily signifies fulness, completion, sufficiency, and is applied to a week, or seven days, because that was the full time employed in the work of creation; to the Sabbath, because on it all things were completed; and to an oath, because it is sufficient to put an end to all strife. This opening of the Hebrew root will enable us to come at the meaning of those expressions of the heathens, and also let us see whence they derived their ideas and modes of speaking, and that the knowledge of the transactions at the creation, though much perverted, was never entirely lost by them.

It has been supposed by some, that the heathens borrowed the notion of the sacredness of the seventh day from the Jews. But this opinion will not readily be admitted, when it is considered that the Jews were held in the greatest contempt by the surrounding nations, who derided them no less for their sabbaths than for their circumcision. All sorts of writers ridiculed them on this account. Seneca charged them with spending the seventh part of their time in sloth. Tacitus said, that not only the seventh day, but also the seventh year, was unprofitably wasted. Juvenal brings forward the same charge; and Persius upbraided them with their *recutita sabbata*. Plutarch said that they kept it in honour of Bacchus; Tacitus affirmed that it was in honour of Saturn; but the most abominable assertion of all is that of Apion, who said that they observed the Sabbath in memory of their being cured on that day of a shameful disease, called by the Egyptians *sabbo*.

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[1] שבע, *seven*.

[2] Holloway's Originals, vol. ii. p. 60.

Some, perceiving the force of this objection, have contended that time was divided into weeks of seven days, that each of the planetary gods, the Sun, Moon, Mercury, Venus, Mars, Jupiter, and Saturn, who were the *Dii majorum gentium*, might have a day appropriated to his service. But if such was the origin of weeks, how came the great and ancient goddess Tellus to be omitted? She was worshipped by the early idolaters as well as the other planets, and must surely have been deemed by them as worthy of a particular day set apart to her honour as the planet Saturn, who was long undiscovered, afterwards seen but occasionally, and at all times considered as of malign aspect.

Still manner in which the ancient Jews observed the sabbath.

Others have supposed, that as the year was divided into lunar months of something more than twenty-eight days, it was natural to divide the months into quarters from the different phases of the moon, which would produce as many weeks of seven days. But this supposition is less tenable than the former. The phases of the moon are not so precisely marked at the quarters as to attract to them any particular notice; nor are the quarterly appearances of one month commonly like those of another. We cannot, therefore, conceive what should have induced the earliest observers of the phases of the moon to divide the month into four parts rather than into three, or five, or seven. Had the ancient week consisted of fourteen days, it might have been inferred, with some degree of plausibility, that its length was regulated by the phases of the moon, because the shape of that luminary, at the end of the second quarter, is very precisely marked; but there is nothing which, in the present hypothesis, could have everywhere led mankind to make their weeks consist of seven days. This division of time, therefore, can be accounted for only by admitting the primeval institution of the Sabbath, as related by Moses in the book of Genesis. That institution was absolutely necessary to preserve among men a sense of religion; and it was renewed to the Jews at the giving of the law, and its observance enforced by the severest penalties. It was accordingly observed by them with more or less strictness in every part of their commonwealth; and there is none of the institutions of their divine lawgiver which, in their present state of dispersion, they more highly honour. They regard it, indeed, with a superstitious reverence, call it their spouse, their delight, and speak of it in the most magnificent terms. They have often varied in their opinions of the manner in which it ought to be kept. In the time of the Maccabees, they carried their respect for the sabbath so very high, that they would not on that day defend themselves from the attacks of their enemies. But afterwards they did not scruple to stand upon their necessary defence, although they would do nothing to prevent the enemy from carrying on their operations. When our Saviour was on earth, it was no sin to loose a beast from the stall and lead him to water; and if he had chanced to fall into a ditch, they pulled him out. But now it is absolutely unlawful to give a creature in that situation any other assistance than that of food; and if they lead an animal to water, they must take care not to let the bridle or halter hang loose, otherwise they are transgressors.

Mode of observing it among the modern Jews.

As the law enjoins rest on that day from all servile employments, in order to comply with the injunction, they undertake no kind of work on Friday but such as can easily be accomplished before evening. In the afternoon they put into proper places the meat that they have prepared to eat the day following. They afterwards set out a table covered with a clean cloth, and place bread upon it, which they also cover with another cloth; and during the sabbath the table is never moved out of its place. About an hour before sunset, the women light the sabbath lamps, which hang in the places where they eat. They then stretch forth their hands to the light, and pronounce the following benediction. "Blessed be thou, O God, king of the world, who hast enjoined us, that are sanctified by thy commandments, to light the sabbath lamp." These lamps are two or more in number, according to the size of the chamber in which they are suspended, and continue to burn during the greater part of the night. In order to begin the sabbath well, they wash their hands and faces, trim their hair, and pair their nails, beginning at the fourth finger, then going to the second, then the fifth, then the third, and ending with the thumb. If a Jew casts the parings of his nails to the ground, he is *rascah*, that is, a wicked man; for Satan has great power over those parings of nails; and it seems they are of great use to the wizards, who know how to employ them in their enchantments. If he buries them in the earth, he is *tzedic*, that is, a just man; if he burns them in the fire, he is *chesid*, that is, worthy of honour, or an holy man. When they have performed these preparatory ceremonies, they repair to the synagogue, and enter upon their devotions. As soon as prayers begin, the departed souls spring out of the purgatorial flames, and have liberty to cool themselves in water while the sabbath lasts, for which reason the Jews prolong the continuance of it as much as they can; and the rabbin have strictly commanded them not to exhaust all the water on the sabbath day, lest those miserable souls should by these means be deprived of the refreshing element. When they have ended their prayers, they return home, and salute one another, by wishing a good sabbath. They then sit down to table. The master of the family takes a cup full of wine, and lifting up his hand, says, "Blessed be thou, O God our Lord, king of the world, who hast created the fruit of the vine. Blessed be thou, O God our Lord, king of the world, who hast sanctified us by thy commandments, and given us thy holy sabbath; and of thy good will and pleasure hast left it to us an inheritance, the memorial of thy works of creation. For it is the beginning of the congregation of saints, and the memorial of the coming out of Egypt. And thou hast also chosen us from all other people, and sanctified us, and with love and pleasure hast left thy holy sabbath an inheritance. Blessed be thou, O God, who sanctifiest the sabbath." After this benediction is ended, he drinks, and gives the cup to all who are present. He then removes the cloth, and taking bread, says, "Blessed be thou, O God our Lord, king of the world, who bringest bread out of the earth." Then he breaks off a bit, and eats, and also gives a piece of it to every one of the company.

On the morning of the sabbath, the Jews do not rise so early as they do at other times, thinking, the greater pleasure they take on that day, the more devoutly they keep it. When they come into the synagogue, they pray as usual, only the devotions are somewhat longer, being intermingled with psalmody, in honour of the sabbath. The pentateuch is then produced, and seven sections of it are read in order by seven persons chosen for the purpose. Several lessons are likewise read out of the prophets, which have some relation to what was read out of the law. After morning prayers, they return to their houses, and eat the second sabbath-meal, showing every token of joy, in honour of the festival. But if one has seen any thing ominous in his sleep; if he has dreamed that he burned the book of the law, that a beam has come out of the walls of his house, or that his teeth have fallen out; then he fasts until very late at night, for all such dreams are bad ones. In the afternoon they go again to the synagogue, and perform the evening service, adding to the ordinary prayers some lessons that respect the sabbath. When the devotional duties are ended, they return home, and light a candle resembling a torch, and again sit down to eat. They remain eating until near six, and then the master of the family takes a cup, and pouring wine into it, rehearses some benedictions; after which he pours a little of the wine upon the ground, and says, "Blessed be thou, O Lord, King of the world, who hast created the fruit of the vine." Then holding the cup in his left hand, with the right he takes a box of sweet spices, and says, "Blessed be thou, O Lord God, who hast created various kinds of sweet spices." He smells the spices, and holds them out to the rest, that they may do the same. He then takes the cup in his right hand, and going to the candle views the left very narrowly, and pronounces a blessing. With the cup in the left hand, he examines the right in the same manner. Again, holding the cup in his right hand, he rehearses another benediction, and at the same time pours some of the wine on the ground. After this he drinks a little of it, and then hands it about to the rest of the family, who finish what remains. In this manner the sabbath is ended by the Jews, and they may return to their ordinary employments. Those who meet pay their compliments, by wishing one another a happy week.

Prohibitions observed.

The rabbin have reckoned up thirty-nine primary prohibitions, which ought to be observed on the sabbatical festival; but their circumstances and dependents, which are also obligatory, are almost innumerable. The thirty-nine articles are, not to till the ground, to sow, to reap, to make hay, to bind up sheaves of corn, to thrash, to winnow, to grind, to sift meal, to knead the dough, to bake, to shear, to whiten, to comb or card wool, to spin, to twine or twist, to warp, to dye, to tie, to untie, to sew, to tear or pull in pieces, to build, to pull down, to beat with a hammer, to hunt or fish, to kill a beast, to flay it, to dress it, to scrape the skin, to tan it, to cut leather, to write, to scratch out, to rule paper for writing, to kindle a fire, to extinguish it, to carry a thing from place to place, and to expose any thing to sale. These are the primary prohibitions, and each of them has its proper consequences, which amount to an incredible number; and the Jews themselves say, that if they could keep but two sabbaths as they ought, they would soon be belivered out of all their troubles.

If a Jew on a journey is overtaken by the sabbath in a wood or on the highway, no matter where, nor under what circumstances, he sits down, he will not stir out of the spot. If he falls down in the dirt, he lies there; he will not rise up. A fresh wound must not be bound up on the sabbath day. A plaster that had been formerly applied to a sore may remain on it; but if it falls off, it must not be put on anew. The lame may use a staff, but the blind must not. These particulars, and a great many more of the same nature, are observed by the Jews in the strictest manner. But if any one wishes to know more of the practice of that race, he may consult Buxtorf's *Judaica Synagoga* (chap. x. xi.), where he will find a complete detail of their customs and ceremonies on the sabbath, and likewise see the primary prohibitions branched out into their respective circumstances.

Institution of Sunday, or the Lord's day.

As the seventh day was observed by the Jewish church, in memory of the rest of God after the works of creation, and their own deliverance from Pharaoh's tyranny; so the first day of the week has always been observed by the Christian church, in memory of the resurrection of Jesus Christ, by which he completed the work of man's redemption upon earth, and rescued him from the dominion of him who has the power of death.

This day was denominated by the primitive Christians the Lord's day. It was also sometimes called Sunday, which was the name given to it by the heathens, who dedicated it to the sun. And, indeed, although it was originally called Sunday by the heathens, yet it may very properly retain that name among the Christians, because it is dedicated to the honour of the true light, which lighteth every man that cometh into the world; of Him who is styled by the prophet the Sun of righteousness, and who on this day arose from the dead. But although it was, in the primitive times, indifferently called the Lord's day or Sunday, yet it was never denominated the sabbath; a name constantly appropriated to Saturday, or the seventh day, both by sacred and ecclesiastical writers.

The mention of it in the New Testament accidental.

Of the change from the seventh to the first day of the week, or even of the institution of the Lord's day festival, there is no account in the New Testament. However, it may be fairly inferred from it, that the first day of the week was, in the apostolic age, a stated time for public worship. On this day the apostles were assembled, when the Holy Ghost came down so visibly upon them to qualify them for the conversion of the world. On this day we find St Paul preaching at Troas, when the disciples came to break bread; and the directions which the same apostle gives to the Corinthians concerning their contributions for the relief of their suffering brethren, plainly allude to their religious assemblies on the first day of the week.

Thus it would appear from several passages in the New Testament, that the religious observation of the first day of the week is of apostolical appointment; and may indeed be very reasonably supposed to be amongst those directions and instructions which our blessed Lord himself gave to his disciples during the forty days between his resurrection and ascension, in which he conversed with them, and spoke of the things pertaining to the kingdom of God. Still, however, it must be owned that those passages, although the plainest that occur, are not sufficient to prove the apostolical institution of the Lord's day, or even the actual observation of it. In order, therefore, to place the matter beyond all controversy, recourse must be had to ecclesiastical testimony.

It nevertheless appears to be of divine origin.

From the consentient evidence and uniform practice of the primitive church, and also from the attestation of Pliny, we find that the first day of the week was observed in the earliest ages as a holiday or festival, in honour of the resurrection of Christ. Now there are but two sources whence the custom could possibly have arisen. It must have been instituted either by human or divine authority. But by human authority it was not instituted; for there was no general council in those early times, and without the decree of a general council it was impossible that any ecclesiastical institution could have been universally established at once. It remains, therefore, that it must have been instituted by divine authority; and that it really was so, will further appear from the following considerations. It is certain that the apostles travelled over the greatest part of the world, and planted churches in the remotest parts of it. It is certain also that they were all led by the same spirit; and their desire was, that unity and uniformity should be observed in all the churches which they had founded. It is not therefore surprising that, in the primitive times, the same doctrine, the same worship, the same rites and customs, should prevail all over the Christian world; nay, it would have been unaccountable had the case been otherwise. For this reason we may conclude that every custom, universally observed in the early ages of the Christian church, and not instituted by a general council, was of original appointment.

As the Lord's day is sanctified, that is, set apart, to Christians for the worship and service of God, their Creator, Redeemer, and Sanctifier, a little consideration will easily discover how it ought to be observed. Although a day separated from worldly business, yet it is in no sense a day of idleness, but a season appropriated to the works of salvation and labours of charity.

Ho it was obs ved in th rimi- tiv imes.

In the primitive times this holy day was observed in the most solemn manner. From the monuments of those early ages we learn, that it was spent in a due and constant attendance on all the offices of divine worship. On it they held their religious assemblies, in which the writings of the apostles and prophets were read to the people, and the doctrines of Christianity further pressed upon them by the exhortations of the clergy. Solemn prayers and praises were offered up to God, and hymns sung in honour of Christ; the Lord's supper was constantly celebrated; and collections were made for the maintenance of the clergy and the relief of the poor. On this day they abstained as much as they could from bodily labour. They looked upon it as a day of joy and gladness; and therefore all fasting on it was prohibited, even during the season of Lent, their great annual fast. Such was the zeal of those times, that nothing, no not the severest persecutions, hindered them from celebrating the holy offices on this day. They were often beset and betrayed, and as often slaughtered in consequence of cruel edicts from emperors, those very emperors for whose happiness and prosperity they always offered up their fervent prayers. For this cause, when they could not meet in the day-time, they assembled in the morning before it was light; and when sick, in exile, or in prison, nothing troubled them more than that they could not attend the service of the church. No trivial pretences were then admitted for any one's absence from public worship; for severe censures were passed upon all who were absent without some urgent necessity. When the empire became Christian, Constantine and his successors made laws for the more solemn observation of the Lord's day. They prohibited all prosecutions and pleadings, and other juridical matters, to be transacted on it, and also all unnecessary labour; not that it was looked upon as a Jewish sabbath, but because these things were considered as inconsistent with the duties of the festival.

But although the primitive Christians did not indulge themselves in the practice of unnecessary labour or trifling amusements, yet they did not wholly abstain from working, if great necessity required it. The council of Laodicea enjoined that men should abstain from work on the Lord's day if possible; but if any were found to Judaize, they were to be censured as great transgressors. So circumspect were the primitive Christians about their conduct on this festival, that on the one hand they avoided all things which tended to profane it, whilst on the other they censured all those who insisted that it should be observed with Pharisaical rigour and devotion.

Adv ta- ges ult- ing f the er- vatio f it.

The primary duty of the Lord's day is public worship. The nature and design of the Christian religion sufficiently shows the necessity and importance of assembling for the duties of devotion. The whole scope of Christianity is to bring us to an union with God, which cannot be obtained or preserved without frequent communications with him; and the reasons which show religious intercourse to be the indispensable duty of Christians in a private capacity, will bind it with equal or more force on them considered as a community.

The advantages of public worship, when duly performed, are many and great. There are two, however, which deserve to be considered in a particular manner. It gives Christians an opportunity of openly professing their faith, and testifying their obedience to their Redeemer in the wisest and best manner; and in an age when infidelity has arisen to an alarming height, when the Son of God is crucified afresh, and put to open shame, every man, who has any regard for religion, will cheerfully embrace all opportunities of declaring his abhorrence of the vicious courses pursued by those apostates. He will lay hold with pleasure on every occasion to testify that he is neither afraid nor ashamed to confess the truth; and will think it his indispensable duty openly to disavow the sins of others, that he may not incur the guilt of partaking of them.

Public worship preserves in the minds of men a sense of religion, without which society cannot exist. Nothing can keep a body of men together, and unite them in promoting the public good, but such principles of action as may reach and govern the heart. But these can be derived only from a sense of religious duties, which can never be so strongly impressed upon the mind as by a constant attendance upon public worship. Nothing can be more weak than to neglect the public worship of God, under the pretence that we can employ ourselves as acceptably to our Maker at home in our closets. Both kinds of worship are indeed necessary; but one debt cannot be paid by the discharge of another. By public worship every man professes his belief in that God whom he adores, and appeals to Him for his sincerity, of which his neighbour cannot judge. By this appeal he endears himself more or less to others. It creates confidence; and it roots in the heart benevolence, and all other Christian virtues, which produce, in common life, the fruits of mutual love and general peace.

Sabbath-Breaking, or profanation of the Lord's day, is punishable by law. For besides the notorious indecency and scandal of permitting any secular business to be publicly transacted on that day, in a country professing Christianity, and the corruption of morals which usually follows its profanation, the keeping one day in seven holy, as a time of relaxation and refreshment, as well as for public worship, is of admirable service to a state, considered merely as a civil institution. It humanizes, by the help of conversation and society, the manners of the lower classes, which would otherwise degenerate into a sordid ferocity and selfishness of spirit; it enables the industrious workman to pursue his occupation in the ensuing week with health and cheerfulness; it imprints on the minds of the people that sense of their duty to God which is so necessary to make them good citizens, but which yet would be worn out and defaced by an unremitted continuance of labour, without any stated times of recalling them to the worship of their Maker.

SABBEA, a town of Yemen, in Arabia, in the mountainous district of Khaulan, eight miles north-east of Abu Arish.

SABEIA, a small island in the Red Sea. Lat. 18. 22. N.

SABELLIANS, a sect of Christians of the third century, that embraced the opinions of Sabellius, a philosopher of Egypt, who openly taught that there is but one person in the Godhead. The Sabellians maintained, that the Word and the Holy Spirit are only virtues, emanations, or functions of the Deity, and held, that he who is in heaven is the Father of all things; that he descended into the virgin, became a child, and was born of her as a son; and that having accomplished the mystery of our salvation, he diffused himself on the apostles in tongues of fire, and was then denominated the Holy Ghost. This they explained by comparing God to the sun, the illuminative virtue or quality of which was the Word, and its warming virtue the Holy Spirit. The Word, they taught, was darted, like a divine ray, to accomplish the work of redemption; and that being re-ascended to heaven, the influences of the Father were communicated after a like manner to the apostles.

SABIANS, an early sect of worshippers of the sun, moon, and stars. See POLYTHEISM.

SABINUS, GEORGE, a celebrated Latin poet, born in the electorate of Brandenburg in 1508. His poem *Res Gestæ Cæsarum Germanorum* spread his reputation all over Germany, and procured him the patronage of all the princes who had any regard for polite literature. He was made professor of the belles lettres at Frankfort on the Oder, rector of the new academy of Königsberg, and counsellor to the elector of Brandenburg. He married two wives, the first of whom was the eldest daughter of Melancthon, and died in 1560. His poems are well known, and have often been printed.

SABIONETTA, a city of the province of Mantua, in Austrian Lombardy, with a citadel, four churches, and 6320 inhabitants. Long. 10. 24. 45. E. Lat. 44. 59. 47. N.

SABLE, or *Sable Animal*, in *Zoology*, a creature of the weasel-kind, called by authors *mustela zibellina*. See Mammalia.

Sable, *Cape*, the most southerly province of Nova Scotia, in North America. Long. 65. 34. W. Lat. 43. 24. N.

Sable, in *Heraldry*, signifies black, and is borrowed from the French, as are most terms in this science. In engraving it is expressed by both horizontal and perpendicular lines crossing each other. Sable of itself signifies constancy, learning, and grief; and ancient heralds will have it, that when it is compounded with

Or,	it signifies	Honour.
Arg.		Fame.
Gul.		Respect.
Azu.		Application.
Ver.		Comfort.
Pur.		Austerity.

SABLES D'OLONNE, Les, an arrondissement of the department of Vendée, in France. It extends over seven hundred and thirty-two and a half square miles, and comprehends eleven cantons, divided into seventy-nine communes, with 98,508 inhabitants in 1836. The capital is the city of the same name, situated at the termination of a sandy plain on the sea-shore, and only connected by a strip of land with the continent. It has a small harbour fit for vessels of not more than a hundred and fifty tons. It consists of four long parallel streets, with 4778 inhabitants, who carry on the fisheries, and deal in corn, cattle, and salt, which last is made by the sun on the marshes. Long. 1. 53. 3. W. Lat. 46. 29. 50. N.

SABON, an island in the Eastern Seas, at the southern entrance of the Straits of Malacca, of a triangular form. It is separated from Sumatra by a navigable channel, the Straits of Sabon, and is twenty-four miles in circumference. Long. 103. 21. E. Lat. 0. 24. N.

SABOU, or Saivu, probably the same island as Savo, near Timor, to which the reader is referred.

SABRAO, an island in the Eastern Seas, separated from the island of Flores by the Straits of Flores. It is forty miles in length by eighteen in average breadth.

SABRE, a kind of sword or scimitar, with a very broad and heavy blade, thick at the back, and a little falcated or crooked towards the point. It is the ordinary weapon worn by the Turks, who are very expert in the use of it.

SA BULAGH, a town and district of Persia, in Azerbijan, situated on the lake Urumea, thirty miles from Maraga.

SACÆA, a feast which the ancient Babylonians and other orientals held annually in honour of the deity Anaitis. The Sacæa were in the East what the Saturnalia were at Rome, namely, a feast for the slaves. One of the ceremonies was to choose a prisoner condemned to death, and to allow him all the pleasures and gratifications he could wish, before he was carried to execution.

SACCHARUM, Sugar, or the *Sugar-Cane*. This plant is a native of Africa, the East Indies, and Brazil; whence it was introduced into our West India islands soon after they were settled. The sugar-cane is the glory and the pride of those islands. It amply rewards the industrious planter, enriches the British merchant, gives bread to thousands of manufacturers and seamen, and brings an immense revenue to the crown. See Sugar.

SACCHAROMETER, an instrument for ascertaining the value of worts, and the strength of different kinds of malt liquor. The name signifies a measure of sweetness.

SACHEVEREL, Dr Henry, a famous Tory clergyman in the reign of Queen Anne, who distinguished himself by indecent and scurrilous sermons and writings against the dissenters and revolution principles. He owed his consequence, however, to being indiscreetly prosecuted by the House of Lords for his assize-sermon at Derby, and his fifth of November sermon at St Paul's in 1709, in which he asserted the doctrine of non-resistance to government in its utmost extent, and reflected severely on the act of toleration. The high and low church parties were very violent at that time; and the trial of Sacheverel inflamed the high-church party to dangerous riots and excesses. He was, however, suspended for three years, and his sermons were burned by the common hangman. The Tories being in administration when Sacheverel's suspension expired, he was freed with every circumstance of honour and public rejoicing; was ordered to preach before the Commons on the 29th of May; had the thanks of the house for his discourse; and obtained the valuable rectory of St Andrews, Holborn. He died in 1724.

SACK, a wine used by our ancestors, which some have taken to be Rhenish and some Canary wine. Venner, in his *Via Recta ad Vitam Longam*, printed in 1628, says that sack is "completely not in the third degree, and that some affect to drink sack with sugar and some without; and upon no other ground, as I think, but as it is best pleasing to their palate." He goes on to say, "that sack, taken by itself, is very hot and very penetrative; being taken with sugar, the heat is both somewhat allayed, and the penetrative quality thereof also retarded." He adds further, that Rhenish declines after a twelvemonth, but sack and the other stronger wines are best after they are two or three years old. It appears to be highly probable that sack was not a sweet wine, from its being taken with sugar; and that it did not receive its name from having a saccharine flavour, but from its being originally stored in sacks or borachios. It does not appear to have been a French wine, but a strong wine, the production of a hot climate. Probably it was what is called dry mountain, or some Spanish wine of that kind. This conjecture is the more plausible, as Howell, in his French and English Dictionary, printed in the year 1650, translates sack by the words "vin d'Espagne, vin sec."

SACKBUT, a musical instrument of the wind kind, being a sort of trumpet, though different from the common trumpet both in form and size. It is fit to play a bass, and is contrived to be drawn out or shortened, according to the tone required, whether grave or acute. The Italians call it *trombone*, and the Latins *tuba ductilis*.

SACKVILLE, Thomas, Lord Buckhurst and Earl of Dorset, a statesman and poet, the son of Richard Sackville of Buckhurst, in the parish of Withian, in Sussex, was born in the year 1536. He was sent to Hart Hall, in Oxford, in the latter end of the reign of Edward VI. whence he removed to Cambridge, where he took a degree of master of arts, and thence to the Inner Temple. He now applied himself to the study of the law, and was called to the bar. We are told that he commenced poet whilst at the universities, and that these his juvenile productions were much admired, though none of them have been preserved. In the fourth and fifth years of Queen Mary we find him a member of the House of Commons, about which time, in 1557, he wrote a poetical piece, entitled the Induction, or the Mirror of Magistrates. This last was meant to comprehend all the unfortunate great from the beginning of our history; but the design being dropped, it was inserted in the body of the work. The Mirror of Magistrates is formed upon a dramatic plan, in which the persons are introduced speaking. The Induction is written much in the style of Spencer, who, with some probability, is supposed to have imitated this author.

In the year 1561, his tragedy of Gorboduc was acted before Queen Elizabeth by the gentlemen of the Inner Temple. This was the first tolerable tragedy in our language. The Companion to the Playhouse tells us that the first three acts were written by Mr Thomas Norton. Sir Philip Sidney, in his Apology for Poetry, says, "it is full of stately speeches and well-sounding phrases, climbing to the height of Seneca in his style." Rymer speaks highly in its commendation. Mr Spence, at the instigation of Pope, republished it in 1736, with a pompous preface. It is said to be our first dramatic piece written in verse. In the first parliament of this reign Mr Sackville was member for Sussex, and for Buckinghamshire in the second. In the mean time he made the tour of France and Italy, and in 1566 was imprisoned at Rome, when he was informed of his father's death, by which he became possessed of a very considerable fortune. Having now obtained his liberty, he returned to England, and being first knighted, was created Lord Buckhurst. In 1570 he was sent as ambassador to France. In 1586 he was one of the commissioners appointed to try the unfortunate Mary queen of Scots, and was the messenger employed to report the confirmation of her sentence, as well as to see it executed. The year following he went as ambassador to the states-general, in consequence of their complaint against the Earl of Leicester, who, disliking his impartiality, prevailed on the queen to recall him, and confine him to his house. In this state of confinement he continued about ten months, when Leicester dying, he was restored to favour, and in 1580 was installed knight of the garter. But the most incontrovertible proof of the queen's partiality for Lord Buckhurst appeared in the year 1591, when she caused him to be elected chancellor in the university of Oxford, in opposition to her favourite Essex. In 1598, on the death of the treasurer Burghley, Lord Buckhurst succeeded him, and by virtue of his office became in effect prime minister; and when, in 1601, the earls of Essex and Southampton were brought to trial, he sat as lord high steward on that awful occasion. On the accession of James I. he was graciously received, had the office of lord high treasurer confirmed to him for life, and was created Earl of Dorset. He continued high in favour with the king till the day of his death, which happened suddenly on the 19th day of April 1608, in the council-chamber at Whitehall. He was interred with great solemnity in Westminster Abbey.

SACKVILLE, *Charles*, Earl of Dorset, a celebrated wit and poet, descended from the foregoing, was born in 1637. He was, like Villiers, Rochester, and Sedley, one of the libertines of King Charles's court, and sometimes indulged himself in inexcusable excesses. He openly discountenanced the violent measures of James II., and engaged early for the prince of Orange, by whom he was made lord chamberlain of the household, and taken into the privy council. He died in 1706, and left several poetical pieces, which, though not considerable enough to make a volume by themselves, may be found amongst the works of the minor poets, published in 1749.

SACMARA, a considerable river of Asiatic Russia, in the government of Orenburg. It has its rise in the Ural Mountains, and, flowing southwards, falls into the river of the same name. Its banks are thinly inhabited, though they are rich in mines of copper.

SACRAMENT is derived from the Latin word *sacramentum*, which signifies an oath, particularly the oath taken by soldiers to be true to their country and their general. The words of this oath, according to Polybius, were, *obtemperaturus sum et facturus quicquid mandabitur ab imperatoribus juxta vires.* The word was adopted by the writers of the Latin church, and employed, perhaps with no great propriety, to denote those ordinances of religion by which Christians came under an obligation, equally sacred with that of an oath, to observe their part of the covenant of grace, and in which they had the assurance of Christ that he would fulfil his part of the same covenant.

Of sacraments, in this sense of the word, Protestant churches admit but of two; and it is not easy to conceive how a greater number can be made out from Scripture, if the definition of a sacrament be just which is given by the church of England. By that church the meaning of the word sacrament is declared to be "an outward and visible sign of an inward and spiritual grace given unto us, ordained by Christ himself as a means whereby we receive the same, and a pledge to assure us thereof." According to this definition, baptism and the Lord's Supper are certainly sacraments; for each consists of an outward and visible sign of what is believed to be an inward and spiritual grace; both were ordained by Christ himself; and by the reception of each does the Christian come under a solemn obligation to be true to his divine master, according to the terms of the covenant of grace. The Catholics, however, add to this number confirmation, penance, extreme unction, ordination, and marriage, holding in all seven sacraments; but two of those rites not being peculiar to the Christian church, cannot possibly be Christian sacraments, in contradistinction to the sacraments or obligations into which men of all religions enter. Marriage was instituted from the beginning, when God made man male and female, and commanded them to be fruitful, and multiply, and replenish the earth; and penance, as far as it is of the same import with repentance, has a place in all religions which teach that God is merciful and men fallible. The external severities imposed upon penitents by the church of Rome may indeed be in some respects peculiar to the discipline of that church, though the penances of the Hindus are certainly as rigid; but none of these severities were ordained by Christ himself as the pledge of an inward and spiritual grace; nor do they, like baptism and the Lord's Supper, bring men under obligations which are supposed to be analogous to the meaning of the word *sacramentum.* Confirmation has a better title to the appellation of a sacrament than any of the other five rites of that name, though it certainly was not considered as such by the earliest writers of the Christian church, nor does it appear to have been ordained by Christ himself. Ordination is by many churches considered as a very important rite; but as it is not administered to all men, nor has any particular form appropriated to it in the New Testament, it cannot be considered as a Christian sacrament conferring grace generally necessary to salvation. It is rather a form of authorizing certain persons to perform certain offices, which respect not themselves, but the whole church; and extreme unction is a rite which took its rise from the miraculous powers of the primitive church vainly claimed by the succeeding clergy. These considerations seem to have some weight with the Catholic clergy themselves; for they call the eucharist, by way of eminence, the holy sacrament. Thus to expose the holy sacrament, is to lay the consecrated host on the altar to be adored. The procession of the holy sacrament is that in which this host is carried about the church, or about a town.

Congregation of the Holy S*ACRAMENT*, a religious establishment formed in France, whose founder was Autherius, bishop of Bethlehem, and which, in 1644, received an order from Urban VIII. to have always a number of ecclesiastics ready to exercise their ministry among pagan nations, wherever the pope, or the congregation *de propaganda fide*, should appoint.

SACRAMENTARIANS, a general name given to all such as have published or held erroneous doctrines of the sacrament of the Lord's Supper. The term is chiefly applied among Roman Catholics, by way of reproach to the Lutherans, Calvinists, and other Protestants.

SACRAMENTARY, an ancient Catholic church-book, which contains all the prayers and ceremonies practised at the celebration of the sacraments. It was written by Pope Gelasius, and afterwards revised, corrected, and abridged, by St Gregory.

SACRED, something holy, or that is solemnly offered and consecrated to God, with benedictions, unctions, and the like. Kings, prelates, and priests, are reckoned sacred persons; abbots are only blessed. The deaconhood, subdeaconhood, and priesthood, are all sacred orders, and are said to impress an indelible character. The custom of consecrating kings with holy oil is derived, says Gutlingius, from the Hebrews, amongst whom, he agrees with Grotius, it was never used but to kings who had not an evident right by succession. He adds, that the Christian emperors never used it before Justin the younger.

SACRED is also applied to things belonging to God and the church. Church-lands and ornaments are held sacred. The sacred college is that of the cardinals.

SACRED *Majesty* is applied to the emperor, and to the king of England.

SACRIFICE, an offering made to God on an altar, by means of a regular minister, as an acknowledgment of his power, and a payment of homage. Sacrifices, though the term is sometimes used for all the offerings made to God, or in any way devoted to his service and honour, differ from mere oblations in this, that in a sacrifice there is a real destruction or change of the thing offered; whereas an oblation is only a simple offering or gift, without any such change at all. Thus, all sorts of tithes and first fruits, and whatever of men's worldly substance is consecrated to God, for the support of his worship and the maintenance of his ministers, are offerings or oblations; and these, under the Jewish law, were either of living creatures or other things; but sacrifices, in the more peculiar sense of the term, were either wholly or in part consumed by fire. They have by divines been divided into bloody and unbloody. Bloody sacrifices were made of living creatures; unbloody, of the fruits of the earth. They have also been divided into expiatory, impetratory, and eucharistical. The first kind were offered to obtain of God forgiveness of sins; the second to procure some favour; and the third to express thankfulness for favours already received. Under one or other of these heads may all sacrifices be arranged; though we are told that the Egyptians had six hundred and sixty-six different kinds, a number surpassing all credibility.

Concerning the origin of sacrifices very various opinions have been held. By many, the Phœnicians are supposed to have been the authors of them, though Porphyry attributes their invention to the Egyptians; and Ovid imagines, from the import of the terms *victim* and *hostia*, that no bloody sacrifices were offered until wars prevailed in the world, and nations obtained victories over their enemies. These are mere hypotheses, contradicted by the most authentic records of antiquity, and entitled to no regard.

By modern deists, sacrifices are said to have had their origin in superstition, which operates much in the same way in every country. It is therefore weak, according to these men, to derive this practice from any particular people, since the same mode of reasoning would lead various nations, without any intercourse with each other, to entertain the same opinions respecting the nature of their gods, and the proper means of appeasing their anger. Men of gross conceptions imagine their deities to be, like themselves, covetous and cruel. They are accustomed to appease an injured neighbour by a composition in money; and they endeavour to compound in the same manner with their gods, by rich offerings to their temples and to their priests. The most valuable property of a simple people is their cattle. These offered in sacrifice are supposed to be fed upon by the divinity, and are actually fed upon by his priests. If a crime is committed which requires the punishment of death, it is accounted perfectly fair to appease the deity by offering one life for another; because, by savages, punishment is considered as a debt, for which a man may compound in the best way that he can, and which one man may pay for another. Hence, it is said, arose the absurd notions of imputed guilt and vicarious atonement. Among the Egyptians a white bull was chosen as an expiatory sacrifice to their god Apis. After being killed at the altar, his head was cut off and cast into the river, with the following execration: "May all the evils impending over those who perform this sacrifice, or over the Egyptians in general, be averted on this head."[1]

Had sacrifice never prevailed in the world but among such gross idolaters as worshipped departed heroes, who were supposed to retain in their state of deification all the passions and appetites of their mortal state, this account of the origin of that mode of worship would have been to us perfectly satisfactory. We readily admit that such mean notions of their gods may have actually led far distant tribes, who could not derive any thing from each other through the channel of tradition, to imagine that beings of human passions and appetites might be appeased or bribed by costly offerings. But we know, from the most incontrovertible authority, that sacrifices of the three kinds that we have mentioned were in use among people who worshipped the true God, and who must have had very correct notions of his attributes. Now we think it impossible that such notions could have led any man to fancy that the taking away of the life of a harmless animal, or the burning of a cake or other fruits of the earth in the fire, would be acceptable to a Being self-existent, omnipotent, and omniscient, who can neither be injured by the crimes of his creatures, nor receive any accession of happiness from a thousand worlds.

Sensible of the force of such reasoning as this, some persons of great name, who admit the authenticity of the Jewish and Christian Scriptures, and firmly rely on the atonement made by Christ, are yet unwilling to allow that sacrifices were originally instituted by God. Of this way of thinking were St Chrysostom, Spencer, Grotius, and Warburton, as were likewise the Jews Maimonides, R. Levi, Ben Gerson, and Abarbanel. The greater part of these writers maintain that sacrifices were at first a human institution; and that God, in order to prevent their being offered to idols, introduced them into his service, though he did not approve of them as good in themselves, or as proper rites of worship. That the infinitely wise and good God should introduce into his service improper rites of worship, appears to us so extremely improbable, that we cannot but wonder how such an opinion should ever have found its way into the minds of such men as those who held it. Warburton's theory of sacrifice is much more plausible, and worthy of particular examination.

According to this ingenious prelate, sacrifices had their origin in the sentiments of the human heart, and in the ancient mode of conversing by action in aid of words. Gratitude to God for benefits received is natural to the mind of man, as well as his bounden duty. "This duty," says the bishop,[2] "was in the most early times discharged in expressive actions, the least equivocal of which was the offerer's bringing the first fruits of pasturage or agriculture to that sequestered place where the Deity used to be more solemnly invoked, at the stated times of public worship; and there presenting them in homage, with a demeanour which spoke to this purpose: 'I do hereby acknowledge thee, O my God, to be the author and giver of all good; and do now, with humble gratitude, return my warmest thanks for these thy blessings particularly bestowed upon me.'" Things thus devoted became thenceforth sacred; and to prevent their desecration, the readiest way was to send them to the table of the priest, or to consume them in the fire of the altar. Such, in the opinion of our author, was the origin of eucharistical sacrifices. Impetratory or precative sacrifices had, he thinks, the same origin, and were contrived to express by action an invocation for the continuance of God's favour. "Expiatory sacrifices," says the same learned prelate, "were in their own nature as intelligible, and in practice as rational, as either of the other two. Here, instead of presenting the first fruits of agriculture and pasturage, in corn, wine, oil, and wool, as in the eucharistical, or a portion of what was to be sown or otherwise propagated, as in the impetratory, some chosen animal, precious to the repenting criminal who deprecates, or supposed to be obnoxious to the Deity who is to be appeased, was offered up and slain at the altar, in an action which, in all languages, when translated into words, speaks to this purpose: 'I confess my transgressions at thy footstool, O my God, and with the deepest contrition implore thy pardon, confessing that I deserve death for those my offences.' The latter part of the confession was more forcibly expressed by the action of striking the devoted animal, and depriving it of life; which, when put into words, concluded in this manner: 'And I own that I myself deserve the death which I now inflict on this animal.'"

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[1] Herodotus, lib. ii.

[2] Divine Legation of Moses demonstrated, b. ix. c. ii.

This system of sacrifice, which his lordship thinks so well supported by the most early movements of simple nature, we admit to be ingenious, but by no means satisfactory. That mankind in the earlier ages of the world were accustomed to supply the deficiencies of their language by expressive gesticulations, we are not inclined to controvert. The custom prevails among savage nations, or nations half civilized, at the present day. His lordship, however, is of opinion, and we heartily agree with him, that our first parents were instructed by God to make articulate sounds significant of ideas, notions, and things, and not left to fabricate a language for themselves. That this heaven-taught language could at first be copious, no man will suppose, who thinks of the paucity of ideas which those who spoke it had to express; but when we consider its origin, we cannot entertain a doubt but that it was precise and perspicuous, and admirably adapted to all the real purposes of life. Among these purposes must surely be included the worship of God as the most important of all. Every sentiment therefore which enters into worship, gratitude, invocation, confession, and deprecation, the progenitors of mankind were undoubtedly taught to clothe in words the most significant and unequivocal; but we know from Moses, whose divine legation the bishop surely admitted, that Cain and Abel, the eldest children of our first parents, worshipped God by the rites of sacrifice; and can we suppose that this practice occurred to them from their having so far forgotten the language taught them by their father, as to be under the necessity of denoting by action what they could not express by words? If this supposition be admitted, it will force upon us another still more extravagant. Even Adam himself must, in that case, have become dumb in consequence of his fall; for it is not conceivable, that as long as he was able to utter articulate sounds, and affix a meaning to them, he would cease, in the presence of his family, to confess his sins, implore forgiveness, and express his gratitude to God for all his mercies.

The author, as if aware of some such objection as this, contends, that if sacrifices had arisen from any other source than the light of reason, the Scripture would not have been silent concerning that source; "especially since we find Moses carefully recording what God immediately, and not nature, taught to Adam and his family." "Had the original of sacrifice," says he, "been prescribed and directly commanded by the Deity, the sacred historian could never have omitted the express mention of that circumstance. The two capital observances in the Jewish ritual were the Sabbath and sacrifices. To impress the highest reverence and veneration on the Sabbath, he is careful to record its divine original; and can we suppose that had sacrifices had the same original, he would have neglected to establish this truth at the time that he recorded the other, since it is of equal use and of equal importance? I should have said, indeed, of much greater; for the multifarious sacrifices of the law had not only a reference to the forfeiture of Adam, but likewise prefigured our redemption by Jesus Christ."

But all this reasoning was foreseen, and completely answered, before his lordship gave it to the public. It is probable, that though the distinction of weeks was well known over all the eastern world, the Hebrews, during their residence in Egypt, were very negligent in their observance of the Sabbath. To enforce a religious observance of that sacred day, it became necessary to inform them of the time and occasion of its first institution, that they might keep it holy in memory of the creation; but, in a country like Egypt, the people were in danger of holding sacrifices rather in too high than too low veneration, so that there was not the same necessity for mentioning explicitly the early institution of them. It was sufficient that they knew the divine institution of their own sacrifices, and the purposes for which they were offered. Besides this, there is reason to believe, that, in order to guard the Hebrews from the infections of the heathen, the rite of sacrificing was loaded with many additional ceremonies at its second institution under Moses. It might, therefore, be improper to relate its original simplicity to a rebellious people, who would think themselves ill used by any additional burdens of trouble or expense, however really necessary to their happiness. Bishop Warburton sees clearly the necessity of concealing from the Jews the spiritual and refined nature of the Christian dispensation, lest such a backsliding people should, from the contemplation of it, have held in contempt their own economy. This, he thinks, is the reason why the prophets, speaking of the reign of the Messiah, borrow their images from the Mosaic dispensation, that the people living under that dispensation might not despise it from perceiving its end; and we think the reason will hold equally good for their lawgiver concealing from them the simplicity of the first sacrifices, let they should be tempted to murmur at their own multifarious ritual.

But his lordship thinks that sacrifices had their origin from the light of natural reason. We should be glad to know what light natural reason can throw upon such a subject. That ignorant pagans, adoring as gods departed heroes, who still retained their sensual appetites, might naturally think of appeasing such beings with the fat of fed beasts, and the perfumes of the altar, we have already admitted; but that Cain and Abel, who knew that the God whom they adored has neither body, parts, nor passions; that he created and sustains the universe; and that from his very nature he must will the happiness of all his creatures, should be led by the light of natural reason to think of appeasing him, or obtaining favours from him, by putting to death harmless animals, is a position which no arguments of his lordship can ever compel us to admit. That Abel's sacrifice was in deed accepted, we know; but it was not accepted because it proceeded from the movements of the human mind, and the deficiency of the original language, but because it was offered through faith. The light of natural reason, however, does not generate faith, but science; and when it fails of that, its offspring is absurdity. "Faith is the substance of things hoped for, the evidence of things not seen," and comes not by reasoning, but by hearing. What things then were they of which Abel had heard, for which he hoped, and in the faith of which he offered sacrifice? Undoubtedly it was a restoration to that immortality which was forfeited by the transgression of his parents. Of such redemption an obscure intimation had been given to Adam, in the promise that the seed of the woman should bruise the head of the serpent; and it was doubtless to impress upon his mind in more striking colours the manner in which this was to be done, that bloody sacrifices were first instituted. As long as the import of such rites was thus understood, they constituted a perfectly rational worship, as they showed the people that the wages of sin is death; but when men sunk into idolatry, and lost all hopes of a resurrection from the dead, the slaughtering of animals to appease their deities was a practice grossly superstitious. It rested in itself without pointing to any further end, and the grovelling worshippers believed that by their sacrifices they purchased the favour of their deities. When once this notion was entertained, human sacrifices were soon introduced; for it naturally occurred to those who offered them, that what they most valued themselves, would be most acceptable to their offended gods. By the Jewish law, these abominable offerings were strictly forbidden, and the whole ritual of sacrifice restored to its original purity, though not simplicity.

All Christian churches, the Socinian, if it can be called a church, not excepted, for a long period of time agreed in believing that the Jewish sacrifices served, amongst other uses, for types of the death of Christ, and the Christian worship. In this belief all sober Christians agree still; whilst many are of opinion that they were likewise federal rites, as they certainly were considered by the ancient Romans.[1]

Of the various kinds of Jewish sacrifices, and the subordinate ends for which they were offered, a full account is given in the books of Moses. When an Israelite offered a loaf or a cake, the priest broke it in two parts, and, setting aside that half which he reserved for himself, broke the other into crumbs, poured oil, wine, incense, and salt upon it, and spread the whole upon the fire of the altar. If these offerings were accompanied with the sacrifice of an animal, they were thrown upon the victim to be consumed along with it. If the offerings were of the ears of new corn, they were parched at the fire, rubbed in the hand, and then offered to the priest in a vessel, over which he poured oil, incense, wine, and salt, and then burned it upon the altar, having first taken as much of it as of right belonged to himself.

The principal sacrifices amongst the Hebrews consisted of bullocks, sheep, and goats; but doves and turtles were accepted from those who were not able to bring the other. These beasts were to be perfect, and without blemish. The rites of sacrificing were various, all of which are minutely described in the books of Moses.

The manner of sacrificing amongst the Greeks and Romans was the following. In the choice of the victim, they took care that it was without blemish or imperfection; its tail was not to be too small at the end, the tongue not black, nor the ears cleft; and that the bull was one that had never been yoked. The victim being pitched upon, they gilt his forehead and horns, especially if a bull, heifer, or cow. The head they also adorned with a garland of flowers, a woollen infula or holy fillet, whence hung two rows of chaplets with twisted ribands; and on the middle of the body a kind of stole, pretty large, hung down on each side. The lesser victims were only adorned with garlands and bundles of flowers, together with white tufts or wreaths.

The victims thus prepared were brought before the altar, the lesser being driven to the place, and the greater led by an halter; when, if they made any struggle, or refused to go, the resistance was taken for an ill omen, and the sacrifice frequently set aside. The victim thus brought was carefully examined, to see that there was no defect in it; then the priest, clad in his sacerdotal habit, and accompanied with the sacrificers and other attendants, and being washed and purified according to the ceremonies prescribed, turned to the right hand, and went round the altar, sprinkling it with meal and holy water, and also besprinkling those who were present. Then the crier proclaimed with a loud voice, Who is here? To which the people replied, Many and good. The priest then having exhorted the people to join with him, by saying, Let us pray, confessed his own unworthiness, acknowledging that he had been guilty of different sins, for which he begged pardon of the gods, hoping that they would be pleased to grant his requests, accept the oblations offered them, and send them all health and happiness; and to this general form he added petitions for such particular favours as were then desired. Prayers being ended, the priest took a cup of wine, and having tasted it himself, caused his attendants to do the like, and then poured forth the remainder between the horns of the victim. Then the priest or the crier, or sometimes the most honourable person in the company, killed the beast, by knocking it down, or cutting its throat. If the sacrifice was in honour of the celestial gods, the throat was turned upwards towards heaven; but if they sacrificed to the heroes or infernal gods, the victim was killed with its throat towards the ground. If by accident the beast escaped the stroke, leaped after it, or expired with pain and difficulty, it was thought to be unacceptable to the gods. The beast being killed, the priest inspected its entrails, and made predictions from them. They then poured wine, together with frankincense, into the fire, to increase the flame, and laid the sacrifice upon the altar, which in the primitive times was burned whole to the gods, and thence called an holocaust; but in after times only part of the victim was consumed in the fire, and the remainder reserved for the sacrificers; the thighs, and sometimes the entrails, being burned to their honour, the company feasted upon the rest. During the sacrifice, the priest, and the person who gave the sacrifice, jointly prayed, laying their hand upon the altar. Sometimes they played upon musical instruments in the time of the sacrifice, and on some occasions they danced round the altar, singing sacred hymns in honour of the god.

Human SACRIFICES, an abominable practice, about the origin of which different opinions have been formed.

The true account seems to be that which we have given in the preceding article. When men had gone so far as to indulge the fancy of bribing their gods by sacrifice, it was natural for them to think of enhancing the value of so cheap an atonement by the cost and rarity of the offering; and, oppressed with their malady, they never rested till they had got that which they conceived to be the most precious of all, a human sacrifice. "It was customary," says Sanchoniathon, "in ancient times, in great and public calamities, before things became incurable, for princes and magistrates to offer up in sacrifice to the avenging dæmons the dearest of their offspring."[2] Sanchoniathon wrote of Phœnicia; but the practice prevailed in every nation under heaven of which we have received any ancient account. The Egyptians had it in the early part of their monarchy. The Cretans likewise had it, and retained it for a long time. The nations of Arabia did the same. The people of Dumah, in particular, sacrificed every year a child, and buried it underneath an altar, which they made use of instead of an idol; for they did not admit of images. The Persians buried people alive. Amestris, the wife of Xerxes, entombed twelve persons quick under ground for the good of her soul. It would be endless to enumerate every city, or every province, where these dire practices obtained. The Cyprians, the Rhodians, the Phoceans, the Ionians, those of Chios, Lesbos, Tenedos, all had human sacrifices. The natives of the Tauric Chersonese offered up to Diana every stranger whom chance threw upon their coast. Hence arose that just expostulation in Euripides upon the inconsistency of the proceeding. Iphigenia wonders, as the goddess delighted in the blood of men, that every villain and murderer should be privileged to escape, nay, to be driven from the threshold of the temple; whereas, if an honest and virtuous man chanced to stray thither, he only was seized upon and put to death. The Pelasgians, in a time of scarcity, vowed the tenth of all that should be born to them for a sacrifice, in order to procure plenty. Aristomenes the Messenian slew three hundred noble Lacedæmonians, among whom was Theopompus the king of Sparta, at the altar of Jupiter at Ithome. Without doubt the Lacedæmonians did not fail to make ample returns; for they were a severe and revengeful people, and offered similar victims to Mars. Their festival of the Diamastigosis is well known, when the Spartan boys were whipped in the sight of their parents with such severity before the altar of Diana Orthia, that they often expired under the torture. Phylarchus, as quoted by Porphyry, affirms that of old every Grecian state made it a rule, before they marched towards an enemy, to solicit a blessing on their undertakings by human victims.

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[1] *Tit. Liv.* lib. xxi. cap. xlv.

[2] Eusebius, *Præp. Evang.* lib. iv.

The Romans were accustomed to the like sacrifices. They both devoted themselves to the infernal gods, and they constrained others to submit to the same horrid doom. Hence we read in Titus Livius, that, in the consulate of Æmilius Paulus and Terentius Varro, two Gauls, a man and a woman, and two in like manner of Greece, were buried alive at Rome in the ox-market, where was a place under ground walled round to receive them, and which had before been made use of for such cruel purposes. He says it was a sacrifice not properly Roman, that is, not originally of Roman institution; yet it was frequently practised there, and that too by public authority. Plutarch makes mention of a similar instance a few years before, in the consulship of Flaminius and Furius. There is reason to think that all the principal captives who graced the triumphs of the Romans were, at the close of that cruel pageantry, put to death at the altar of Jupiter Capitolinus. Caius Marius offered up his own daughter for a victim to the *Dii Averrunci*, to procure success in a battle against the Cimbri, as we are informed by Dorotheus, quoted by Clemens. It is likewise attested by Plutarch, who says that her name was Calpurnia. Marius was a man of a sour and bloody disposition, and had probably heard of such sacrifices being offered in the enemy's camp, among whom they were very common, or he might have beheld them exhibited at a distance, and therefore murdered what was nearest, and should have been dearest to him, to counteract their fearful spells, and outdo them in their wicked machinery. Cicero, making mention of this custom being common in Gaul, adds, that it prevailed among that people even at the time he was speaking; whence we may be led to infer that it was then discontinued among the Romans. And we are told by Pliny, that it had then, and not very long before, been discouraged. For there was a law enacted, when Lentulus and Crassus were consuls, so late as the 657th year of Rome, that there should be no more human sacrifices; for till that time those horrid rites had been celebrated in broad day, without any mask or control, which, had we not the best evidence for the fact, would appear scarcely credible. And however they may have been discontinued for a time, we find that they were again renewed, though they became not so public nor so general. For not very long after this, it is reported of Augustus Cæsar, when Perugia surrendered, in the time of the second triumvirate, that besides multitudes executed in a military manner, he offered up, upon the ides of March, three hundred chosen persons, both of the equestrian and the senatorial order, at an altar dedicated to the manes of his uncle Julius. Even at Rome itself this custom was revived; and Porphyry assures us, that in his time a man was every year sacrificed at the shrine of Jupiter Latialis. Heliogabalus offered similar victims to the Syrian deity which he introduced among the Romans. The same is said of Aurelian.

The Gauls and the Germans were so devoted to this shocking custom, that no business of any moment was transacted among them without being prefaced with the blood of men. They were offered up to various gods; but particularly to Hesus, Taranis, and Thautates. These deities are mentioned by Lucan, where he enumerates the various nations who followed the fortunes of Cæsar.

The altars of these gods were far removed from the common resort of men, being generally situated in the depth of woods, that the gloom might add to the horror of the operation, and give a reverence to the place and proceeding. The persons devoted were led thither by the Druids, who presided at the solemnity, and performed the cruel offices of the sacrifice. Tacitus takes notice of the cruelty of the Hermunduri, in a war with the Catti, in which they had greatly the advantage, and at the close of which they made one general sacrifice of all that was taken in battle. The poor remains of the legion under Varus suffered in some degree the same fate. There were many places destined for this purpose all over Gaul and Germany; but especially in the mighty woods of Arduenna, and the great Hercynian Forest, a wild that extended above thirty days' journey in length. The places set apart for this solemnity were held in the utmost reverence, and only approached at particular seasons. Lucan mentions a grove of this sort near Massilia, which even the Roman soldiers were afraid to violate, although commanded by Cæsar. It was one of those set apart for the sacrifices of the country.

Claudian compliments Stilicho, that, among other advantages accruing to the Roman armies through his conduct, they could now venture into the awful forest of Hercynia, and follow the chase in those so much dreaded woods, and otherwise make use of them.

These practices prevailed among all the people of the north, of whatever denomination. The Massagetæ, the Scythians, the Getes, the Sarmatians, all the various nations upon the Baltic, particularly the Suevi and Scandinavians, held it as a fixed principle, that their happiness and security could not be obtained but at the expense of the lives of others. Their chief gods were Thor and Woden, whom they thought they could never sufficiently glut with blood. They had many very celebrated places of worship, especially in the island Rugen near the mouth of the Oder, and in Zeeland; some, too, which were very famous among the Semnones and Naharvalli. But the most reverenced of all, and the most frequented, was at Upsal; where there was every year a grand celebrity, which continued for nine days. During this term they sacrificed animals of all sorts. But the most acceptable victims, and the most numerous, were men. Of these sacrifices none were esteemed so auspicious and salutary as a sacrifice of the prince of the country. When the lot fell for the king to die, it was received with universal acclamations and every expression of joy; as it once happened in the time of a famine, when they cast lots, and it fell to King Domalder to be the people's victim. And he was accordingly put to death. Olaus Tretelger, another prince, was burned alive to Woden. They did not spare their own children. Harald the son of Gunild, the first of that name, slew two of his children to obtain a storm of wind. "He did not hesitate," says Verstegan, "to sacrifice two of his sons unto his idols, to the end he might obtain of them such a tempest at sea as should break and disperse the shipping of Harald king of Denmark." Saxo-Grammaticus mentions a similar fact. He calls the king Haquin; and speaks of the persons put to death as two very hopeful young princes. Another king slew nine sons to prolong his own life, in hopes, perhaps, that what they were abridged of would in a great measure be added to himself. Such instances, however, occur not often; but the common victims were without end. Adam Bremensis, speaking of the awful grove at Upsal, where these horrid rites were celebrated, says that there was not a single tree but what was reverenced, as if it were gifted with some portion of divinity; and all this because they were stained with gore, and foul with human putrefaction. The same is observed by Scheiffer in his account of this place.

The manner in which the victims were slaughtered was different in different places. Some of the Gaulish nations chined them with a stroke of an axe. The Celtæ placed the man who was to be offered for a sacrifice upon a block or an altar, with his breast upwards, and with a sword struck him forcibly across the sternum; then tumbling him to the ground, from his agonies and convulsions, as well as from the effusion of blood, they formed a judgment of future events. The Cimbri ripped open the bowels, and from them they pretended to divine. In Norway they beat men's brains out with an ox-yoke. The same operation was performed in Iceland, by dashing them out against an altar of stone. In many places they transfixed them with arrows. After they were dead, they suspended them upon trees, and left them to putrefy. One of the writers above quoted mentions, that in his time seventy carcasses of this sort were found in a wood of the Suevi. Dithmar of Mersburg, an author of nearly the same age, speaks of a place called Ledur in Zeeland, where there were every year ninety-nine persons sacrificed to the god Swantowite. During these bloody festivals a general joy prevailed, and banquets were most royally served. They fed, caroused, and gave a loose to indulgence, which at other times was not permitted. They imagined that there was something mysterious in the number nine; for which reason these feasts were in some places celebrated every ninth year, in others every ninth month, and continued for nine days. When all was ended, they washed the image of the deity in a pool, and then dismissed the assembly. Their servants were numerous, who attended during the term of their feasting, and partook of the banquet. At the close of all, they were smothered in the same pool, or otherwise made away with. On this Tacitus remarks, how great an awe this circumstance must necessarily infuse into those who were not admitted to these mysteries.

These accounts are handed down from a variety of authors in different ages, many of whom were natives of the countries which they describe, and to which they seem strongly attached. They would not therefore have brought so foul an imputation on the part of the world in favour of which they were each writing, nor could there be that concurrence of testimony, were not the history in general true.

The sacrifices of which we have been treating, if we except some few instances, consisted of persons doomed by the chance of war, or assigned by lot, to be offered. But among the nations of Canaan the victims were peculiarly chosen. Their own children, and whatever was nearest and dearest to them, were deemed the most worthy offering to their god. The Carthaginians, who were a colony from Tyre, carried with them the religion of their mother-country, and instituted the same worship in the parts where they settled. It consisted in the adoration of several deities, but particularly of Kronus, to whom they offered human sacrifices, and especially the blood of children. If the parents were not at hand to make an immediate offer, the magistrates did not fail to make choice of what was most fair and promising, that the god might not be defrauded of his due. Upon a check being received in Sicily, and some other alarming circumstances happening, Hamilcar, without any hesitation, laid hold of a boy, and offered him on the spot to Kronus; and at the same time he drowned a number of priests, to appease the deity of the sea. The Carthaginians another time, upon a defeat of their army by Agathocles, imputed their miscarriages to the anger of this god, whose services had been neglected. Touched with this, and seeing the enemy at their gates, they seized at once three hundred children of the prime nobility, and offered them in public for a sacrifice. Three hundred more, being persons who were somehow obnoxious, yielded themselves voluntarily, and were put to death with the others. The neglect of which they accused themselves consisted in sacrificing children purchased of parents among the poorer sort, who reared them for the purpose, and not selecting the most promising and the most honourable, as had been the custom of old. In short, there were particular children brought up for the altar, as sheep are fattened for the shambles; and they were bought and butchered in the same manner. But this indiscriminate way of proceeding was thought to have given offence. It is remarkable, that the Egyptians looked out for the most specious and handsome person to be sacrificed. The Albanians pitched upon the best man of the community, and made him pay for the wickedness of the rest. The Carthaginians chose what they thought the most excellent and at the same time the most dear to them; which made the lot fall heavy upon their children. This is taken notice of by Silius Italicus in his fourth book. Kronus, to whom these sacrifices were exhibited, was an oriental deity, the god of light and fire; and therefore always worshipped with some reference to that element.

The Greeks, we find, called the deity to whom these offerings were made Agraulos; and feigned that she was a woman, the daughter of Cecrops. But how came Cecrops to have any connection with Cyprus? Agraulos is a corruption and transposition of the original name (which should have been rendered *Uk El Aur*, or *Uk El Aurus)*; but has, like many other oriental titles and names, been strangely sophisticated, and is here changed to Agraulos. It was in reality the god of light, who was always worshipped with fire. This deity was the Moloch of the Tyrians and Canaanites, and the Melech of the East; that is, the great and principal god, the god of light, of whom fire was esteemed a symbol, and at whose shrine, instead of viler victims, they offered the blood of men.

Such was the Kronus of the Greeks and the Moloch of the Phœnicians. And nothing can appear more shocking than the sacrifices of the Tyrians and Carthaginians, which they performed to this idol. In all emergencies of state, and times of general calamity, they devoted what was most necessary and valuable to them as an offering to the gods, and particularly to Moloch. But besides these undetermined times of bloodshed, they had particular and prescribed seasons every year, when children were chosen out of the most noble and reputable families, as before mentioned. If a person had an only child, it was the more liable to be put to death, as being esteemed more acceptable to the deity, and more efficacious for the general good. Those who were sacrificed to Kronus were thrown into the arms of a molten idol, which stood in the midst of a large fire, and was red with heat. The arms of it were stretched out, with the hands turned upwards, as it were to receive them; yet sloping downwards, so that they dropped from thence into a glowing furnace below. To other gods they were otherwise slaughtered, and, as it implied, by the very hands of their parents. What can be more horrid to the imagination, than to suppose a father leading the dearest of all his sons to such an infernal shrine; or a mother the most engaging and affectionate of her daughters, just rising to maturity, to be slaughtered at the altar of Ashtaroth or Baal? Justin describes this unnatural custom very pathetically: "Quippe homines, ut victimas, immolabant; et impuberes (quæ ætas hostium misericordiam provocat) aris admovebant, pacem sanguine eorum exposcentes, pro quorum vita Dii rogari maxime solent." Such was their blind zeal, that this was continually practised; and so much of natural affection still left unextinguished, as to render the scene ten times more shocking, from the tenderness which they seemed to express. They embraced their children with great fondness, and encouraged them in the gentlest terms, that they might not be appalled at the sight of the hellish process, begging of them to submit with cheerfulness to this fearful operation. If there was any appearance of a tear rising, or a cry unawares escaping, the mother smothered it with her kisses, that there might not be any show of backwardness or constraint, but the whole might be a free-will offering. These cruel endearments being over, they stabbed them to the heart, or otherwise opened the sluices of life; and with the blood warm as it ran, besmeared the altar and the grim visage of the idol. These were the customs which the Israelites learned of the people of Canaan, and for which they are upbraided by the Psalmist. "They did not destroy the nations, concerning whom the Lord commanded them; but were mingled among the heathen, and learned their works; yea, they sacrificed their sons and their daughters unto devils, and shed innocent blood, even the blood of their sons and of their daughters, whom they sacrificed unto the idols of Canaan; and the land was polluted with blood. Thus were they defiled with their own works, and went a-whoring with their own inventions."

These cruel rites, which were practised in so many nations, made Plutarch debate with himself, "Whether it would not have been better for the Galatæ, or for the Scythians, to have had no tradition or conception of any superior being, than to have formed to themselves notions of gods who delighted in the blood of men; of gods who esteemed human victims the most acceptable and perfect sacrifice? Would it not," says he, "have been more eligible for the Carthaginians to have had the atheist Critias, or Diagoras, their lawgiver, at the commencement of their polity, and to have been taught that there was neither god nor demon, than to have sacrificed, in the manner they were wont, to the god which they adored?" In this they acted, not as the person did whom Empedocles describes in some poetry, where he exposes this unnatural custom. The sire there, with many idle vows, offers up unwittingly his son for a sacrifice; but the youth was so changed in feature and in figure that his father did not know him. These people used knowingly and wilfully to go through this bloody work, and slaughter their own offspring. Even they who were childless would not be exempted from this cursed tribute; but purchased children of the poorer sort, and put them to death with as little remorse as one would kill a lamb or a chicken. The mother who sacrificed her child stood by, without any seeming sense of what she was losing, and without uttering a groan. If a sigh did by chance escape, she lost all the honour which she proposed to herself in the offering, and the child was notwithstanding slain. All the time of this ceremony, whilst the children were murdering, there was a noise of clarions and tabors sounding before the idol, that the cries and shrieks of the victims might not be heard. "Tell me now," says Plutarch, "if the monsters of old, the Typhons and the giants, were to expel the gods, and to rule the world in their stead, could they require a service more horrid than these infernal rites and sacrifices?"

SACRILEGE, Sacrilegium, the crime of profaning sacred things, or things devoted to God; or of alienating to laymen, for common purposes, what was given to religious persons and pious uses.

SACRISTAN, a church-officer, otherwise called sexton.

SACRISTY, in *Ecclesiastical History*, an apartment in a church where the sacred utensils were kept.

SADDUCEES were a famous sect among the ancient Jews, and consisted of persons of great quality and opulence. Respecting their origin there are various accounts and various opinions. Epiphanius, and after him many other writers, contend that they took their rise from Dositheus, a sectary of Samaria, and derived their name from the Hebrew word צדק, *just* or *justice*, from the great justice and equity which they showed in all their actions; a derivation which neither suits the word Sadducee nor the general character of the sect. They are thought by some, too, to have been Samaritans. But this is by no means probable, as they always attended the worship and sacrifices at Jerusalem, and never at Gerizim.

In the Jewish Talmud, we are told that the Sadducees derived their name from Sadoc, and that the sect arose about 260 years before Christ, in the time of Antigonus of Socho, president of the Sanhedrim at Jerusalem, and teacher of the law in the principal divinity school of that city. Antigonus had often in his lectures, it seems, taught his scholars that they ought not to serve God as slaves do their masters, from the hopes of a reward, but merely out of filial love for his own sake; and from this Sadoc and Baithus inferred that there were no rewards at all after this life. They therefore separated from their master, and taught that there was no resurrection nor future state. This new doctrine quickly spread, and gave rise to the sect of Sadducees, which in many respects resembled the Epicureans.

Dr Prideaux thinks that the Sadducees were at first no more than what the Caraites are now; that is, they would not receive the traditions of the elders, but acknowledged the written word only; and the Pharisees being great promoters of those traditions, these two sects hence became directly opposite to each other.

Afterwards the Sadducees imbibed other doctrines, which rendered them a sect truly impious. They denied the resurrection of the dead, and the existence of angels, and the spirits or souls of men departed. They held that there is no spiritual being but God only; and that as to man, this world is his all. They did not deny but that we had reasonable souls; but they maintained that this soul was mortal, and, by a necessary consequence, they denied the rewards and punishments of another life. They pretended also, that what is said of the existence of angels and of a future resurrection is nothing but illusions. St Epiphanius, and after him St Augustin, have advanced, that the Sadducees denied the Holy Ghost. But neither Josephus nor the evangelists accuse them of any error like this. It has been also imputed to them, that they thought God corporeal, and that they received none of the prophecies.

It is difficult to apprehend how they could deny the being of angels, and yet receive the books of Moses, where such frequent mention is made of angels and of their appearances. Grotius and Le Clerc observe, that it is very likely they looked upon angels, not as particular beings, subsisting of themselves, but as powers, emanations, or qualities, inseparable from the Deity, as the sunbeams are inseparable from the sun. Or, perhaps, they held angels not to be spiritual, but mortal, just as they thought that substance to be which animates us and thinks in us. The ancients do not tell us how they solved this difficulty, that might be urged against them from so many passages of the Pentateuch, where mention is made of angels.

As the Sadducees acknowledged neither punishments nor recompenses in another life, so they were inexorable in chastising the wicked. They observed the law themselves, and caused it to be observed with the utmost rigour by others. They admitted none of the traditions, explications, or modifications, of the Pharisees; they kept to the text of the law, and maintained that only what was written was to be observed.

The Sadducees are accused of rejecting all the books of Scripture except those of Moses; and to support this opinion, it is observed, that our Saviour makes use of no Scripture against them, but passages taken out of the Pentateuch. But Scaliger produces good proofs to vindicate them from this reproach. He observes, that they did not appear in Israel till after the number of the holy books was fixed; and that if they had been to choose out of the canonical Scriptures, the Pentateuch was less favourable to them than any other book, since it often makes mention of angels and their apparition. Besides, the Sadducees were present in the temple, and at other religious assemblies, where the books of the prophets were read indifferently, as well as those of Moses. They were in the chief employments of the nation; many of them even were priests. Would the Jews have suffered in these employments persons that rejected the greater part of their Scriptures? Menasse ben-Israel says expressly, that they did not indeed reject the prophets, but that they explained them in a sense very different from that of the other Jews.

Josephus assures us that they denied destiny or fate; alleging that these were only sounds void of sense, and that all the good or evil that happens to us is in consequence of the good or evil side we have taken, by the free choice of our will. They said, also, that God was far removed from doing or knowing evil, and that man was the absolute master of his own actions. This was roundly to deny a providence; and upon this footing I know not, says Calmet, what could be the religion of the Sadducees, or what influence they could ascribe to God in things here below. However, it is certain that they were not only tolerated among the Jews, but that they were admitted to the high priesthood itself. John Hircanus, high priest of the nation, separated himself in a signal manner from the sect of the Pharisees, and went over to that of Sadoc. It is said, also, that he gave strict command to all the Jews, on pain of death, to receive the maxims of this sect. Aristobulus, and Alexander Jannæus, son of Hircanus, continued to favour the Sadducees; and Maimonides assures us, that under the reign of Alexander Jannæus, they had in possession all the offices of the Sanhedrim, there only remaining of the party of the Pharisees Simon the son of Secra. Caiaphas, who condemned Jesus Christ to death, was a Sadducee; as was also Ananus the younger, who put to death St James the brother of our Lord. At this day the Jews hold as heretics the small number of Sadducees which are to be found among them.[1]

The sect of the Sadducees was much reduced by the destruction of Jerusalem, and by the dispersion of the Jews; but it afterwards revived. At the beginning of the third century it was so formidable in Egypt, that Ammonim, Origen's master, when he saw them propagate their opinions in that country, thought himself obliged to write against them, or rather against the Jews, who tolerated the Sadducees, though they denied the fundamental points of their religion. The Emperor Justinian mentions the Sadducees in one of his novels; banishes them out of all places of his dominions; and condemns them to the severest punishments, as people that maintained atheistical and impious tenets, denying the resurrection and the last judgment. Annus, or Ananus, a disciple of Juda, son of Nachman, a famous rabbi of the eighth century, declared himself, as it is said, in favour of the Sadducees, and strenuously protected them against their adversaries. They had also a celebrated defender in the twelfth century, in the person of Alpharagius, a Spanish rabbi. This doctor wrote against the Pharisees, the declared enemies of the Sadducees, and maintained by his public writings, that the purity of Judaism was only to be found among the Sadducees; that the traditions avowed by the Pharisees were useless; and that the ceremonies, which they had multiplied without end, were an insupportable yoke. The rabbi Abraham ben David Italleri replied to Alpharagius, and supported the sect of the Pharisees by two great arguments; that of their universality, and that of their antiquity. He proved their antiquity by a continued succession from Adam down to the year 1167; and their universality, because the Pharisees are spread all the world over, and are found in all the synagogues. There are still Sadducees in Africa and in several other places. They deny the immortality of the soul and the resurrection of the body; but they are rarely found, at least there are but few who declare themselves friendly to these opinions.

SADLER, John, descended from an ancient family in Shropshire, was born in 1615, and educated at Cambridge, where he became eminent for his great knowledge in the oriental languages. He removed to Lincoln's Inn, where he made great progress in the study of the law; and in 1644 he was admitted one of the masters in chancery, as also one of the two masters of requests. In 1649 he was chosen town-clerk of London, and the same year he published his Rights of the Kingdom. He was greatly esteemed by Oliver Cromwell, by whose special warrant he was continued a master in chancery, when their number was reduced to six. By his interest it was that the Jews obtained the privilege of building for themselves a synagogue in London. In 1658 he was made member of parliament for Yarmouth, and next year was appointed first commissioner under the great seal with Mr Taylor, Mr Whitelocke, and others, for the probate of wills. In 1660 he published his *Olbia;* and soon after the Restoration he lost all his employments. In the fire of London in 1666 he was a great sufferer, which obliged him to retire to his seat of Warmwell in Dorsetshire, where he lived in a private manner until 1674, when he died.

SADLER, *Michael Thomas*, was born at Snelstone, a village in Derbyshire, in January 1780. He was descended, on the father's side, from Sir Ralph Sadler, one of Queen Elizabeth's ministers; and his mother's family had been French refugees at the revocation of the edict of Nantes. He was educated principally at home, his father having intended him for one of the learned professions; but, when about eighteen years old, he was induced to join his brother in business at Leeds, where he continued until called into public life by the ministerial proposal of the Catholic Relief Bill. On a vacancy occurring for the borough of Newark, in March 1829, Mr Sadler, being invited to become a candidate, immediately complied, and triumphantly carried his election, though opposed by Mr Sergeant Wilde, one of the most able and energetic members of the bar. Mr Sadler distinguished himself by a long and eloquent speech delivered against the Roman Catholic claims on the 17th of the same month; and during the continuance of the discussion he was the great champion of the Protestant cause. At the general election of 1830, he was again chosen for Newark, and in 1831 he took his seat for Aldborough in Yorkshire. At the first general election under the Reform Bill, Aldborough having been disfranchised, he became a candidate for the new borough of Leeds; but, though highly esteemed by a large number of his townsmen, his reputation as an anti-reformer preponderated over his less equivocal merits, and he lost his election.

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[1] See upon this matter *Menasse ben-Israel de Resurrectione Mortuorum;* Basnage's History of the Jews; and Calmet's Dissertation upon the Sects of the Jews, before the Commentary of St Mark.

In his public career Mr Sadler was generally associated with the old constitutional Tories. We have already mentioned his strenuous opposition to the Roman Catholic Relief Bill. To the policy of free trade he was also most decidedly hostile; nor was he less unfriendly to the settlement of the currency question, which he considered should have been effected upon a more equitable adjustment. Mr Sadler was likewise very hostile to the Reform Bill, to which he recorded his objections in a speech when seconding General Gascoigne's motion, the effect of carrying which was the dissolution of parliament. For Ireland he always expressed the deepest interest, and twice introduced a poor-law bill for that country into parliament. During the last session he sat in parliament, he was almost constantly occupied in prosecuting the bill he had brought before the legislature for the protection of children employed in the manufactories, and which is familiarly called the Ten Hours Bill. This measure was referred to a select committee, of which Mr Sadler was appointed chairman; and it is believed that the fatigue and responsibility thus imposed on him, of collecting the mass of evidence contained in the report, laid the foundation of his long and fatal illness. Neither, after all, were his efforts successful in passing this measure.

Mr Sadler was some years a member of the Royal Society, and author of several works, the most important of which are, 1. Ireland, its Evils, and their Remedies; and, 2. An Essay on the Law of Population, in two volumes, written principally to controvert the opinions of Mr Malthus. A third volume, intended to complete this treatise, the author was engaged upon at the time of his death, which took place at New Lodge, near Belfast, on the 29th of July 1835. Mr Sadler's disease appears to have been an incurable affection of the heart, brought on by severe study and intense anxiety. At the time of his death, he was the leading partner of the firm of Sadler, Fenton, and Company, of Belfast. (A.)

SADO, an island of Japan, about ninety miles in circumference, on the northern coast of the island of Niphon, in a large bay. Long. 138. 54. E. Lat. 37. 40. N.

SADOC, a famous Jewish rabbi, and founder of the sect of the Sadducees.

SADOLET, James, a learned cardinal, was born at Modena in 1477. Leo X. made him and Peter Bembo his secretaries, an office for which they were both well qualified; and Sadolet was soon afterwards made bishop of Carpentras, near Avignon. He was made a cardinal in 1536 by Paul III.; employed in several negotiations and embassies; and died in 1547, not without the suspicion of poison, for corresponding too familiarly with the Protestants, and testifying too much regard for some of their doctors. His works, which are all in Latin, were collected in 1607 at Mentz, in one volume 8vo. All his contemporaries spoke of him in the highest terms.

SADRAS, a town of Southern India, in the Carnatic, on the sea-coast. It was formerly a small village, which was purchased by the Dutch about the middle of the seventeenth century; and under their protection it grew up into a populous place, the seat of a flourishing manufacture of ginghams of a superior quality. It was surrounded by them with a brick wall fifteen feet in height, and close to the sea. The fort was seized by the French general Lally in the year 1759, while the French were besieging Madras, though the Dutch were neutral in the war. It was afterwards restored to Holland, and was finally taken possession of by the British in 1795. The town has now fallen into a state of decay. At a short distance are some hills, on which are situated seven Hindu temples, held in great estimation. Long. 80. 16. E. Lat. 12. 27. N.

SAFAD, or Saphet, a village of Palestine, in an elevated situation, which overlooks the western coast of the Lake of Tiberias, and was of some consideration in the time of the crusades; but in 1759, being destroyed by an earthquake, and since regarded with an evil eye by the Turks, it has now dwindled into a poor village. Pococke found in it the ruins of a very strong old castle, which appeared to have commanded the whole surrounding district, which takes its name from the place. It is sixty-five miles south-west from Damascus.

SAFFRON is formed of the stigmata of the *crocus officinalis*, dried upon a kiln, and pressed together into cakes. There are two kinds of saffron, the English and Spanish; but the latter is by far the most esteemed. Saffron is principally cultivated in Cambridgeshire. This drug has been reckoned a very elegant and useful aromatic. Besides the virtues it has in common with other substances of the same class, it has been accounted one of the highest cordial.

SAFFRON-WALDEN, a town in the hundred of Uttlesford, in the county of Essex, forty-two miles from London. It has a good market for corn, which is held on Saturday. It is a borough, whose charter was granted by Edward VI., and is governed by a mayor and aldermen; but it does not return a member to the House of Commons. The chief trade is preparing malt for the great breweries in London. The church is a fine Gothic building of great extent, and adorned by the monuments of many eminent persons who have been buried in it. Adjoining to the town is the magnificent house of Audley End, belonging to Lord Howard of Walden. The town has the benefit of water-communication with London. The population amounted in 1801 to 3181, in 1811 to 3403, in 1821 to 4154, and in 1831 to 4762.

SAFFY, Saffee, Safi, Azafi, or Asfee, is a seaport town of Morocco, capital of the province of Abda. It is situated between two hills, and at the foot of a steep and high mountain, a part of Atlas. Its position renders it extremely hot, and in winter very disagreeable, as the waters from the neighbouring mountains, occasioned by the rains, discharge themselves through the main street into the ocean, deluging the lower apartments of the houses. The walls of Saffy are extremely thick and high. It is a very ancient town, and was the chief seat of European commerce till the monopolizing predilections of the Emperor Sidi Mahommed transferred it to Mogadore. The roadstead is safe in summer; but in winter, when the winds blow from the south or south-west, vessels are obliged to run to sea, sometimes more than once whilst taking in their cargoes. The surrounding country abounds in corn, and two falls of rain a year are sufficient to bring the crops to maturity. There are many sanctuaries in the environs, on which account the Jews are obliged to enter the town barefooted, taking off their sandals when they approach these consecrated places; and if riding, they must descend from their mules and enter the town on foot. There is here a neat palace, and a fort stands at a little distance north of the town. Saffy is still supposed to retain a population of 12,000. Long. 9. 5. W. Lat. 32. 20. N.

SAFIA, a small river of Arabia, which falls into the Red Sea two miles north of Tor.

SAFRA, a town of Hedjaz, in Arabia, forty miles south-south-west of Medina.

SAGAING, a town in the Burmese dominions, situated on the Irrawaddy, opposite to Ava, the capital. It is a large, straggling place, where the houses are of a mean description, and thinly scattered among groves of fruit-trees, with temples and monasteries innumerable. A considerable portion of the inhabitants are Cassay captives or their descendants. On the river face it has a brick-wall, which extends for about half a mile; it is not above ten feet in height, but has a parapet and embrasures. To each flank of the brick-wall there is a stockade of a paltry description." Inland it is quite defenceless. The town extends along the Irrawaddy about a mile and a half, but its breadth is inconsiderable. Over the site of the town and its environs are innumerable temples, many of them ruinous and old, and also modern.

SAGAN, in scripture history, the suffragan or deputy of the Jewish high priest. According to some writers, he was only employed to officiate for him when he was rendered incapable of attending the service through sickness or legal uncleanness on the day of expiation; or, according to others, he was destined to assist the high priest in the care of the affairs of the temple and the service of the priests.

Sagan, a city of Prussian Silesia, in the government of Liegnitz, the capital of a circle of its own name, which extends over 484 square miles, and contains 41,600 inhabitants. It stands on the river Bober, and is strongly fortified. It was a principality, but has been mediatized; and it still retains a fine palace of the prince, besides 540 houses, with 4920 inhabitants. It contains manufactures of linen, lace, paper, glass-ware, and hosiery, and carries on a considerable trade in corn and in corn-spirits.

SAGANAK, a town of Independent Tartary, situated on the Sihon or Jaxartes. It was taken by Ghengis Khan, and the greater part of the inhabitants put to death.

SAGANEER, a Rajpoot town of Hindustan, in the province of Ajmeer, and district of Jyenagur, eight miles south-east from the city of Jyenagur. Long. 75. 50. E. Lat. 26. 49. N. This is also the name of a town of the province of Gundwana, belonging to the rajah of Nagpoor. Long. 79. 18. E. Lat. 21. 34. N.

SAGARA Nacken Bay, a bay on the east coast of the island of Java. Long. 109. 21. E. Lat. 8. 15. S.

SAGARAWIDA Bay, on the south coast of the island of Java. Long. 113. E. Lat. 8. 15. S.

SAGE, Alain Rene, an ingenious French romance-writer, was born at Ruys, in Bretagne, in the year 1667. He had a fine flow of imagination, was a complete master of the French and Spanish languages, and wrote several admired romances in imitation of the Spanish authors. These were, 1. The Bachelor of Salamanca, two vols. 12mo; 2. New Adventures of Don Quixote, two vols. 12mo; 3. The Devil on Two Sticks, two vols. 12mo; and, 4. Gil Blas, four vols. 12mo. He produced also some comedies, and other humorous pieces. This ingenious author died in the year 1747, in the vicinity of Paris.

Sage, *John*, so justly admired by all who knew him for his classical learning and reasoning powers, was born in 1652, in the parish of Creich and county of Fife, where his ancestors had lived for seven generations with great respect, though with little property. His father was a captain in Lord Duffus's regiment, and fought for his king and country when Monk stormed Dundee on the 30th of August 1651.

The issue of the civil wars, and the loyalty of Captain Sage, left him nothing to bestow upon his son but a liberal education and his own principles of piety and virtue. In those days the Latin language was taught in the parochial schools of Scotland with great ability and at a trifling expense; and after young Sage had acquired a competent knowledge of that language at one of those useful seminaries, his father, without receiving from an ungrateful court any recompense for what he had lost in the cause of royalty, was still able to send him to the university of St Andrews. Having remained in college the usual number of terms or sessions, and performed the exercises required by the statutes, he was admitted to the degree of master of arts, the highest honour which it appears he ever received from any university.

During his residence in St Andrews he studied the Greek and Roman authors with great diligence, and was likewise instructed in logic, metaphysics, and such other branches of philosophy as then obtained in the schools. When Mr Sage had taken his master's degree, the narrowness of his fortune compelled him to accept of the first literary employment which was offered to him; and that happened to be nothing better than the office of schoolmaster in the parish of Bingry in Fifeshire, whence he was soon removed to Tippermuir, in the county of Perth. In these humble stations, though he wanted many of the necessaries and almost all the comforts of life, he prosecuted his studies with great success; but in doing so, he unhappily imbibed the seeds of several diseases, which afflicted him through life, and, notwithstanding the native vigour of his constitution, impaired his health and shortened his days. From the miserable drudgery of a parish-schoolmaster he was relieved by Mr Drummond of Cultmalundie, who invited him to superintend the education of his sons, whom he accompanied first to the public school at Perth, and afterwards to the university of St Andrews. This was still an employment by no means adequate to his merit, but it was not wholly without advantages. At Perth, he gained the friendship and esteem of Dr Rose, afterwards bishop of Edinburgh, and at St Andrews that of every man capable of properly estimating genius and learning.

The education of his pupils terminated in 1684, when he was left with no determinate object of pursuit. In this moment of indecision, his friend Dr Rose, who had been promoted from the parsonage of Perth to the professorship of divinity in the university which he was leaving, recommended him so effectually to his uncle, then archbishop of Glasgow, that he was by that prelate admitted into orders, and presented to one of the churches in the city. He was then about thirty-four years of age, and had studied the Scriptures with great assiduity; he was no stranger to ecclesiastical history, or the apologies and other writings of the ancient fathers, and had examined with great accuracy the modern controversies, especially those between the Romish and Reformed churches. A man so far advanced in life, and so thoroughly accomplished as a scholar, would naturally be looked up to by the greater part of the clergy as soon as he became one of their body. This was in fact the case. Mr Sage was, immediately on his admission into orders, appointed clerk to the synod or presbytery of Glasgow; an office of great trust and respectability, to which we know nothing similar in the church of England. During the establishment of episcopacy in Scotland, the authority of the bishops, though they possessed the sole power of ordination, was very limited in the government of the church. They did every thing with the consent of the presbyters over whom they presided. Diocesan synods were held at stated times for purposes of the same kind with those which employ the meetings of presbyteries at present; and the only prerogative which the bishop seems to have enjoyed was to be permanent president, with a negative voice over the deliberations of the assembly. The acts of each synod, and sometimes the charge delivered by the bishop at the opening of it, were registered in a book kept by the clerk, who was always one of the most eminent of the diocesan clergy.

Mr Sage continued in this office, discharging in Glasgow all the duties of a clergyman, in such a manner as endeared him to his flock, and gained him the esteem even of those who were dissenters from the establishment. Many of his brethren were trimmers in ecclesiastical as well as in civil politics. They had been republicans and presbyterians in the days of the covenant; and, with that ferocious zeal which too often characterizes interested converts, had concurred in the severities which, during the reign of Charles II. were exercised against the party whom they had forsaken at the Restoration. When that party again raised its head during the reign of James, and every thing indicated an approaching change of the establishment, those whose zeal for the church had so lately incited them to persecute the dissenters, suddenly became all gentleness and condescension, and advanced towards the presbyterians as to their old friends.

The conduct of Mr Sage was the reverse of this. He was an episcopalian and a royalist from conviction; and in all his discourses, public and private, he laboured to instil into the minds of others the principles which to himself appeared to have their foundation in truth. To persecution he was at all times an enemy, whilst he never tamely betrayed through fear what he thought it his duty to maintain. The consequence was, that in the end of the year 1688, he was treated by the rabble, which in the western counties of Scotland rose against the established church, with greater lenity than his more complying brethren.

Mr Sage retired to the metropolis, and carried with him the synodical book, which was afterwards demanded by the presbytery of Glasgow, but not recovered till, on the death of a nephew of Dr Rose, the last established bishop of Edinburgh, it was found in his possession, and restored to the presbytery to which it belonged. Mr Sage had detained it and given it to his friend, in the fond hope that episcopacy would soon be re-established in Scotland; and it was doubtless with a view to contribute what he could to the realizing of that hope, that, immediately on his being obliged to leave Glasgow, he commenced as a polemical writer. At Edinburgh he preached for a time, till, refusing to take the oaths of allegiance when required by the government, he was obliged to retire. Returning to Edinburgh in 1695, he was observed, and obliged to abscond. Yet he returned in 1696, when his friend Sir William Bruce was imprisoned as a suspected person.

After a time Mr Sage found a safe retreat with the Countess of Callendar, who employed him to instruct her family as chaplain, and her sons as tutor. These occupations did not wholly engage his active mind; for he employed his pen in defending his order or in exposing his oppressors. When the Countess of Callendar had no longer sons to instruct, Sage accepted the invitation of Sir John Stewart of Grandtully, who wanted the help of a chaplain and the conversation of a scholar. With Sir John he continued till the decency of his manners and the extensiveness of his learning recommended him to a higher station; and, on the 25th of January 1705, he was consecrated a bishop by Paterson the archbishop of Glasgow, Rose the bishop of Edinburgh, and Douglas the bishop of Dumblane. But this promotion did not prevent him from falling into sickness in November 1706. After lingering for many months in Scotland, he tried the effect of the waters of Bath in 1709, without success. At Bath and at London he remained twelve months, recognised by the great and caressed by the learned. Yet though he was invited to stay, he returned in 1710 to his native country, and died at Edinburgh on the 7th of June 1711.

His works are, 1st, Two Letters concerning the Persecution of the Episcopal Clergy in Scotland, London, 1689; 2. An Account of the late Establishment of Presbyterian Government by the Parliament of Scotland in 1690, London, 1693; 3. The Fundamental Charter of Presbytery, London, 1695; 4. The Principles of the Cyprianick Age with regard to Episcopal Power and Jurisdiction, London, 1695; 5. A Vindication of the Principles of the Cyprianick Age, London, 1701; 6. Some Remarks on the Letter from a Gentleman in the City to a Minister in the Country, on Mr David Williamson's Sermon before the General Assembly, Edinburgh, 1703; 7. A Brief Examination of some Things in Mr Meldrum's Sermon, preached on the 16th of May 1703, against a Toleration to those of the Episcopal Persuasion, Edinburgh, 1703; 8. The Reasonableness of a Toleration of those of the Episcopal Persuasion inquired into purely on Church Principles, Edinburgh, 1704; 9. The Life of Gawin Douglas, in 1710; and 10. An Introduction to Drummond's History of the Five Jameses, Edinburgh, 1711.

SAGHALIEN, a large island or peninsula, situated at the eastern extremity of Asia, immediately to the north of the large island of Jesso or Matsmai. It is called also Oku Jesso, or Upper Jesso, and by the natives Tchoka. It is separated from the continent by a narrow channel called the channel of Tartary; and it is not certainly known whether this channel extends along the whole western coast and forms Saghalien into an island, or whether it is connected with Tartary by an isthmus, thus making it a peninsula. The channel was entered by Pérouse with the idea of determining this question; but he was obliged, by adverse winds and other circumstances, to quit it before examining its whole extent. The inhabitants assured him that it was an island separated from the continent only by a narrow strait. The people of Tartary, on the other hand, asserted that it was a peninsula connected with the continent by a narrow isthmus of sand, and covered with marine plants. In confirmation of the latter theory, Pérouse observed the depth of the water constantly to diminish, without any current being felt; and he concluded that it was a strait, though so obstructed by sand and sea-weed as to be scarcely passable. Broughton, who penetrated twenty miles farther, and Krusenstern, observed that in the strait to the north of the river Saghalien the water is rendered almost fresh by the influx of the stream. The territory of Saghalien is mountainous, especially towards the centre. In the lower parts are wooded valleys and hills, and behind lofty mountains covered with snow; towards the south the country becomes more level, and exhibits only hills of sand. Krusenstern, who sailed along the eastern coast, remarked that it was nearly destitute of inhabitants. The southern and western coasts are occupied by rude tribes, of whose dispositions, however, Pérouse gives a favourable account. They are chiefly employed in hunting and in fishing. The north-east coast, opposite to the mouth of the Saghalien, is occupied by a colony of Mantchou Tartars. The Japanese had formed a colony in the Bay of Aniwa, at the southern extremity of the island; but it has been destroyed by the Russians, who, it is supposed, intend to form establishments for themselves in those countries.

SAGITTA, in *Astronomy*, the Arrow, a constellation of the northern hemisphere, near the Eagle, and one of the forty-eight old asterisms. According to the fabulous ideas of the Greeks, this constellation owes its origin to one of the arrows of Hercules, with which he killed the eagle or vulture that gnawed the liver of Prometheus. In the catalogues of Ptolemy, Tycho, and Hevelius, the stars of this constellation are only five in number, while Flamsteed made them amount to eighteen.

SAGITTA, in *Geometry*, a term used by some writers for the absciss of a curve.

SAGITTA, in *Trigonometry*, the same as the versed sine of an arch, being so denominated because it is like a dart or arrow, standing on the chord of the arch.

SAGITTARIA, an island in the Southern Pacific Ocean, discovered by Quiros in 1606, and supposed to be the same as Otaheite.

SAGITTARIUS, in *Astronomy*, the name of one of the twelve signs of the zodiac.

SAGO, a nutritive substance brought from the East Indies, and of considerable use in diet as a restorative. It is produced from a species of palm-tree (*Cycas Circinalis*, Linn.), growing spontaneously in the East Indies without any culture.

SAGOR, or GANGA SAGOR, an island belonging to the province of Bengal, situated at the entrance and eastern side of the Hooghly, or Bhagurutty river, which here separates it from another island formed by the numerous outlets of the Ganges. It is eight miles in length by four in breadth, and is detached from the mainland by a creek, the north end of which is dry at low water. The spring-tides rise here to the height of four fathoms. This station is found more healthy for ships than those farther up the Hooghly. This is owing to the great expansion of the river, in consequence of which, ships have the advantage of lying at a greater distance from the shore, and of enjoying a refreshing circulation of sea-air; and they also escape the offensive exhalations from the mud banks at Culpee and Diamond Harbour.

Sagor island has been from time immemorial a celebrated place of pilgrimage among the Hindus, being situated at the junction of the Bhagurutty river, or most sacred branch of the Ganges, with the ocean. Many of the pilgrims formerly made voluntary sacrifices of themselves, and sometimes of their children, to the sacred sharks and alligators inhabiting the surrounding waters. But in 1812 the practice was abolished under the administration of the Marquis Wellesley. The jungles of this island swarm with tigers of the largest and most ferocious sort. The island is not inhabited; but the Brahmins repair at the appointed season to the temple, and are followed by pilgrims. Its south point is in long. 88. 20. E. and lat. 21. 34. N.

SAGRES, a town of Portugal, in the province of Algarve, and in the corregimiento of Lagos. It is situated on a steep and rocky tongue of land which projects into a deep bay near to Cape St Vincent. It has a good roadstead, with a safe anchorage, and it is defended by a fort, but is chiefly inhabited by fishermen. It is celebrated as having been the favourite residence of the children of one of their princes, Henry the Sailor.

SAGUM, in Roman antiquity, a military habit, open from top to bottom, and usually fastened on the right shoulder with a buckle or clasp. It was not different in shape from the *chlamys* of the Greeks, and the *paludamentum* of the generals. The only difference between them was, that the *paludamentum* was made of a richer stuff, and was generally of a purple colour, and both longer and fuller than the *sagum*.

SAGUNTUM. See MURVIEDRO.

SAHABAD, a Rajpoot town of Hindustan, in the province of Ajmeer, tributary to the Mahrattas. It is eighty-five miles east by north from Kotah. Long. 77. 10. E. Lat. 25. 26. N.

SAHARA, or the GREAT DESERT, an immense tract of territory in Northern and Central Africa, the most desolate and terrible on the face of the globe. It is bounded on the north by the Barbary States; on the south by Soudan, or the countries watered by the upper course of the Niger, and by the Lower Senegal; and on the east it commences near the left bank of the Nile, and stretches westward to the shores of the North Atlantic Ocean, being nearly the whole breadth of Africa. Its actual extent may be stated as from the fifteenth to the thirtieth parallels of north latitude, and from the thirtieth of east to the fifteenth of west longitude. Its length is thus about three thousand miles, and its breadth is in some parts above a thousand miles. It is by many degrees the largest desert to be found in any part of the world, and it occupies about one fifth of the surface of this part of the globe. Sahara seems to be a table-land little raised above the level of the sea, covered with moving sands, and here and there containing some rocky heights, and valleys, or oases, where the water collects and nourishes thorny shrubs, ferns, and grass. From the defective cultivation of the surrounding countries, and the influence of the prevailing winds, the desert has always been gaining ground, so that in the east some of the Egyptian monuments of antiquity, which at the time of their erection were no doubt unencumbered by the sand, even at their bases, are now covered with it. In the south, likewise, it has encroached on the banks of the Niger and the Senegal; and on the north and north-west the southern provinces of Morocco have been partly usurped by it, so that the streams descending from the Atlas Mountains are either drunk up, or have their courses diverted so as to be rendered comparatively useless; while in the west it has, in some parts, extended a hundred miles into the sea, forming immense sand-banks, destructive to the formation of landing-places. The mountains along the Atlantic Ocean are in no continued chain, but rise up in isolated peaks, and through the open spaces between them the sand is drifted by the winds. Towards the interior they again lose themselves in a plain covered with white and sharp pebbles. From being frequently shifted by winds, the sand extends over the vast plain in a billowy or undulating manner, like the sea when agitated. In its nature it is quartzy and calcareous. The solid fixed rocks which occasionally rise above this mobile surface are sometimes extensive enough to form tracts of country. In the eastern part of the Sahara, the rocks are principally secondary, and for the most part limestone, sandstone, gypsum, and rock-salt, which occasionally appear to be traversed by trap-rocks. At Tegazza, and some other places, a sal-gem, whiter than the purest marble, lies in extensive strata under a bed of rock. Golberry informs us, that on its southern margin he found masses of native iron. The waters of the lakes which here and there occur in the desert are in some instances impregnated with carbonate of soda, in others with muriate of soda or common salt, forming the natron and salt lakes of travellers. The rocks on the sea-coast of the Sahara, and the islands that lie along it, are said to be principally composed of igneous rock, and chiefly basalt.

The principal production of Sahara is mineral salt, which, in many places, covers the surface in white glittering crystals, so that at a distance they appear to be rugged fields of snow or ice. This salt constitutes the staple article of the trade of Soudan, and Timbuctoo is indebted to this product of the waste for its existence as well as its prosperity.

The most remarkable feature of this desolate ocean of sand consists in the oases or verdant islands which, at distant and dreary intervals, agreeably break its appaling uniformity. These are formed by springs, which, fed by distant mountains, burst forth amidst the desert solitudes, and, diffusing a partial verdure and fertility, form a strikingly beautiful contrast with the surrounding desolation. They are embellished with flowering shrubs of peculiar beauty. An aromatic plant resembling thyme, the same which bears the grains of zahara, acacias and other thorny shrubs, nettles, and brambles, constitute the ordinary vegetation of these places. Whole tracts are covered with forests of acacia, from which rich gums distil their odours; and groves of the date and lotus also occur, but more rarely. The fruits and berries which they yield constitute the food of whole tribes of men, while the verdure affords a support for animals chiefly of the antelope species. But lions, panthers, and serpents of enormous size, sometimes augment the horrors of these frightful solitudes. Ravens and other birds of prey are likewise often seen hovering over the track of the caravan, ready to dispute with the Moorish dogs for the carcasses of those who have perished in the desert. These oases are frequented by numerous flocks of ostriches, which feed on snails, lizards, and some coarse plants. For a great part of the year the dry and heated air has the appearance of a reddish vapour, and the horizon looks like the fire of a series of volcanoes. The rain, which descends from July to October or November, does not extend its precarious and momentary blessing to all the districts. In some of them rain does not fall for years together, on which occasions the springs also dry up, and a frightful want of water ensues, which drives men and animals to despair. The air during the day is oppressively hot, without a cloud to mitigate the glowing sunshine; and during the night it is disproportionally cool. The natural magic of the *Fata Morgana*, here often exhibited to the eye of the parched traveller, is provokingly deceptive. Sometimes he sees in the distance what appears almost beyond question to be a sheet of water glittering in the sunbeams. He hastens forward, in hopes of soon allaying his thirst at the welcome lake; but his efforts to reach it are as vain as those of the child to clasp the rainbow. Still his fainting steps pursue, for still the imaginary lake lies before him as lovely and alluring, but as distant, as ever.

It is of course only on the borders of the Sahara that oases on a great scale occur. In the eastern part they are extensive enough to form small kingdoms, generally dependent on some more powerful neighbour. In other parts, particularly the western, they consist merely of one or more detached villages, serving as emporia for the trade carried on by the caravans. And sometimes, especially as we penetrate into the interior of the desert, the oases are merely springs which nourish too scanty a vegetation to admit of inhabitants settling there, but affording supplies of water to the caravans, whose route is determined by the situation of these fountains. Dreary and encompassed with dangers as such abodes must be, every spot on which inhabitants can subsist is occupied; and notwithstanding the perils and sufferings of such travelling, regular journeys are performed across the whole breadth of this desolate region, from Morocco on the north to Timbuctoo on the south. The only animal fitted for traversing these solitudes as a beast of burden is the camel, which with equal truth and beauty has been designated the ship of the desert. By its patience of hunger and fatigue, by the provision which has been made for its carrying a large supply of water, and by the structure of its hoof, so formed as to glide smoothly over the level sand, it seems expressly designed by nature as a means of communication across these immense wastes. The merchandise which they convey is firmly secured on their backs by means of creels and otherwise; and for the sake of mutual aid and defence, as well as to relieve the tedium of the route, they proceed in large bodies, occasionally amounting to the number of two thousand. The trade is carried on by merchants inured from their infancy to the hardships which attend such journeys. Their food consists of the milk of the camel, with barley-meal or Indian corn, and a few dates, although the more opulent carry dried flesh and coffee. Water is conveyed in goat-skins, covered with tar for the purpose of preventing evaporation. The caravans, or akkabahs, as the Moors call them, do not proceed in a straight line to their journey's end, but turn in various directions according to the position of the different oases. At each of these the travellers rest and refresh themselves for a day or two, and take in supplies of water. Two great evils are encountered in crossing the desert. The first and most terrible is, when from a peculiarly dry season one or more of the springs happens to fail; and the second is the burning wind, called the samoom, shoom, or simoom. Less than half a century ago a caravan consisting of two thousand persons and eighteen hundred camels, not finding water at the usual places, perished utterly, both men and animals. The vehemence of the wind, which is more like the breath of a furnace than the natural commotion of the atmosphere, raises and rolls before it the waves of red sand, causing the desert so much to resemble a stormy sea, that the Arabs have given it the name of "Bahar billa-maia," or waterless sea.

Major Denham relates an instance of the terrible effects of the simoom. "The overpowering effect of a sudden sand-wind, when nearly at the close of the desert, often destroys a whole kafila, already weakened with fatigue. The spot was pointed out to us, strewed with bones and dried carcasses, where, the year before, fifty sheep, two camels, and two men, perished from thirst and fatigue, when within eight hours' march of the well which we were anxiously looking for."

Captain Lyon thus describes the appearance of these dead bodies: "We observed many skeletons of animals which had died of fatigue on the desert, and occasionally the grave of some human being. All these bodies were so dried by the extreme heat of the sun, that putrefaction did not appear to have taken place after death. In recently dead animals I could not perceive the slightest offensive smell; and in those long dead, the skin, with the hair on it, remained unbroken and perfect, although so brittle as to break with a slight blow. The sand-winds never cause these carcasses to change their places, as in a short time a slight mound is formed round them, and they become stationary." The fact here noticed of the preservation of the dead bodies in the sand has been observed in other parts of the world, for instance in South America. It appears that the heat of the sun rapidly exhales the natural juices, which prevents the usual process of putrefaction from going on, and thus the carcass is parched into something resembling the well-known mummy of Egypt.

The merchants possess some knowledge of the heavenly bodies, and direct their course by the polar star, often preferring to travel during the clear nights of these climates rather than brave the scorching heat of a tropical sun. This nocturnal travelling, however, has its inconveniences, so that the most part of the journey is performed during the day. The camel-drivers sing as they go along; and as they approach houses, or when the camels seem in danger of dropping down with fatigue, their songs acquire additional spirit and expression, which is said to have the intended effect upon the animals. At four o'clock in the afternoon they pitch their tents and join in prayer. Supper follows this act of devotion, after which they sit down in a circle and converse or recite stories until sleep closes their eyes, and the perils of the desert are forgotten in its unconsciousness.

The coast of Sahara contains some harbours and roadsteads. Those of Rio-do-Ouro and of St Cyprian are formed by large creeks, resembling the mouths of rivers. The Gulf of Ardum, and the Portendic Road, have often been visited by Europeans. On the same line are Cape Bojadore and Cape Blanco, which latter is supposed to mark the limit of the discoveries of the Carthaginians. At Hoden, Tisheet or Tegazza, and Taudeny, in the western region of Sahara, are extensive mines of rock-salt, an article which is wanting in the populous regions of Central Africa, and is consequently in great demand in those quarters. One of the principal dépôts of salt is Walet, which, by this article, is rendered a place second in importance only to Timbuctoo. Aroun, also, in the very centre of the desert, has become a place of some importance, containing three thousand inhabitants, chiefly by this trade and the passage of caravans. In the heart of Sahara, between Gadamis and Timbuctoo, is the district of Suat or Tuat, inhabited by a mixture of Arabs and Tuaricks, in no respect superior to the rest of the desert tribes. Aghably and Ain-el-Salah, their chief towns, are frequented as caravan stations. (R. R. R.)

SAHARUNPORE, an extensive and valuable district of Hindustan, in the province of Delhi, situated principally between the rivers Jumna and Ganges, and about the thirty-first degree of northern latitude. It is bounded on the north by the Sewalic Mountains, and the province of Serinagur. The soil is fertile, and being well watered by innumerable streams from the hills, produces all kinds of grain, sugar, indigo, cotton, and tobacco. It has a fine and temperate climate for the greater part of the year; but during the months of April and May the hot winds blow with great violence, while some of the winter months are excessively cold. This district, though it is placed between the Ganges and the Jumna, which here run parallel at the distance of about fifty-five miles, is not subject to the periodical inundation which prevails in Bengal and the southern provinces. The country is flat to the bottom of the hills, which rise abruptly, being the northern boundary of the immense valley through which the Ganges flows in its progress to the sea. The whole district was, about the middle of the last century, made over to Nijeeb Khan, an Afghan chief, who brought it into a high state of cultivation, and was succeeded by his son, Zabita Khan, who, dying in 1785, was succeeded by his son Ghoolam Kadir, a cruel tyrant. He rebelled against the unfortunate emperor Shah Alum, and put out his eyes, and tortured and starved to death many of the royal family; in retaliation for which he was himself put to death by the Mahratta chief Mahdajee Sindia, who took possession of the district. In 1803, this country, with all the other Mahratta possessions between the Ganges and the Jumna, was acquired by the British government, and in 1804 was separated into two divisions, the northern and the southern, and placed under the superintendence of a civil establishment of a judge, collector, &c. and has since been divided into two collectorships. From the death of Aurungzebe, until its acquisition by the British in 1803, it was one continued scene of intestine commotion. The capital is of the same name, and is an open town, a hundred and five miles north by east from Delhi. Long. 77. 23. E. Lat. 30. 15. N.

SAHLAYDUN, a town of the Birman empire, in the province of Pegu, and situated on the Irrawaddy river. It carries on a considerable trade in teak-timber with Rangoon, and has also a land-communication with the seacoast of Arracan. Long. 94. 40. E. Lat. 18. 35. N.

SAHWOTTY, a town of the Birman empire, situated on the western bank of the Irrawaddy. Long. 94. 50. E. Lat. 19. 41. N.

SAIBGUNGE, a town of Hindustan, in the province of Bengal and district of Rungpore. Long. 88. 48. E. Lat. 26. 15. N.

SAIDA, or SEIDA, a seaport of Syria, celebrated as one of the most ancient Phœnician cities, and supposed to be built on the site of the ancient Sidon. In sacred writ it is often mentioned along with Tyre, and always as a flourishing commercial city. It was occupied by the French during the middle ages, who repaired and strengthened the fortifications. Although decayed from its ancient splendour, it is still of importance as the port of Damascus. It is situated in a plain extending only two miles inward from the sea, when it rises into steep mountains, barren and unproductive; and hence its prosperity must always have been derived from commerce. The town extends six hundred paces along the sea. It is, like all Turkish towns, dirty, ill built, and filled with ruins. It formerly had a magnificent harbour, composed of vast moles stretching out into the sea, but it is now entirely destroyed. The huge stones of which it was built may be still seen, some twelve feet long by eleven broad, and five deep. It is said to be the work of Louis IX. but contains on the top work of an older date. The harbour is said to have been ruined by Feckerdine, emir of the Druses, when he established an independent power with a view of preventing the grand seignior from effecting a landing with a maritime force. On the opposite side of the town is a modern fort, consisting merely of a large tower, but incapable of resisting any serious attack. The road is formed by a shoal running opposite the castle, and leaving a space between, where vessels may ride, though not in perfect safety. The surrounding country is laid out in gardens and orchards, which appear very beautiful at a distance. It carries on a considerable trade, and is the emporium, not only of Damascus, but of the surrounding country. The exports consist of corn, silk, raw and spun cotton, the last article forming the principal trade of the inhabitants. It is now included in the pashalik of Damascus. The population is from 7000 to 8000. Long. 35. 14. E. Lat. 33. 25. N.

SAIL, in *Navigation*, an assemblage of several breadths of canvass, sewed together by the lists, and edged round with cord, fastened to the yards of a ship, to make it drive before the wind.

The edges of the cloths or pieces of which a sail is composed, are generally sewed together with a double seam; and the whole is skirted round at the edges with a cord, called the bolt-rope. Although the form of sails is extremely different, they are all nevertheless triangular or quadrilateral figures; or, in other words, their surfaces are contained either between three or four sides.

The former of these are sometimes spread by a yard, as lateen-sails, and otherwise by a stay, as stay-sails, or by a mast, as shoulder-of-mutton sails; in all which cases the foremost leech or edge is attached to the said yard, mast, or stay, throughout its whole length. The latter, or those which are four-sided, are either extended by yards, as the principal yards of a ship; or by yards and booms, as the studding-sails, drivers, ring-tails, and all those sails which are set occasionally; or by gaffs and booms, as the mainsails of sloops and brigantines. See SHIP and SHIP-BUILDING.

SAIL is also a name applied to any vessel seen at a distance under sail, and is equivalent to ship.

To set SAIL, is to unfurl and expand the sails upon their respective yards and stays, in order to begin the action of sailing.

To make SAIL, is to spread an additional quantity of sail, so as to increase the ship's velocity.

To shorten SAIL, is to reduce or take in part of the sails, with an intention to diminish the ship's velocity.

To strike SAIL, is to lower it suddenly. This is particularly used in saluting or doing homage to a superior force, or to one whom the law of nations acknowledges as superior in certain regions. Thus all foreign vessels strike to a British man-of-war in the British seas.

SAILING, the movement by which a vessel is wafted along the surface of the water, by the action of the wind upon her sails.

When a ship changes her state of rest into that of motion, as in advancing out of a harbour, or from her station at anchor, she acquires motion very gradually, as a body which arrives not at a certain velocity till after an infinite repetition of the action of its weight.

The first impression of the wind greatly affects the velocity, because the resistance of the water might destroy it; since the velocity being but small at first, the resistance of the water which depends upon it will be very feeble. But as the ship increases her motion, the force of the wind on the sails will be diminished; and, on the contrary, the resistance of the water on the bow will accumulate in proportion to the velocity with which the vessel advances. Thus the repetition of the degrees of force, which the action of the sail adds to the motion of the ship, is perpetually decreasing; while the new degrees added to the effort of resistance on the bow are always augmenting. The velocity is then accelerated in proportion as the quantity added is greater than that which is subtracted; but when the two powers become equal, when the impression of the wind on the sails has lost so much of its force as only to act in proportion to the opposite impulse of resistance on the bow, the ship will then acquire no additional velocity, but continue to sail with a constant uniform motion. The great weight of the ship may indeed prevent her from acquiring the greatest velocity; but when she has attained it, she will advance by her own intrinsic motion, without gaining any new degree of velocity, or lessening what she has acquired. She moves then by her own proper force *in vacuo*, without being afterwards subject either to the effort of the wind on the sails, or to the resistance of the water on the bow. If at any time the impulsion of the water on the bow should destroy any part of the velocity, the effort of the wind on the sails will revive it, so that the motion will continue the same. It must, however, be observed, that this state will only subsist when these two powers act upon each other in direct opposition, otherwise they will mutually destroy one another. The whole theory of working ships depends on this counter action, and the perfect equality which should subsist between the effort of the wind and the impulsion of the water.

The effect of sailing is produced by a judicious arrangement of the sails to the direction of the wind. Accordingly the various modes of sailing are derived from the different degrees and situations of the wind with regard to the course of the vessel. See SEAMANSHIP.

SAILING also implies a particular mode of navigation, which is formed on the principles and regulated by the laws of trigonometry. Hence we say, Plain Sailing, Mercator's, Middle-latitude, Parallel, and Great-circle Sailing.

SAINT means a person eminent for piety and virtue, and is generally applied to the apostles and other holy persons mentioned in Scripture. But the Roman Catholics give it an application much more extensive. The canonization of saints, they tell us, is the enrolment of any person in the *canon* or catalogue of those who are called saints; or it is a judgment and sentence of the church, by which it is declared that a deceased person was eminent for sanctity during his lifetime, and especially towards the end of it, and that consequently he must now be in glory with God, and deserves to be honoured by the church on earth with that veneration which she is wont to pay to the blessed in heaven.

The discipline with regard to this matter has varied. It would seem that in the first ages every bishop in his own diocese was wont to declare what persons were to be honoured as saints by his people. Hence St Cyprian, about the middle of the third century, requires that he be informed of those who should die in prison for the faith, that so he might make mention of them in the holy sacrifice with the martyrs, and might honour them afterwards on the anniversary day of their happy death. This veneration continued sometimes to be confined to one country; but sometimes it extended to distant provinces, and even became universal all over the church. It was thus that St Laurence, St Ambrose, St Augustin, St Basil, and many others, appear to have been canonized by custom and universal persuasion. In those ages none were reckoned saints but the apostles, the martyrs, and very eminent confessors, whose sanctity was everywhere notorious. Afterwards it appears that canonizations were wont to be performed in provincial synods, under the direction of the metropolitan. It was thus that St Isidore of Seville was canonized in the seventh century, by the eighth council of Toledo, fourteen years after his death. This manner of canonization continued occasionally down to the twelfth century. The last instance of a saint canonized in this way, is that of St Walter, abbot of Pontoise, who was declared a saint by the archbishop of Rouen in the year 1153. In the twelfth century, in order to prevent mistakes in so delicate a matter, Pope Alexander III. judged it proper to reserve this declaration to the Holy See of Rome exclusively; and decreed that no one should for the future be honoured by the church as a saint without the express approbation of the pope.

Several authors have written on canonization, particularly Prosper Lambertini, afterwards pope under the name of Benedict XIV., who had held the office of Promoter of the Faith for many years. He published on it a large work in several volumes, in folio, of which there is an abridgment in French. In this learned performance there is a full history of the canonization of saints in general, and of all the particular processes of that kind that are on record.

ST ANDREWS. See ANDREWS, ST.

ST ANTONIO, one of the Cape de Verd islands. See VERD CAPE, ISLANDS OF.

ST BARBES ISLE, a small island in the Eastern Seas, situated under the equinoctial line. It is about three miles in circumference. Long. 107. 40. E.

ST BERNARDINO, straits that separate the islands of Luzon and Samar, in the Philippines.

ST GEORGE, one of the Azores. See AZORES.

ST IAGO, one of the Cape de Verd islands. See VERD CAPE, ISLANDS OF.

ST MICHAELS, one of the Azores. See AZORES.

ST NICHOLAS, one of the Cape de Verd islands. See VERD CAPE, ISLANDS OF.

ST PETER AND ST PAUL, a seaport village of Asia, on the south-eastern coast of Kamtschatka, in the bay of Awatska, which, though small, is described by Captain King as most commodious. Long. 158. 43. E. Lat. 54. N.

ST SERVAN, a city of France, in the department of the Ille-Vilaine, and arrondissement of St Malo. It stands on the bay of St Malo, where the river Rance falls into it, and is separated from the city of that name by an arm of it. It has an enclosed harbour and a good roadstead, in which ships of the line can ride in security. It is only fortified towards the sea. There is an establishment for building ships, where some frigates have been constructed. It has manufactories of sail-cloth, ropes, and ship-biscuits, and, in the year 1836, contained 9975 inhabitants, who depend mostly on the shipping.

ST SEVER, an arrondissement of the department of the Landes, in France, containing 170,746 hectares, equal to $600\frac{1}{3}$ square miles in extent. It is divided into eight cantons, and these into 114 communes, with 90,500 inhabitants in 1836. The capital is the city of the same name situated on the left bank of the river Adour, and contains 5863 inhabitants. Long. 0. 55. W. Lat. 43. 45. N.

ST THOME, a town of the south of India, in the province of the Carnatic, situated close to the sea-side, which here forms a small bay. It stands in a fine plain abounding in cocoa-nut trees, which retain their verdure throughout the year. Except the church, it is now nearly a heap of ruins, inhabited chiefly by Indians, Portuguese, and Hindu weavers, who consist of Hindus, Mahommedans, and Roman Catholic Christians, the latter being a mixture of the Portuguese and natives, and of a very dark complexion. This town arose on the ruins of the ancient Hindu city of Maliapurum, which the Portuguese took possession of about the year 1545, and made it the capital of all their settlements on the Coromandel coast. They changed the name to St Thome, in honour of the apostle. In 1672 it was taken by the French, who in 1674 were compelled to surrender it to the Dutch, who gave it up to the king of Golconda. In 1749 it was taken by a British fleet under Admiral Boscawen; and in the Carnatic wars between the British and the French it was occupied by the Madras presidency, under whose authority it has ever since remained. Long. 80. 22. E. Lat. 13. 1. N.

ST TROPES, a city of France, in the department of the Var and the arrondissement of Draguignan. It is a seaport on the bay of Grimaud, in a fruitful district, has a haven defended by a castle, is well built, and enjoys a great trade in cork and in ship-building, and a considerable tunny fishing. In 1836 it contained 3736 inhabitants. Long. 6. 33. 25. E. Lat. 43. 16. 8. N.

SAINTES, an arrondissement of the department of the Lower Charente, in France. It is 536 square miles in extent, and comprehends eight cantons, divided into 109 communes, with 104,871 inhabitants in 1836. The capital is the city of the same name situated at the foot of a hill on the navigable river Charente. It is an ill-built place, but, with the suburb, contains 1800 houses, with 9559 inhabitants, carrying on some woollen manufactories, and considerable distilleries of brandy and spirits of wine. Near to it are some Roman antiquities, especially the remains of an amphitheatre, an aqueduct, and a triumphal arch. Long. 0. 43. 58. W. Lat. 45. 44. 43. N.

Saintes, *Des*, a group of small islands in the West Indies, adjacent to Guadaloupe, of which government they form a part.

SAIPOOR, a town of Hindustan, in the province of Gundwana, possessed by independent zemindars. It is situated on the north-west side of the Rhair river, fifteen miles from the southern frontier of the Rhotas district, in Bahar. Long. 82. 50. E. Lat. 24. 2. N.

SAJENE, a Russian measure of length, equal to about seven English feet.

SAKERTOL, a town and fortress of Hindustan, in the province of Delhi, and district of Saharunpore. It was taken by the Mahrattas in 1772. It is situated on the western bank of the Ganges. Long. 77. 0. E. Lat. 29. 25. N.

SAKKAR, a district of Hindustan, in the province of Bejapoor, belonging to the nizam, and situated about the seventeenth degree of north latitude. It is well watered, being situated between the rivers Beemah and Krishna, and is extremely fertile. To the north of the Beemah it is somewhat hilly. The principal towns are Nusseritabad and Sakkar; and the latter is the capital. It is situated on the north side of the Beemah river, sixty-five miles east from the city of Bejapoor. Long. 76. 38. E. Lat. 17. 4. N.

SAL si Puedes, is the name of some islands in the Gulf of California. They lie in the interior of the gulf, and form a chain, leaving only some very narrow channels, of difficult entrance for vessels. They are of various sizes, the largest bearing the names of Las Animas, San Lorenzo, San Estevan, and San Augustin.

SALA, a city of Italy, in the province of Principato Citra, of the kingdom of Naples, situated on a small river of the same name. It is an inland place, situated on an elevated spot, and has a castle, five parish churches, and 6100 inhabitants. Another place of the same name in Italy is in the duchy of Parma, being situated on the river Baganza. It was the favourite residence of the last duchess, and now belongs to her successor, who keeps on the land belonging to it a large flock of merino sheep, with the view of extending that race throughout the country. There is another place in Sicily of the name, in the intendancy of Trapani, which is described as containing 9800 inhabitants, but ill built and disgustingly filthy.

SALAD, or Sallad, a dish of eatable herbs, seasoned with salt, oil, and vinegar. Ménage derives the word from the Latin *salata*, from *sal*, salt; but others from *salcedo*. Ducange derives it from *salgama*, which is used in Ausonius and Columella in the same sense. Some add mustard, hard eggs, and sugar. The principal salad herbs, and those which ordinarily make the basis of our English salads, are lettuce, celery, endive, cresses, radish, and rape.

SALADIN, a famous sultan of Egypt, equally renowned as a warrior and a legislator. He supported himself by his valour, and the influence of his amiable character, against the united efforts of the chief Christian potentates of Europe, who carried on wars against him, under the appellation of *Holy Wars*.

SALAIBSKOIE, a fortress of Asiatic Russia, situated at the confluence of the small river Salaiba with the Bia, and surrounded with immense forests.

SALAMANCA, one of the departments into which the kingdom or province of Leon, in Spain, is divided. It is situated between lat. 40° and 41° 38′ north. The river Duero forms its limit to the north and north-west, except where it comes in contact with Portugal. Estremadura is on its southern side, and the province of Segovia to the eastward. It extends over 471 square leagues, and its population amounts to 272,982 souls. It generally consists of an open country with extensive plains, and for the most part destitute of trees. The soil is more fruitful than its appearance would suggest. It yields excellent corn, and in moist summers the harvests are abundant; but it is subject to that want which the greater part of Spain feels from the scarcity of water; for although there are several rivers in the department, the influence of their moisture extends but a small distance from their banks. The principal of these rivers is the Duero, into which the Alba, the Tormes, and the Agueda run, whilst the Alagon, taking a southern course, runs into the Tagus. From the nature of the soil through which these rivers pass, they have worn very deep channels, and therefore cannot be used for the purposes of irrigation, without a portion of labour and expenditure which the inhabitants are neither willing nor able to bestow upon them. Though generally the department is destitute of wood, yet in some parts there are extensive forests of evergreen oak trees, without any brushwood under them; and the oaks themselves are without those spreading branches and lofty tops with which our forests exhibit these trees. They are, however, of considerable benefit to the inhabitants by their copious produce of acorns, on which large droves of pigs are fed. The peasants who attend to these animals precede the drove, and proceeding from tree to tree, beat them with a kind of flail, causing the acorns to fall, which the swine most greedily devour. They thus proceed daily from tree to tree till the food they supply is exhausted. The hams of the pigs fattened in this way are most highly esteemed. In this department large flocks of the merino kind of sheep are fed; and many of the stationary kind are bred here, whose wool is of a very inferior degree of fineness. In the early part of the late war the plains of Salamanca were very favourable to the operations of the French armies, who being superior in cavalry, could act on them with the most powerful effect. The cattle of this province are reckoned to be 9363 horses, 6163 mules, 22,002 asses, 107,800 oxen, 103,401 goats, and 107,200 pigs. Of fruits it yields 9500 fanegas of chestnuts, 502,000 of nuts, and 12,000 of raisins.

Salamanca, a city of Spain, head of the department of the same name, in the province or kingdom of Leon. It is situated on the river Tormes, over which there is a bridge standing, the piers of which were built by the Romans, and there remain twelve of the arches constructed by them, and thirteen of more recent date, probably erected since the expulsion of the Moors. At a short distance Salamanca has a most imposing effect. Its lofty towers and cupolas, the magnificent Gothic cathedral, the numerous convents and colleges, and the lengthened bridge which leads to them, present a landscape of the first order.

The immediate vicinity of the city is fruitful, being on a plain surrounded by mountains of no great elevation, though the Sierra de Guadarrama is visible in the distance, towering above them. It is well supplied from its fields with wine, corn, fruits, and edible vegetables. It grows some flax and oil, but procures a part of the latter from Estremadura and Andalusia.

The principal fame of Salamanca has arisen from its university, which is one of the largest establishments for education in Spain, if not in Europe. The professors are not generally distinguished for their learning or activity, and principally exercise their faculties in keeping the minds of the pupils down to that level of inquiry and pursuit which is best calculated to secure their attachment to the existing civil and religious institutions of their country. Every inquiry which may have a tendency to lead them from this beaten track is most carefully checked; and even books of science, if composed by foreigners, are viewed with a suspicion that there may be in them some latent heretical tenets. Under such restraints, it is not wonderful that the orthodoxy of the university of Salamanca is unimpeached. The spirit of loyalty was, in fact, so great, that at the commencement of the invasion a regiment was formed from the students, which was soon disciplined and effective, but the whole of which was almost destroyed at the fatal battle of Medellin.

No establishment of the kind in Spain enjoys revenues equal to this university, and none under proper regulations could be more beneficial to this or any country; but science and knowledge are so checked by the tendency towards the preservation of the religion of the state, and the apprehension that knowledge may give a bias contrary to the interests of the church, that a vast deal of time, which might be usefully employed, is devoted, both by pupils and tutors, to a course of studies which, to say the least, neither tends to enlarge the boundaries of knowledge nor to strengthen the minds of the students. Besides the candidates for holy orders, great numbers of the sons of good families from all parts of Spain are sent to this seminary to pass a few years; and hence the number of the members of the university has at some periods amounted to more than four thousand. The regular inhabitants of the city, exclusive of the university, amount to 13,500 persons.

The cathedral is a fine object of the Gothic kind, though of no earlier erection than the reign of Charles I. of Spain, in the beginning of the sixteenth century; and as at that period Gothic architecture was on the decline in Spain, it will not bear very rigid criticism. It is, however, a magnificent mass of building, and is adorned with paintings from the pencil of Titian, Spagnoletti, and some other great masters. The college formerly belonging to the order of Jesuits is a very large pile of building, now occupied by regular canons. The church, dedicated to St Mark, within it, has some of the best productions of the Spanish painter Mengs, but being a representation of the various parts of the life of Loyola, the founder of the order of Jesuits, whatever merit they may have as paintings, they have now none as historical pieces.

The principal square of Salamanca, in the centre of the city, is a fine object. The buildings that surround it are handsome and lofty, and supported by piazzas, under which is the principal public walk for the inhabitants. It is situated in latitude 41. 21. N.

SALAME, a small island at the entrance of the Persian Gulf, near Cape Mussendoon. Long. 56. 48. E. Lat. 26. 20. N.

SALAMIS, an island of the Archipelago, situated in long. 34. 0. E. and lat. 37. 32. N. It was famous in antiquity for a battle fought there between the Greek and Persian fleets. In this engagement, which was one of the most memorable actions we find recorded in history, the Grecians lost forty ships, and the Persians two hundred, besides a great many more which were taken, with all the men and ammunition on board.

The island of Salamis is of a very irregular shape; it was reckoned eight or ten miles in length, reaching westward as far as the mountains called *Kerata* or *The Horns*. Pausanias informs us that on one side of this island stood in his time a temple of Diana, and on the other a trophy for a victory obtained by Themistocles, together with the temple of Cychreus, the site of which is now thought to be occupied by the church of St Nicholas.

The city of Salamis was demolished by the Athenians, because in the war with Cassander it surrendered, from disaffection, to the Macedonians. In the second century, when it was visited by Pausanias, some ruins of the Agora or market-place remained.

SALAYR ISLE, an island in the Eastern Seas, situated off the southern extremity of Celebes, about the sixth degree of south latitude. This island is about forty miles in length by eight in average breadth; and there are many smaller isles around it, two of which only are inhabited, namely, Bonarutte and Calawe. It is mountainous and woody, yet better cultivated and peopled than most of the eastern isles. The principal produce is millet, which is the chief subsistence of the natives, and cotton, which is raised in a coarse manner. From this raw material coarse blue and white stripped cloths are manufactured, for internal consumption and for exportation. The inhabitants, according to the estimate of Captain Forrest, amount to about 60,000. They have good houses; and the richer classes, in travelling, are carried in bamboo chairs over the hills, while horses are used in the level country. The island was ceded by the Macassars, who had obtained possession of it, to the king of Ternate, from whom it was taken by the Dutch East India Company. The Dutch had a junior resident here as merchant, who dwelt in a pallisadoed fort.

SALE is the exchange of a commodity for money; barter, or permutation, is the exchange of one commodity for another.

SALEMI, a city of the island of Sicily, in the province of Mazzara. It stands on a healthy spot on the summit of a hill, which is the ancient Alicia or Halycus. It is surrounded with walls in a dilapidated state. It is on the decline, but still contains 9200 inhabitants, who are chiefly employed in agriculture, especially in producing the best oil, and in making excellent wire.

SALENGORE, a district in the Malay peninsula, extending along the Straits of Malacca, and governed by a Mahommedan chief, who bears the title of rajah. It is situated at no great distance from Prince of Wales' Island, in which the trade of the place chiefly centres. Pepper, cloves, wild nutmegs, wax, nutmeg-oil, rattans, dammer, wood, oil, &c., are imported in the Buggess prows; and from a large river near to Salengore great quantities of long rattans are brought. The prince is the chief merchant, as in the other Malay principalities, monopolizing all the trade. Ships lying in the river are secure from pirates; but in the road it is necessary to be on the alert against straggling prows, which are always ready to take advantage of unguarded ships. The Buggesses have still a small settlement here, and profess the Mahommedan religion.

SALEP, in the *Materia Medica*, the dried root of a species of orchis. "The restorative, mucilaginous, and demulcent qualities of the orchis root, render it of considerable use in various diseases. In the sea-scurvy it powerfully obtunds the acrimony of the fluids, and at the same time is easily assimilated into a mild and nutritious chyle. In diarrhœas and the dysentery it is highly serviceable, by sheathing the internal coat of the intestines, by abating irritation, and gently correcting putrefaction. In the symptomatic fever which arises from the absorption of pus from ulcers in the lungs, from wounds, or from amputation, salep used plentifully is an admirable demulcent, and well adapted to resist the dissolution of the crasis of the blood, which is so evident in these cases. And by the same mucilaginous quality it is equally efficacious in the strangury and dysury, especially in the latter when arising from a venereal cause, because the discharge of urine is then attended with the most exquisite pain, from the ulceration about the neck of the bladder and through the course of the urethra. I have found it also an useful aliment for patients who labour under the stone or gravel." (Dr Percival's Essays, Medical and Experimental.) The ancient chemists appear to have entertained a very high opinion of the orchis root, as appears from the *Secreta Secretorum* of Raymund Lully, a work dated 1565.

SALERNO, a city of Italy, the capital of the Neapolitan province Principato Citeriore. It stands on the sea-shore, in the bay of that name, between mountains and the two small rivers called Sele and Larino. It is surrounded with walls, and defended by a castle. An archbishop is situated here, with a fine cathedral, under which are the graves of the ancient kings of Lombardy, as well as of Pope Gregory VII. It contains seventeen parish and nineteen conventual churches, a lyceum, which was formerly a university, and the remains of the celebrated medical school. The houses, though old, are large and grand, and the inhabitants are 10,650. A fair of the greatest trade in Italy was formerly held here; but it has gradually fallen into decay of late years, owing to the insecurity of the roadstead, where ships must anchor, there being no harbour.

SALFORD, a township of the parish of Manchester, and a kind of suburb to that place, being separated from it only by a small bridge. It is chiefly inhabited by operatives in the cotton trade. It was created a borough by the law of 1832, for the purpose of returning one member to the House of Commons. The population amounted in 1801 to 13,611, in 1811 to 19,114, in 1821 to 25,772, and in 1831 to 40,786.

SALIANT, in *Fortification*, denotes projecting. There are two kinds of angles; the one saliant, which have their points outwards; the other re-entering, which have their points inwards.

Saliant, Salient, or Saillant, in *Heraldry*, is applied to a lion, or other beast, when its fore-legs are raised in a leaping posture.

SALIBABO Isles, a group of islands in the Eastern Seas, situated about the fourth degree of north latitude, and between 126 and 127 of east longitude. The island of Salibabo is about fifteen miles in circumference, and is situated to the southward of Tulour, from which it is divided by a narrow strait, about one mile across. The names of the principal islands are Tulour or Kercolang, Salibabo, and Kabruang. Salibabo contains twelve villages, the united population of which amounts to 3000. All these islands are well cultivated and populous, abounding in potatoes, rice, goats, hogs, &c. The inhabitants are of the Malay colour, with long hair; and have for arms lances, swords, targets, and daggers. They manufacture a coarse kind of cloth from the wild plantain tree. They are much oppressed by their chiefs, and sold as slaves for trifling offences. They barter provisions with such ships as pass, for coarse calicoes, red handkerchiefs, coarse cutlery, &c. There is a good harbour on the east coast of the island of Salibabo.

SALIC or Salique Law (*Lex Salica*), an ancient and fundamental law of the kingdom of France, usually supposed to have been made by Pharamond, or at least by Clovis, in virtue of which males only are to inherit.

Some, as Postellus, would have it to have been called *Salic*, as if *Gallic*, because peculiar to the Gauls. Montanus insists that it was so named because Pharamond was at first called *Salicus*. Others will have it to be so named as having been made for the Salic lands. These were noble fiefs which the first kings used to bestow on the Sallians, that is, the great lords of their *salle* or court, without any other tenure than military service; and for this reason such fiefs were not to descend to women, as being by nature unfit for such a tenure. Some, again, derive the origin of this word from the Salians, a tribe of Franks that settled in Gaul in the reign of Julian, who is said to have given them lands upon condition of their personal service in war. He even passed the conditions into a law, which the new conquerors acquiesced in, and called it *salic*, from the name of their former countrymen.

SALII, in Roman antiquity, priests of Mars, of which there were twelve, instituted by Numa, and wearing painted, parti-coloured garments, and high bonnets, with a steel cuirass on the breast. They were called *salii*, from *saltare*, to dance; because, after assisting at sacrifices, they went dancing about the streets, with bucklers in their left hand, and a rod in their right, striking musically with their rods on one another's bucklers, and singing hymns in honour of the gods.

SALIM, a river of Asiatic Russia, which falls into the Obi, sixty miles from Sourgout.

SALINA, an island in the Mediterranean, belonging to the kingdom of the Two Sicilies. It is divided by a channel three miles across from Lipari to the north-west of that island. It is about fourteen miles in circuit. A valley between two mountains, called Fossa Felice, is extremely fertile, and produces a great revenue from the exportation of grain, fruit, pulse, capers, salt, alum, and wine, the last of which, known by the name Malvasia, is highly valued. It is evidently of volcanic origin, having vestiges of ancient craters and several thermal springs. It was known to the ancients by the name of Didyme, or twins, from the two conical mountains, which are prominent objects when seen from the sea. The population consists of 4000 persons. The chief town is Amalfi, near to which is good anchorage. Long. 14. 47. 35. E. Lat. of Amalfi church, 38. 35. 40. N.

SALINES, a city of France, in the department of the Jura, and arrondissement of Poligny. It is situated in a narrow valley on the river Furieuse, and is defended by two forts. In it are some strong brine springs, from which culinary salt is prepared; but much of the brine is conducted to Arp and Senans to be granulated. Near to it some excellent wine is produced, as well as much honey and bees-wax. In 1836 it contained 6554 inhabitants.

SALISBURY, or New Sarum, a city in the county of Wilts, and in the hundred of Underditch. It is the shire town of the county, where the assizes and the elections are held, and where, but in the village of Fisherton adjoining, is the county jail. It stands in a narrow valley, in which the small rivers Willy and Nadder unite with the Avon. These streams are, by means of small channels, conducted through most parts of the city, forming clear running brooks in several of the streets. By means of a canal the city communicates with the sea through Southampton. Among the public edifices for secular purposes, the most distinguished is the council-house, erected about forty-five years ago. It is a square building with a grand Doric portico, which forms on one side the entrance to the law-courts, and on the other to a large public room used for county meetings and other purposes. But the public building which most distinguishes this city is the magnificent cathedral, which is the most uniform structure, as well as being the most perfect and original example, of all the edifices dedicated to the choral service of the Church of England. The erection of it at the commencement of the reign of Henry III. marks a decided epoch in English architecture, the very beautiful pointed style having then been brought to its utmost perfection. A very experienced critic has given it as his opinion, that this very interesting church, so remarkable in its design for purity, simplicity, and grandeur, holds the same rank in English architecture which the Parthenon bears in the Grecian.

This edifice was founded in the year 1220, the fifth year of the reign of Henry III., the see having been then removed from Old Sarum, to which place it had been translated from Sherborn, in Dorsetshire, in 706, when the episcopal jurisdiction of it extended over what have since become the dioceses of Salisbury, Bristol, Wells, and Exeter. The extreme length of the cathedral outside from west to east is 480 feet. The length of the grand transept from south to north is 232 feet, and the extreme length of the eastern transept is 172 feet.

This church has an important advantage over many other edifices of a similar character, in not being so closely surrounded by other buildings. It is easy of access, and it affords a most delightful view from almost every point. As to outline and dimensions, a more splendid building can scarcely be imagined; while the lofty proportions of the spire, which rises to the height of four hundred feet, become the more striking upon a near approach. The spire is a most interesting object from every part of the surrounding country. A slight settlement was observed to have taken place on the western sides of the tower, which on examination was found in 1681 to be twenty-two inches out of the perpendicular, but no variation has taken place since that time.

By a recent act of parliament the see of Salisbury has been increased by the county of Dorset, which before was within the diocese of Bristol, having been added to it. The establishment of the church, besides the bishop, comprises the dean, the precentor, the chancellor, three archdeacons, the sub-dean, the sub-chanter, and forty-five prebendaries (six of whom being residentiary, are called canons), four vicars, six singing men, eight choristers, and other inferior officers. The palace of the bishop and the houses of the several dignitaries surround the cathedral, in what is called the Close, being all encircled with an ancient and lofty wall.

The civil government of the city was in a body corporate, consisting of a mayor, high steward, recorder, deputy-recorder, and twenty-four aldermen; but by the late law it has been divided into three wards, having six aldermen and eighteen councillors, who elect the mayor. It has also a recorder appointed by the crown. The city elects two members to the House of Commons, and gives the title of marquis to the family of Cecil. Salisbury was formerly celebrated for its manufactories of cutlery, which have of late years declined, in consequence of the powerful competition of Sheffield and Birmingham; but still some of the best knives, scissors, and razors are made there, and some of the most beautiful and costly ornaments in steel. There was till recently a considerable trade in making flannels, especially one kind, almost wholly appropriated to the market of Spain, from whence the goods were despatched to Buenos Ayres and other parts of South America.

Salisbury being on the high road to Exeter and to Plymouth, is a great thoroughfare, and well provided with good inns, carriages, and horses. It is well supplied with provisions at moderate prices, and has good markets, which are held on Tuesdays and Fridays. It has a great number of charitable establishments, both for the purposes of education and for the solace of old age, or of infirmities of body or mind. It contains three parish churches, and an appropriate number of places of worship for the various sects of dissenters. It is eighty-one miles from London, and ninety from Exeter. The population appears at the decennial enumerations to have amounted in 1801 to 7668, in 1811 to 8243, in 1821 to 8763, and in 1831 to 9876.

SALIVA is that fluid by which the mouth and tongue are continually moistened in their natural state, and is supplied by glands which form it, and are called salivary glands.

SALIVATION, in *Medicine*, a promoting of the flux of saliva by means of medicines, chiefly by mercury.

SALIX, the Willow. Willow trees have been frequently the theme of poetical description, both in ancient and modern times. In Virgil, in Horace, and in Ovid, we have many exquisite allusions to them and their several properties. The *Babylonica*, Babylonian pendulous salix, commonly called weeping willow, grows to a large size, having numerous long, slender, pendulous branches, hanging down loosely all round in a curious manner, and long, narrow, spear-shaped, serrated, smooth leaves. This curious willow is a native of the East, and is retained in our hardy plantations for ornament; it exhibits a most agreeable variety, particularly when disposed singly by the verges of any piece of water, or in spacious openings of grass ground. All the species of salix are of the tree kind, very hardy, remarkably fast growers, and several of them attaining a considerable stature when permitted to run up to standards. They are mostly of the aquatic tribe, being generally the most abundant and of most prosperous growth in watery situations. They, however, will grow freely almost anywhere, in any common soil and exposure; but they spring considerably faster and stronger in low moist land, particularly in marshy situations, by the verges of rivers, brooks, and other waters, which places often lying waste, may be employed to good advantage in plantations of willows for different purposes.

SALLAWATTY, one of the Papuan or Oriental Negro Isles, separated from the island of Papua or New Guinea by a narrow strait. It is thirty miles in length by twenty-five in average breadth, and produces abundance of sago of an excellent quality. It is situated about the 131st degree of east longitude.

SALLEE, an ancient and considerable town of Africa, in the kingdom of Fez, with a harbour and several forts; but the river, which formerly admitted large vessels, is now choked up with sand. It was formerly the stronghold of Moorish piracy, from which great depredations were committed upon Europeans; and there may still be seen an immense and dreary dungeon formed under ground for the detention of the unfortunate captives. On the opposite side of the river stands Rabat, or New Sallee, which is chiefly frequented by Europeans, and where they once possessed numerous factories; but the trade is now nearly annihilated. Long. 6. 40. W. Lat. 34. 3. N.

Sallee, a town of Hindustan, in the province of Gujerat, situated on the north side of the Mahy river, and thirty-eight miles east by north from Cambay. Long. 73. 20. E. Lat. 22. 27. N.

SALLEEOLAKIT, a small island in the Eastern Seas, near the south-west coast of Mindanao. Long. 121. 25. E. Lat. 6. 42. N.

SALLIAN, a city of Persia, situated on the Caspian, at the mouth of the Kur. It is chiefly inhabited by Russians, who carry on here an extensive fishery of sturgeon, which abounds in the neighbouring seas. It is ninety miles south of Schamachi.

SALLO, Denis de, a French writer, famous for being the projector of a certain class of literary journals, was born at Paris in 1626. He studied the law, and was admitted a counsellor in the parliament of Paris in 1652. It was in 1664 that he formed the plan of the *Journal des Savans;* and the year following he began to publish it under the name of Sieur de Héronville, which was that of his valet de chambre. But he played the critic so severely, that authors, surprised at the novelty of such attacks, retorted so powerfully, that M. de Sallo, unable to weather the storm, after he had published his third journal, declined the undertaking, which he handed over to the Abbé Gallois, who, without presuming to criticise, contented himself merely with giving titles and making extracts. M. de Sallo died in 1669.

SALLUNA, a town of Northern Hindustan, tributary to the Ghoorkhali rajah of Nepaul. Long. 81. 37. E. Lat. 29. 2. N.

SALLUSTIUS, C. Crispus, a celebrated Latin historian, was born of a plebeian family of Amiternum, a city of the Sabines, B. C. 86, the same year that Marius died. We can have no doubt that the cultivation of his mental powers must have been carefully attended to, though this does not seem to have prevented him from falling into all the extravagances and dissipation of a profligate age. His intrigue with Fausta, daughter of Sulla, and wife of Milo, became known to her husband, and was punished in a way which made the two parties irreconcileable enemies. Sallust became quæstor at the age of twenty-seven, and tribune of the people in the year B. C. 52. His profligacy, however, became so notorious, that the censors, Appius Claudius and L. Piso, B. C. 50, found it necessary to remove him from the senate, though his removal has been ascribed by others to political reasons, as he was a warm supporter of Cæsar. It is supposed that he at this time wrote his account of the conspiracy of Catiline. His absence from public affairs continued only for a short time, as we find him prætor, B. C. 47, when he accompanied Cæsar to Africa; and after the battle of Thepsa, he was appointed to the province of Numidia, where he enriched himself by the most nefarious means. He returned to Rome with immense wealth; and after the murder of Cæsar abstained from taking any part in public affairs. He again devoted himself to a life of pleasure, and constructed a magnificent palace on the Quirinal, in the midst of gardens which were afterwards known as the Horti Sallustiani. This palace was subsequently occupied by Vespasian, Nerva, and many other emperors, and was destroyed by fire when Rome was plundered by Alaric. According to Eusebius, Sallust was married to Terentia, wife of Cicero, and died B. C. 35, in the fifty-first year of his age, being not less distinguished for his talents than for his profligacy. Of his historical works the following remain: 1. Bellum Catilinarium, a history of the conspiracy of Catiline, B. C. 63, with a very beautiful introduction, in which he laments, with much apparent feeling, the corruption of the age, and the profligacy of his contemporaries; 2. Bellum Jugurthinum, a history of the wars carried on against Jugurtha, king of Numidia, which he was probably induced to write from his residence in that country; 3. Historiarum Libri Quinque, a work on the history of Rome, from the consulship of M. Æmilius Lepidus and Q. Lutatius Catulus, B. C. 78, to that of M. Æmilius Lepidus and L. Volcatius Tullus, B. C. 66, with an introduction on the manners and government of Rome, and a short summary of the wars of Marius and Sulla. Of this work only a few fragments have been preserved. Some other works, however, have come down to us, which are ascribed to Sallust, though without sufficient reason: 1. Duæ Orationes de Republica Ordinanda, addressed to Julius Cæsar when he was proceeding against Petreius and Afranius, in Spain; and, 2. Declamatio in Ciceronem, which is alluded to by Quintilian. The character of Sallust as a historian stood high among the ancients, who regarded him as the rival of Thucydides, and in many points he was certainly the imitator of that writer. Like Thucydides, he endeavours to give the causes of the various events which he is narrating; and if he more frequently ascribes them to unworthy motives, we may readily discover the reason of this in the corruption of the age in which he lived. But they both show themselves profound thinkers, and intimately acquainted with the springs of human action. The first edition of the works of Sallust was published in Rome in 1470, and in Venice the same year; but since that time a variety of editions have appeared. The best is that of C. H. Frotscher, giving the notes and emendations of Cortius, three vols. Lips. 1380, 8vo. C. Sallustii Histor. iii. fragmenta e cod. Vatic. edita ab. Angelo Maio, editio auctior et emendatior, curante J. Th. Kreissig, Misen. 1830.

SALLUZZO, a city of the kingdom of Sardinia, in the province of Turin, and the capital of the division of that name. It stands on an elevation not far from the river Po. It is surrounded with walls, is the see of a bishop, and has a cathedral, several churches and monasteries, and 10,150 inhabitants, who carry on much trade in wine and in corn, and make silk goods and ironmongery. Long. 16. 55. E. Lat. 25. 3. N.

SALLY-PORTS, in *Fortification*, are those underground passages which lead from the inner to the outward works; such as from the higher flank to the lower, or to the tenailles, or the communication from the middle of the curtain to the ravelin.

SALMASIUS, CLAUDIUS, a French writer of uncommon abilities and erudition, descended from an ancient and noble family, and born at or near Samur in the year 1596. His mother, who was a Protestant, infused her notions of religion into him, and he at length converted his father. He settled at Leyden; and in 1650 he paid a visit to Christina queen of Sweden, who is reported to have shown him extraordinary marks of regard. Upon the violent death of Charles I. of England, he was prevailed on by the royal family, then in exile, to write a defence of that king; which was answered by our Milton in 1651, in a work entitled *Defensio pro Populo Anglicano contra Claudii Salmasii Defensionem Regiam.* This book was read over all Europe, and conveyed such a proof of the writer's abilities, that he was respected even by those who hated his principles. Salmasius died in 1653; and some did not scruple to say that Milton killed him by the acuteness of his reply. His works are numerous, and of various kinds; but the greatest monuments of his learning are, his *Notæ in Historiæ Augustæ Scriptores*, and his *Exercitationes Plinianæ in Solinum.*

SALMO, the SALMON. See ICHTHYOLOGY.

SALMON FISHERY. See FISHERY.

SALO, a market-town of Italy, in the Austrian kingdom of Venetian Lombardy, and in the delegation of Brescia. It is most delightfully situated on a bay in the lake of Garda, and behind it rises the Alpine mountain Pennino. It is the seat of a judicial tribunal, has three churches, an orphan-house, a hospital, and many well-built houses, and about 6500 inhabitants. The finest silk in Italy is produced in the vicinity; and within the town there are manufactories of hats, leather, glass, and linen threads.

SALO BAY, on the north coast of the island of Java. Long. 112. 36. E. Lat. 6. 58. S.

SALOMBO, a cluster of small islands in the Eastern Seas. Long. 113. 13. E. Lat. 5. 30. S.

SALON, a city of France, in the department of the Mouths of the Rhone, and the arrondissement of Aix. It stands partly on the side of a hill and partly on the plain below, through which the canal of Craponne connects it with the river Crau. In 1836 it contained 5987 inhabitants, who cultivate great numbers of olive trees, in extracting the oil from which consists the chief occupation. Salon was the birthplace of the celebrated astrologer Nostradamus. Long. 5. 5. E. Lat. 43. 40. N.

SALONA, a seaport town of Dalmatia, situated on a bay of the Gulf of Venice. It was formerly a very considerable place, and its ruins show that it was twelve miles in circumference. In a valuable manuscript relation of Dalmatia, written by the senator Giambattista Giustiniani, about the middle of the sixteenth century, there is a sketch of what existed at the time. "The nobility, grandeur, and magnificence of the city of Salona, may be imagined from the vaults and arches of the wonderful theatre, which are seen at this day; from the vast stones of the finest marble, which lie scattered on and buried in the fields; from the beautiful column of three pieces of marble, which is still standing in the place where they say the arsenal was, towards the sea-shore; and from the many arches of surprising beauty, supported by very high marble columns. The height of the arches is a stone-throw, and above them there was an aqueduct, which reached from Salona to Spalatro. There are to be seen many ruins and vestiges of large palaces, and many ancient epitaphs may be read on fine marble stones; but the earth, which is increased, has buried the most ancient stones and the most valuable things." Long. 17. 29. E. Lat. 24. 10. N.

SALONICA, a large city of Turkey in Europe, the capital of a province of the same name, and anciently Thessalonica. It is situated on a bay formed by the two capes of the Great and Little Burnu. It is of a triangular shape, the base of which is on the sea-shore. The walls of brick, on a stone foundation, are of an unusual thickness, and defended by bastions at the appropriate points. The appearance of the city from without is magnificent, from the number of minarets, cupolas, and lofty buildings; but the interior is found with narrow and crooked streets, disgusting public squares, and low, ill-built houses, resembling barracks; but still a considerable degree of cleanliness is observable everywhere. The quays are covered with sheds; and the numerous buyers and sellers who are congregated near them, and near the ships, present a striking picture of animation and bustle, and seem to confirm what is asserted by the natives, that Salonica is the first trading city of the Levant. The inhabitants are calculated, for they are not ascertained, to be between sixty and seventy thousand, of whom one half are Turks, one quarter Greeks, one fifth Jews, and the remainder Franks of all the several European nations, each of which have resident consuls. The manufactures are extensive, yielding cotton and silk goods, turkey leather, carpets, tobacco, and snuff, and the small articles of gold, silver, copper, steel, and iron; these, and many raw materials, such as raw silk, cotton, wool, corn, oil, honey, wax, with opium and other drugs, form the exports. Although the excellence and security of the haven naturally creates great maritime commerce, yet that by land with Austria and Germany is very extensive, and at one period conveyed vast quantities of colonial wares to great distances in the interior of Europe, as long as Bonaparte's continental system was in force, and is still a valuable branch of the trade of this city. This place has institutions for education, and especially the Jews have an institution in which it is said there are more than a hundred tutors and a thousand pupils. The Greeks have several elementary schools, but none for the higher branches of learning. There are few remains of antiquity except the Hippodrome, which is of marble, and highly ornamented with most valuable sculpture. There is also a rotunda built in resemblance of that in Rome, and the remains of two triumphal arches built by Augustus and Constantine. In 1313 this city was ceded for a valuable consideration by the Greek emperors to the Venetians, who retained it ten years, and it fell under the Turks with Constantinople. Long. 22. 25. 25. E. Lat. 40. 40. N.

SALOON, a town of Hindustan, in the nabob's territories, in the province of Oude, sixty-five miles south-south-east from Lucknow. Long. 81. 24. E. Lat. 26. 2. N.

SALOOR, a town of Hindustan, in the Northern Circars, fifty-three miles north-west from Vizagapatam. Long. 83. 19. E. Lat. 18. 26. N.

SALOP, or SHROPSHIRE, an inland county of England. It is bounded on the north by Cheshire and the Welsh counties of Flint and Denbigh; on the west by the Welsh counties of Denbigh, Montgomery, and Radnor; on the south by Herefordshire and Worcestershire; and on the east by Staffordshire. It is of an oblong figure, extending from north to south, and contains a variety of projections and indentations. Its greatest length is about forty-six, and its greatest breadth thirty-seven miles. Its superficial contents are 1341 square miles, or 854,240 statute acres.

This county is divided into fifteen districts or hundreds, of which five are on the north-east side of the river Severn, three extend to both banks of that river, and the remainder are on its south-west side. The ecclesiastical divisions of the county are into the diocese of Lichfield and Coventry, extending over 114 churches; of Hereford, over 127; of Worcester, over three; and of St Asaph, over twelve; besides which there are six in the peculiar jurisdiction of Bridgenorth, making in the whole 262 churches, of which 229 are parochial.

The population of this county at the four decennial periods of enumeration has been found to be as follows: In 1801, 167,639; in 1811, 194,298; in 1821, 206,153; and in 1831, 222,800.

The occupiers of land employing labourers, were	3,832
Occupiers of land not employing labourers	2,139
Labourers employed in agriculture	17,296
Ditto employed in manufactures	1,353
Ditto employed in retail trade or handicraft	14,461
Capitalists, bankers, &c	1,948
Labourers not agricultural	11,585
Other males under twenty years of age	2,800
Males above twenty years of age	56,474
Male servants	1,560
Female servants	11,371

In the year 1831, the number of families chiefly employed in agriculture was found to be 17,096; of those chiefly employed in trade, manufactures, and handicraft, 16,210; and of those not comprised in the two preceding classes, 13,121. The annual value of the real property of the county, as assessed in 1813, was L.1,037,988. The number of houses in 1831 was thus estimated: Inhabited, 42,633, occupied by 46,267 families; uninhabited, 1415; and building, 253.

The towns whose population exceeded 1500 persons in 1831 are,

Shrewsbury	21,297
Hales Owen	9,765
Wellington	9,671
Ellesmere	6,540
Whitchurch	5,736
Bridgenorth	5,298
Ludlow	5,253
Shiffnal	4,779
Oswestry	4,478
Drayton	3,882
Wenlock town, 3,481; but in the borough are included several parishes, of which Broseley contained 4,299, and Madeley 5,822, or in the whole	17,435
Newport	2,745
Bishop's Castle	2,007
Wem	1,932
Hodnel	1,767
Cleobury Mortimer	1,716

The face of the county is very much diversified. On the western side it has the wild appearance of the adjoining principality of Wales. Throughout the rest of the county the land is rather undulating, tolerably wooded, and with many beautiful rivulets meandering along the different valleys. The whole tract of country, from Wellington to the termination of the county between Oswestry and Chirk, exhibits the mild beauties of a fertile and cultivated district, enclosed by well-formed hedges into fields, of dimensions well calculated for advantageous husbandry, and ornamented with several domains of noblemen and gentlemen, which present a most pleasing succession of pictures to the traveller.

That singular insulated mountain, the Wrekin, rising from a plain to the height of eleven hundred feet, exhibits its sugar-loaf form over the tops of the smaller elevations in its vicinity, and increases the interest of the scenery. In the southern division of the county, the Brown Clee Hill and the Titterson Clee Hill rise to greater elevations than the Wrekin, and produce much picturesque variety.

In a county of such extent the soil must be very varied. On the eastern side, the valleys are flat and warm, and the soil generally of a sandy nature. In the middle part, the soil is most tenacious, and the bottoms of the wider valleys have frequently a stiff but rich clay. On the most western parts, the soil is very shallow, resting upon rocks of varied descriptions; and is better calculated for sheep-pasture than for producing grain. There are some moorlands, but enclosures and drainage have considerably diminished their extent. A very great portion of the soil rests on a limestone subsoil; and almost the whole of the plains are easy to work with light ploughs and two or three horses. The easterly wind generally prevails in the spring, and the westerly in autumn; but the former is more remarkable for regularity than the latter. The whole of the county enjoys a salubrious air; but on the hills, on the western side, the cold of winter is most intensely felt.

The chief river is the Severn, which runs through the whole extent of the county from north-west to south-east. It is navigable at all seasons to the Bristol Channel downwards, and in wet seasons upwards to Welshpool in Montgomeryshire. The navigation is, however, at all times impeded by many obstructions. In dry weather, the fords

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are only passable with difficulty, and in very wet weather the floods cover the banks, and extend so far over the level land on both sides, that the barges cannot be drawn up, from wanting a path on which the men who draw them can securely walk. It is one of the singularities of this navigation, that men are employed instead of horses, as on other rivers, to draw the vessels against the stream. Imperfect as this navigation is, it is, however, the chief source of the wealth of the county, as affording the means of conveying to good markets the various heavy productions which it yields. The fish found in the Severn, in its course through Shropshire, are salmon, pike, flounders, grayling, and eels. There are also some lampreys in the Shropshire part of the Severn, but they are less abundant than in the lower parts of the river. The principal tributary rivers are the Camlet, the Vyrnwey, the Tern, the Clun, the Ony, and the Teme. There are, besides, innumerable rivulets and streams, which adorn and fertilize the country. The lakes of Shropshire, though neither numerous nor extensive, form a variety in its landscapes rarely to be seen in the midland counties of England. Adjoining the town of Ellesmere is a beautiful lake of a hundred and sixteen acres, with some others smaller near it. On the western side of the county is Marton Pool, of forty-five acres. On the north of the Severn are Fennymere, Llynclyspool, and Ancot; and at Shrawardine is a fine lake of forty acres. That side of the county which most abounds in running streams has few or no lakes. The canals of this county, if not equal in extent to those in some others, yield to none in their construction, or in the obstacles they have surmounted, or in the beneficial consequences by which they have been followed. The first canal was a private undertaking by a Mr Reynolds, completed in the year 1788, for the conveyance of his ironstone and coals. It was a short canal, but a descent of seventy-three feet was conducted by a well-contrived inclined plane and double railroad, by means of which the loaded boat passing down drew up another with a load nearly equal to one third of its own weight. This contrivance was found to be applicable to similar purposes upon a larger scale, and was speedily adopted by a company who, under the power of an act of parliament, soon constructed the Shropshire Canal, which passes through the most considerable iron and coal works, till it reaches the Severn. The Ellesmere Canal is a most important undertaking, as by it a communication is opened between the Severn and all the great canals and rivers in the north of England. Bristol and Liverpool are thus become connected by inland navigation; and the rivers Severn, Dee, Mersey, Trent, and Humber, are united for the purposes of conveyance. In districts where the inequalities of the surface would not admit of canals, iron railways have been constructed, on which heavy goods are conveyed, in appropriate waggons, with a great saving in the expense of carriage.

There are few counties in which the agricultural business is, on the whole, better conducted than Shropshire. The land is very well adapted for the turnip cultivation, and the large flocks of sheep which are commonly fed on that valuable root a great part of the year, supply abundance of manure for the due cultivation of the different kinds of grain. The most prevailing breed of sheep are the Southdown, but many of the New Leicesters are to be seen, and in the hilly parts of the county are many of the fine-woolled Welsh sheep. The meadows on the banks of the Severn, and on the flat lands contiguous to the smaller streams, afford pasturage for numerous cows, whose milk, when converted into cheese, is commonly sold under the denomination of Cheshire. The corn generally cultivated is either wheat, barley, oats, or pease, and the crops on an average equal in productiveness those of the best districts of the kingdom. Hops are grown in small quantities upon that part of the county which adjoins to Herefordshire.

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Some small portions of land are appropriated to the growth of hemp and flax. The cultivation of potatoes has been very much extended of late years, and now furnishes a large proportion of the aliment of the labouring part of the population. The growth of hay, and the cultivation of artificial grasses, are more neglected than any other branch of rural economy. On the flat lands, the deposits from the overflowing of the streams sufficiently enrich them without any artificial manure; but from the embankments being neglected, the hay produced on such situations is liable to be much injured by the floods that frequently occur in summer.

A great portion of the wealth of this county consists in the mineral productions, which are most profusely found beneath its surface. The chief of these are lead, iron, limestone, freestone, pipe-clay, and coals. The lead is procured in considerable quantities, chiefly from the mines of the Hope and Snailbeach. The matrix of the ore is crystallized quartz, sulphate and carbonate of barytes, and carbonate of lime. The iron ore is found contiguous to the coal, and frequently close to it. This is especially the case about Colebrook Dale, a division peculiarly rich in those minerals. This district is about eight miles long and two broad, on the banks of the Severn, on the western side of the Wrekin, and running parallel with it, from north-east to south-west. The whole, but especially the southern part, of the coal district, is considerably above the plain of Shropshire, so that at one part the height is five hundred feet above the Severn. The works of the dale supply both ore and coal, as well as limestone, in great quantities; and every part of the process, from digging the ore to the completion of the manufacture, including the conversion of the coal into coke, is performed on the spot. Arthur Young, describing this part of the county, says, "Colebrook Dale is a winding glen, between two immense hills, which break into various forms, being all thickly covered, and forming most beautiful sheets of hanging woods. The noise of the forges, mills, furnaces, &c., with all their vast machinery, the flames bursting from the furnaces, with the burning coal, and the smoke of the limekilns, are altogether horribly sublime." A bridge of cast iron, the first, we believe, constructed in this kingdom, thrown over the Severn, gives to the whole scenery a most romantic appearance. Soon after it was ascertained that iron might be made with coals reduced to the state of coke, as well as from wood, the operation of coking was begun here by Lord Dundonald, with a view to obtain the fossil tar in the course of the process. This operation led to the discovery of that gas, extracted from coal, whose brilliant light now serves to illuminate so many of our streets and public buildings. In this dale was discovered, in opening a coal-mine, a copious spring of fossil tar. It yielded, at first, very plenteously, but the quantity diminished in a few years, and although it still runs, its produce is but of small amount. Though the iron-works in this dale were the first begun, on a large scale, they are by no means confined to it; for in many other parts of the county they are carried on to an extent that is unequalled in any other country but Great Britain.

Besides the process of separating the iron from its ore, and bringing it into the state of bar-iron and pig-iron, the other steps in the application of that mineral to general purposes are made within this county. The larger kind of iron goods, whether cast or wrought, are prepared, and most of the iron bridges which have been erected in different parts of the kingdom have been formed here into such a state as only to require to be put together in the places where they were destined to be ultimately fixed. Some of the largest establishments for making porcelain have been formed here, especially that for iron-stone china in Colebrook Dale, which has lowered the price of that beautiful commodity so as to bring it within the reach of a greater number of consumers than could formerly afford it. Manufactures of a coarser kind of earthenware, and of tobacco-pipes, are carried on at Broseley and other places. The raw materials of which these articles are formed are almost all found near the spots where they are converted to these useful and profitable purposes. The preparation of iron for the forge is in fact the principal manufacture of Shropshire; at Hales Owen, nearly five hundred males of twenty years of age and upwards are so employed; and at Madeley half as many. At Dowley and other places in its vicinity, many men are employed in the blast-furnaces; and at and near Shrewsbury seventy-four men are employed in iron-castings and at forges, in preparing the weighty apparatus of powerful machinery. Nails are largely made at Wellington. The finer kinds of earthenware employ two hundred men at Broseley and Madeley; carpeting employs ninety men at Bridgenorth; glass is made at Wrockwordine; flannels are made at Oswestry, Church Stretton, and Worthen. There is a small manufacture of hair-seating carried on at Drayton. The trade in Welsh flannels centres in a great degree in Shrewsbury. The merchants of that town repair to the markets of Welshpool and Oswestry, and make their purchases of the small country weavers, who bring their goods in an unfinished state; and the pieces are rendered fit for the markets to which they are destined by the Shrewsbury traders.

Shrewsbury, the county town of Shropshire, from its vicinity to Wales, in which the towns are few, and from its distance from any other large town, has ever been considered as a kind of provincial capital. It is situated on a circular peninsula of considerable elevation, formed by the curvatures of the Severn. It presents at every approach a pleasing variety of views; and the noble sweep of the river, which seems to embrace it, heightens at every turn the charm of the scenery. The exterior ranges of houses command the rich and beautiful landscapes of the surrounding country. The stately spires of two venerable churches, and the massive towers of the castle, give that imposing grandeur to the whole which is commonly felt in contemplating the works of antiquity. The walks between the river and the town are finely shaded by an avenue of lofty trees, and furnish an agreeable promenade to the inhabitants. The interior of the town by no means corresponds with its external beauty. The streets are intricately dispersed, many of them steep and narrow, and all badly paved. They exhibit a strange contrast of ancient and modern buildings, and are as uncouth in their names as in their appearance. This town, as well as many other parts of the county, exhibits many interesting remains of antiquity. Among these is the castle, placed on the narrow neck of land by which the only entrance to the town can be gained without passing a bridge. The remains consist of the keep, a square building of a hundred feet, connected with two towers; the walls of the inner court; and the great arch of the interior gate. The keep is the most perfect of the whole mass of building. The walls of this building are ten feet in thickness, and its beams of very large dimensions. It is stated to have been built by Roger de Montgomery the Norman, as a feudal hold; but being forfeited to the crown in the reign of Henry I., was used as a royal fortress in subsequent periods, to check the incursions of the less civilized Welsh. The remains of the abbey, erected by the same founder as the castle, rewards the lover of antiquities for the inspection of them. The most perfect remains of this edifice is an octagonal structure six feet in diameter, usually called the Stone Pulpit, standing upon a portion of the ruined wall. It is crowned by an obtuse dome of stone-work at about eight feet from the base, supported on six narrow-pointed arches rising on pillars. The ancient church of St Chad, which fell down in 1788, presents an interesting group of ruins. That of St Mary, founded by Edgar, as well as St Alkmunds, founded by Queen Elfleda, daughter of Offa king of Mercia, have received such alterations in more recent periods that they exhibit the architectural taste of several successive ages. The charitable institutions of Shrewsbury, consisting of hospitals, infirmary, schools, and other establishments, rather exceed the proportion to be found in other places of equal population, and do much credit to the liberality of the natives.

Our limits do not admit of lengthened descriptions of the numerous remains of ancient architecture which are still existing in this county. The most remarkable are Haugmond Abbey, about four miles from Shrewsbury; the walls of Wroxeter, of British and Roman construction; the Abbey of Buildwas, founded in 1135 by Roger bishop of Chester, for monks of the Cistercian order; the Monastery of Wenlock, founded in 680, destroyed by the Danes, and afterwards re-established; the Roman camp, called the Walls, at Quatford; the castle of Ludlow, celebrated for its splendour in the reigns of Henry VIII. and of Elizabeth, during the latter period the residence of the Sidneys, and in the reign of Charles I. immortalized as the place where Milton composed some of his works; Wannington Castle, near Oswestry, a house of strength before the Norman conquest; Lilleshall Abbey, near Newport, with one of the most highly adorned Norman arches in the kingdom; and Boscobel House, with the oak in the grounds near it which served as a shelter to Charles II. when, after the battle of Worcester, he was closely pursued by the victorious party.

By the parliamentary reform bill, this county has been formed into two separate divisions, distinguished as the northern and southern, each of which is empowered to elect two members to the House of Commons. The polling places for the northern division are Shrewsbury, Oswestry, Whitchurch, and Wellington; and for the southern division, Church Stretton, Bridgenorth, Ludlow, Bishop's Castle, and Wenlock. By the same law, the borough of Bishop's Castle has been disfranchised. The borough of Shrewsbury, as before, returns two members, as well as Ludlow, Bridgenorth, and Wenlock.

The titles of peers derived from the county are, Earl of Shrewsbury, and Barons Hill and Forrester, and the Irish title of Earl of Ludlow. As there are fewer titles derived from this county, so the seats of peers are much fewer than in any other of the same extent. The most remarkable residences of noblemen and gentlemen are the following: Walcot Hall, Earl Powis; Hardwicke, Lord Hill; Ross Hall and Willey Park, Lord Forrester; Apley Park, Thomas Whitmore, M. P.; Dudmaston, William Whitmore; Pitchford, Honourable C. C. C. Jenkinson, M. P.; Hodnett, the late Mr Heber; Hawkstone, Sir Richard Hill, Bart., M. P.; Kinlet Hall, W. C. Childe, Esq. M. P.; Stanley Hall, Sir T. Tyrwhit Jones, Bart.; Altingham, Lord Berwick; Manor House, Lord Stafford; Pradoe, Honourable Thomas Kenyon; Pentrepant Hall, Honourable F. West; Orlaton Hall, William Cludde, Esq.; Downton Castle, Richard Payne Knight, Esq.; Oakley Park, Honourable Robert Clive; Plowden Hall, Edward Plowden, Esq.; Audlim, Lady Cotton.

SALOPAR, a town of the island of Ceylon, belonging to the British, eighteen miles north-north-west of Trincomalee.

SALPINX, σαλπιγξ, the name of an ancient Greek trumpet.

SALSETTE, an island on the western coast of Hindustan, in the province of Aurungabad, about eighteen miles in length by fourteen in average breadth. It was formerly separated from Bombay by a narrow strait about two hundred yards across, opposite to the fort of Tannah, across which, in 1805, a causeway was carried, which, although it is said to have had a prejudicial effect on the harbour, has been of much advantage to the island. The soil is well adapted for the cultivation of sugar, cotton, hemp, indigo, and the like; but it has been hitherto kept in a state of nature, and almost wholly covered with jungle, for the purpose of supplying Bombay with wood, charcoal, and sea-salt, of which there is a considerable manufactory in this island. It is more unhealthy than Bombay, the jungle being thicker and more shut in. In its present uncultivated state, it scarcely produces the hundredth part of what it might supply. Notwithstanding its present desolate state, Salsette contains numerous mythological antiquities, and the remains of reservoirs with flights of steps round them, and the ruins of temples, which indicate that it was formerly in a greater state of prosperity, and had a more numerous population. Among the most remarkable curiosities, are the caverns at Kennere, which are very extraordinary excavations. The largest resembles that at Carli, but is not equal to it in size and elegance. It contains two gigantic figures of Boodh, nearly twenty feet in height, and each filling one side of the vestibule. They are exactly alike, and in complete preservation, the Portuguese having adopted them and painted them red, and converted the temple into a Christian church. The manufacture of salt is carried on at the sea-shore, where extensive enclosures are levelled and divided into partitions of about twenty feet square, which are filled by the overflowing of the sea, and contain six or eight inches of water. The moisture is exhaled by the heat of the sun before the next tide, and the salt is gathered from the bottom of the enclosure. The first account we have of this island is dated in 1330, and was written by a friar named Oderic. It was taken possession of by the Portuguese in the sixteenth century, and from them by the Mahrattas in 1750. In 1773, during a rupture with that nation, the Company's troops obtained possession of it; and it was formally ceded by the Mahrattas, at the treaty of Poorbunder, in 1776, and subsequently confirmed at the peace of 1782–83, when all the small islands in the gulf formed by Bombay and Salsette were also ceded.

SALT, one of the great divisions of natural bodies. The characteristic marks of salt have usually been reckoned its power of affecting the organs of taste, and its being soluble in water. But this will not distinguish salt from quicklime, which also affects the sense of taste, and dissolves in water; yet quicklime has been universally reckoned an earth, and not a salt. The only distinguishing property of salts, therefore, is their crystallization in water. But this does not belong to all salts; for the nitrous and marine acids, though allowed on all hands to be salts, are yet incapable of crystallization, at least by any method hitherto known. Several of the imperfect neutral salts, such as combinations of the nitrous, muriatic, and vegetable acids, with some kinds of earths, also crystallize with very great difficulty. However, by the addition of spirit of wine, or some other substances which absorb part of the water, and keeping the liquor in a warm place, all of them may be reduced to crystals of one kind or other. Salt, therefore, may be defined a substance affecting the organs of taste, soluble in water, and capable of crystallization, either by itself or in conjunction with some other body; and, universally, every salt capable of being reduced into a solid form is also capable of crystallization *per se*. Thus the class of saline bodies will be sufficiently distinguished from all others; for quicklime, though soluble in water, cannot be crystallized without addition either of fixed air or of some other acid; yet it is most commonly found in a solid state. The precious stones, though supposed to be formed by crystallization, are nevertheless distinguished from salts by their insipidity and insolubility in water.

But acids and alkalis, and combinations of both, when in a concrete form, are salts, and of the purest form. Hence we conclude, that the bodies to which the name of salts more properly belongs are the concretions of those substances, which are accordingly called acid salts, alkaline salts, and neutral salts. These last are combinations of acid and alkaline salts, in such proportion as to render the compounds neither sour nor alkaline to the taste. This proportional combination is called saturation. Thus common kitchen salt is a neutral salt, composed of muriatic acid and soda combined together to the point of saturation. The appellation of neutral salts is also extended to denote all those combinations of acids, and any other substance with which they can unite, so as to lose, wholly or in a great measure, their acid properties.

But although this general definition of salts is commonly received, yet there are many writers, especially mineralogists, who confine the denomination of salts in the manner we first mentioned, viz. to those substances only which, besides the general properties of salts, have the power of crystallizing, that is, of arranging their particles so as to form regularly-shaped bodies, called crystals, when the water superfluous to their concrete existence has been evaporated.

Common SALT, or *Sea-Salt*, the name of that salt extracted from the waters of the ocean, which is used in greater quantities for preserving provisions, and other domestic purposes.

It is a perfect neutral salt, composed of marine or muriatic acid, saturated with mineral alkali. It has a saline but agreeable flavour. It requires about four times its weight of cold water to be dissolved, and nearly the same quantity of boiling water, according to Macquer; but according to Kirwan, it only requires 2·5 its weight of water to be dissolved in the temperature of sixty degrees of Fahrenheit. This salt always contains some part formed with a calcareous base; and, in order to have it pure, it must be dissolved in distilled water. Then a solution of mineral alkali is to be poured into it until no white precipitation appears; and by filtrating and evaporating the solution, a pure common salt is produced. Its figure is perfectly cubic, and those hollow pyramids, as well as the parallelopipeds formed sometimes in its crystallization, consist all of a quantity of small cubes, disposed in those forms. Its decrepitation on the fire, which has been reckoned by some as a characteristic of this salt, although the vitriolated tartar, nitrous lead, and other salts, have the same property, is owing chiefly to the water, and perhaps also to the air of its crystallization.

Its specific gravity is 2·120 according to Kirwan. The acid of tartar precipitates nothing from it. One hundred parts of common salt contain thirty-three of real acid, fifty of mineral alkali, and seventeen of water. It is commonly found in salt water and salt springs, in the proportion of even thirty-six per cent. It is found also in coals, and in beds of gypsum. This salt is unalterable by fire, though it fuses and becomes more opaque. Nevertheless a violent fire, with the free access of air, causes it to evaporate in white flowers, which adhere to the neighbouring bodies. It is only decomposed, as Macquer affirms, by the sulphuric and nitric acids, and also by the boracic or sedative salt. But although nitre is very easily decomposed by arsenic, this neutral marine salt is nowise decomposed by it. According to Monge, the fixed vegetable alkali, when caustic, decomposes all this marine salt. It preserves from corruption almost all sorts of animal food much better for use than any other salt, as it does so without destroying their taste and qualities; but when applied in too small a quantity, it then promotes putrefaction.

Of this most useful commodity there are ample stores on land as well as in the ocean. There are few countries indeed which do not afford vast quantities of rock or fossil salt. Mines of it have long been discovered and wrought in England, Spain, Italy, Germany, Hungary, Poland, and other countries of Europe. In several parts of the world there are huge mountains which wholly consist of fossil salt. Of this kind are two mountains in Russia, near Astracan; several in the kingdoms of Tunis and Algiers, in Africa; some also in Asia; and the whole island of Ormus, in the

Persian Gulf, almost entirely consists of fossil salt. The new world is likewise stored with treasures of this useful mineral, as well as with all other kinds of subterranean productions. Moreover, the sea affords such abundance of common salt, that all mankind might thence be supplied with quantities sufficient for their occasions. There are also innumerable springs, ponds, lakes, and rivers, impregnated with common salt, from which the inhabitants of many countries are plentifully supplied. In some countries which are remote from the sea, and have little commerce, and which are not blessed with mines of salt or salt-waters, the necessities of the inhabitants have forced them to invent a method of extracting common salt from the ashes of vegetables. The muriatic salt of vegetables was described by Dr Grew under the title of lixiviated marine salt. Leeuwenhoeck obtained cubical crystals of this salt from a lixivium of soda or kelp, and also from a solution of the lixivial salt of *carduus benedictus*; of which he gave an account in a letter to the Royal Society, published in their Transactions.

The muriatic salt which Mr Boyle extracted from sandiver, and supposed to be produced from the materials used in making glass, was doubtless separated from the kelp made use of in that process. Kunckel also informs us, that he took an alkaline salt, and after calcining it with a moderate fire, dissolved it in pure water, and placing the solution in a cool cellar, obtained from it many crystals of a neutral salt. He supposes that the alkaline salt was by the process converted into this neutral salt. But it is more reasonable to believe that the alkaline salt which he applied was not pure, but mixed with the muriatic salt of vegetables, which by this process was only separated from it.

Naturalists, observing the great variety of forms under which this salt appears, have thought fit to rank the several kinds of it under certain general classes; distinguishing it most usually into rock or fossil salt, sea-salt, and brine or fountain salt. To these classes others might be added, particularly those muriatic salts which are found in vegetable and animal substances. These several kinds of common salt often differ from each other in their outward form and appearance, or in such accidental properties as they derive from the heterogeneous substances with which they are mixed. But when perfectly pure, they have all the same qualities; so that chemists have not been able to discover any essential difference between them. For this reason we shall distinguish common salt after a different manner, into the three following kinds, viz. into rock or native salt, bay-salt, and white salt. By *rock* or *native salt* is understood all salt dug out of the earth, which has not undergone any artificial preparation. Under the title of *bay-salt* may be ranked all kinds of common salt extracted from the water in which it is dissolved, by means of the sun's heat, and the operation of the air, whether the water from which it is extracted be sea-water or natural brine drawn from wells and springs, or salt water stagnating in ponds and lakes. Under the title of *white* or *boiled salt* may be included all kinds of common salt extracted by coction from the water in which it is dissolved.

The first of these kinds of salt is, in several countries, found so pure that it serves for most domestic uses, without any previous preparation, triture excepted; for, of all natural salts, rock-salt is the most abundantly furnished by nature in various parts of the world, being found in large masses occupying vast tracts of land.

The English fossil salt is unfit for the uses of the kitchen, until by solution and coction it is freed from several impurities, and reduced into white salt. The British white salt also is not so proper as several kinds of bay-salt for curing fish and such meats as are intended for nautical provisions, or for exportation into hot countries. For these purposes, therefore, we are obliged, either wholly or in part, to use bay-salt, which is purchased in France, Spain, and other foreign countries.

However, it does not appear that there is any other thing requisite in the formation of bay-salt than to evaporate the sea-water with an exceedingly gentle heat; and it is even very probable, that our common sea-salt, by a second solution and crystallization, might attain the requisite degree of purity. Without entering into any particular detail of the processes used for the preparation of bay-salt in different parts of the world, we shall content ourselves with giving a brief account of the best methods of preparing common salt.

At some convenient place near the sea-shore is erected the saltern. This is a long, low building, consisting of two parts; one of which is called the fore-house, and the other the pan-house or boiling-house. The fore-house serves to receive the fuel and cover the workmen, and in the boiling-house are placed the furnace, and pan in which the salt is made. Sometimes they have two pans, one at each end of the saltern; and the part appropriated for the fuel and workmen is in the middle.

The furnace opens into the fore-house by two mouths, beneath each of which is a mouth to the ash-pits. To the mouths of the furnace, doors are fitted; and over them a wall is carried up to the roof, which divides the fore-house from the boiling-house, and prevents the dust of the coal and the ashes and smoke of the furnace from falling into the salt-pan. The fore-house communicates with the boiling-house by a door placed in the wall which divides them.

The body of the furnace consists of two chambers, divided from each other by a brick partition called the mid-feather, which from a broad base terminates in a narrow edge near the top of the furnace, and, by means of short pillars of cast iron erected upon it, supports the bottom of the salt-pan. It also fills up a considerable part of the furnace, which otherwise would be too large, and would consume more coals than, by the help of this contrivance, are required. To each chamber of the furnace is fitted a grate, through which the ashes fall into the ash-pits. The grates are made of long bars of iron, supported underneath by strong cross bars of the same metal. They are not continued to the farthest part of the furnace, it being unnecessary to throw in the fuel so far. For the flame is driven from the fire on the grate to the farthest part of the furnace, and thence passes, together with the smoke, through two flues into the chimney; and thus the bottom of the salt-pan is everywhere equally heated.

The salt-pans are made of an oblong form, flat at the bottom, with the sides erected at right angles. The length of some of these pans is fifteen feet, the breadth twelve feet, and the depth sixteen inches; but at different works they are of different dimensions. They are commonly made of plates of iron, joined together with nails, and the joints are filled with a strong cement. Within the pan five or six strong beams of iron are fixed to its opposite sides, at equal distances, parallel to each other and to the bottom of the pan, from which they are distant about eight inches. From the beams hang down strong iron hooks, which are linked to other hooks or clasps of iron firmly nailed to the bottom of the pan; and thus the bottom of the pan is supported, and prevented from bending down or changing its figure. The plates most commonly used are of malleable iron, about four feet and a half long, a foot broad, and the third of an inch in thickness. The Scotch commonly prefer smaller plates fourteen or fifteen inches square. Several make the sides of the pan, where they are not exposed to the fire, of lead; those parts, when made of iron, being found to consume fast in rust from the steam of the pan. Some have used plates of cast iron five or six feet square, and an inch in thickness; but they are very subject to break when unequally heated, and shaken, as they frequently are, by the violent boiling of the liquor. The cement most commonly used to fill the joints is plaster made of lime.

The pan, thus formed, is placed over the furnace, being supported at the four corners by brick-work, but along the middle, and at the sides and ends, by round pillars of cast iron called taplins, which are placed at three feet distance from each other, being about eight inches in height, and at the top, where smallest, four inches in diameter. By means of these pillars the heat of the fire penetrates equally to all parts of the bottom of the pan, its four corners only excepted. Care is also taken to prevent the smoke of the furnace from passing into the boiling-house, by bricks and strong cement, which are closely applied to every part of the salt-pan. In some places, besides the common salt-pans here described, they have a preparing pan placed between two salt-pans, in the middle part of the building, which in other works is the fore-house. The sea-water being received into this preparing pan, is there heated and in part evaporated by the flame and heat conveyed under it through flues from the two furnaces of the salt-pans. And the hot water, as occasion requires, is conveyed through troughs from the preparing pan into the salt-pans. Various other contrivances have been invented to lessen the expense of fuel, and several patents have been obtained for that purpose; but the salt-boilers have found the old methods the most convenient.

Between the sides of the pan and walls of the boiling-house there runs a walk five or six feet broad, where the workmen stand when they draw the salt, or have any other business in the boiling-house. The same walk is continued at the end of the pan, next to the chimney; but the pan is placed close to the wall at the end adjoining to the fore-house.

The roof of the boiling-house is covered with boards fastened with nails of wood, iron nails quickly mouldering into rust. In the roofs are several openings, to convey off the watery vapours; and on each side of it a window or two, which the workmen open when they look into the pan whilst it is boiling.

Not far distant from the saltern, on the sea-shore, between full sea and low-water marks, they also make a little pond in the rocks, or with stones on the sand, which they call their *sump*. From this pond they lay a pipe, through which, when the tide is in, the sea-water runs into a well adjoining to the saltern; and from this well it is pumped into troughs, by which it is conveyed into the ship or cistern, where it is stored up until they have occasion to use it.

The cistern is built close to the saltern, and may be placed most conveniently between the two boiling-houses, on the back of the fore-house; it is made either of wood or of brick and clay. It sometimes wants a cover, but ought to be covered with a shed, that the salt water contained therein may not be weakened by rains, nor mixed with soot and other impurities. It should be placed so high that the water may conveniently run out of it, through a trough, into the salt-pans.

Besides the buildings already mentioned, several others are required; as storehouses for the salt, cisterns for the bittern, an office for his majesty's salt-officers, and a dwelling-house for the salt-boilers.

All things being thus prepared, and the sea-water having stood in the cistern till the mud and the sand are settled to the bottom, it is drawn off into the salt-pan. And at the four corners of the salt-pan, where the flame does not touch its bottom, are placed four small lead pans, called scratch-pans, which, for a salt-pan of the size above mentioned, are usually about a foot and a half long, a foot broad, and three inches deep, and have a bow or circular handle of iron, by which they may be drawn out with a hook when the liquor in the pan is boiling.

The salt-pan being filled with sea-water, a strong fire of pit-coal is lighted in the furnace; and then, for a pan which contains about four hundred gallons, the salt-boiler takes the whites of three eggs, and incorporates them well with two or three gallons of sea-water, which he pours into the salt-pan whilst the water contained therein is only lukewarm, and immediately stirs it about with a rake, that the whites of the eggs may everywhere be equally mixed with the salt water.

Instead of whites of eggs, at many salterns, as at most of those near Newcastle, they use blood from the butchers, either of sheep or black cattle, to clarify the sea-water; and at many of the Scotch salterns they do not give themselves the trouble of clarifying it. As the water grows hot, the whites of eggs separate from it a black frothy scum, which rises to the surface of the water, and covers it all over. As soon as the pan begins to boil, this scum is all risen, and it is then time to skim it off.

The most convenient instruments for this purpose are skimmers of thin ash boards, six or eight inches broad, and so long that they may reach above half way over the salt-pan. These skimmers have handles fitted to them; and the salt-boiler and his assistant, each holding one of them on the opposite sides of the pan, apply them so to each other that they overlap in the middle, and beginning at one end of the pan, carry them gently forward together, along the surface of the boiling liquor, to the other end; and thus, without breaking the scum, they collect it all to one end of the pan, whence they easily take it out.

After the water is skimmed, it appears perfectly clear and transparent; and they continue boiling it briskly till so much of the fresh or aqueous part is evaporated, that what remains in the pan is a strong brine almost fully saturated with salt, so that small saline crystals begin to form on its surface; and this operation, in a pan filled fifteen inches deep with water, is usually performed in five hours.

The pan is then filled up a second time with clear sea-water drawn from the cistern; and about the time when it is half filled, the scratch-pans are taken out, and being emptied of the scratch found in them, are again placed in the corners of the salt-pan. The scratch taken out of these pans is a fine white calcareous earth found in the form of powder, which separates from the sea-water during its coction, before the salt begins to form into grains. This subtile powder is violently agitated by the boiling liquor, until it is driven to the corners of the pan, where the motion of the liquor being more gentle, it subsides into the scratch-pans placed there to receive it; in them it remains undisturbed, and thus the greatest part of it is separated from the brine.

After the pan has again been filled up with sea-water, three whites of eggs are mixed with the liquor, by which it is clarified a second time, in the manner before described; and it is afterwards boiled down to a strong brine as at first, which second boiling may take up about four hours. The pan is then filled up a third time with clear sea-water; and after that a fourth time, the liquor being each time clarified and boiled down to a strong brine, as before related, and the scratch-pans being taken out and emptied every time that the pan is filled up. Then, at the fourth boiling, as soon as the crystals begin to form on the surface of the brine, they slacken the fire, and only suffer the brine to simmer, or boil very gently. In this heat they constantly endeavour to keep it all the time that the salt corns or granulates, which may be nine or ten hours. The salt is said to granulate when its minute crystals cohere together into little masses or gains, which sink down in the brine, and lie at the bottom of the salt-pan.

When most of the liquor is evaporated, and the salt thus lies in the pan almost dry on its surface, it is then time to draw it out. This part of the process is performed by raking the salt to one side of the pan into a long heap, where it drains a while from the brine, and is then filled out into barrows or other proper vessels, and carried into the storehouse, and delivered into the custody of his majesty's officers. And in this manner the whole process is performed in twenty-four hours, the salt being usually drawn every morning.

In the storehouse the salt is put hot into drabs, which are partitions like stalls for horses, lined on three sides and at the bottom with boards, and having a sliding-board on the foreside to put in or draw out as occasion requires. The bottoms are made shelving, being highest behind, and gradually inclining forwards, by which means the saline liquor, which remains mixed with the salt, easily drains from it; and the salt, in three or four days, becomes sufficiently dry, and is then taken out of the drabs, and laid up in large heaps, where it is ready for sale.

The saline liquor which drains from the salt is not a pure brine of common salt, but has a sharp and bitter taste, and is therefore called bittern. This liquor, at some works, is saved for particular uses, and at others is thrown away. A considerable quantity of this bittern is left at the bottom of the pan after the process is finished; and as it contains much salt, it is suffered to remain in the pan when it is filled up with sea-water. But at each process this liquor becomes sharper and more bitter, and also increases in quantity. Thus, after the third or fourth process is finished, they are obliged to take it out of the pan, otherwise it mixes in such quantities with the salt as to give it a bitter taste, disposes it to grow soft and run in the open air, and renders it unfit for domestic uses.

After each process there also adheres to the bottom and sides of the pan a white stony crust, of the same calcareous substance with that before collected from the boiling liquor. This the operators call stone-scratch, distinguishing the other found in the lead pans by the name of powder-scratch. Once in eight or ten days they separate the stone-scratch from their pans with iron picks, and in several places find it a quarter of an inch in thickness. If this stony crust be suffered to adhere to the pan much longer, it grows so thick that the pan is burned by the fire, and quickly wears away.

The consumption of salt in this country is immense. Neckar estimated the consumption, in those provinces of France which had purchased an exemption from the *gabelle*, at 19½ lbs. English for each individual. But we believe that the people in this country may be estimated a little higher, or at 22 lbs.; and, on this supposition, taking the population at 16,500,000, the entire consumption will amount to 363,000,000 lbs. or 161,000 tons. Exclusively of this immense home consumption, we annually export about 10,000,000 bushels, which, at 56 lbs. a bushel, are equivalent to 250,000 tons. The cheapness of this important necessary of life is therefore not less remarkable than its diffusion.

In this country duties upon salt were imposed in the reign of William III. In the year 1798, they amounted to five shillings a bushel, but were subsequently increased to fifteen shillings, or about forty times the cost of the salt. So exorbitant a duty was productive of the worst effects, and by its magnitude, as well as by the regulations allowing salt duty-free to the fisheries, occasioned a great deal of smuggling. For this reason, the opinion of the public and the House of Commons having been strongly expressed against the tax, it was finally repealed in the year 1823. (M'Culloch's Commercial Dictionary, art. *Salt.*)

SALT *Springs.* Of these there are great numbers in different parts of the world, which undoubtedly have their origin from some of the large collections of fossil salt mentioned under the article *Common* SALT.

SALT, *Valley of*, in Syria. It is a lake in winter; but in summer the moisture is evaporated by the heat of the sun, when the salt is left in beds of about half an inch thick, and is afterwards purified for use. It is about eighteen miles to the east of Aleppo.

SALTASH, a market-town of the county of Cornwall, in the hundred of East, and a part of the parish of St Stephen. It is 220 miles from London, on the banks of the river Tamar, three miles above Plymouth, with which place it is connected by the Crimble Ferry. It is a corporate town, with a charter granting jurisdiction on the river Tamar. It returned two members to parliament before 1832. It has a market, which is held on Saturday. The population amounted in 1801 to 1150, in 1811 to 1478, in 1821 to 1548, and in 1831 to 1637.

SALTCOATS, a seaport town in Ayrshire, on the Frith of Clyde, thirty miles distant from Glasgow. At the end of the seventeenth century it consisted only of four houses; but it is now a place of considerable trade, and exports large quantities of coals, which are procured from the extensive coal-fields in the neighbourhood. There are some hundreds of looms in the town employed in weaving for the Glasgow and Paisley manufacturers; and ship-building has been carried on successfully for some years. In 1821 the population of the town and parish was 3413, and in 1831 it was 3544.

SALTPETRE, or NITRE (*nitrate of potash*), a compound of nitric acid and potash. It is generally obtained in the form of six-sided prismatic crystals, terminated by six-sided pyramids, joined by their bases. Its specific gravity is 1·933. See CHEMISTRY.

It is used in the various arts, and is the principal ingredient in the manufacture of gunpowder. See GUNPOWDER.

SALTSKAMMER, a circle in the Austrian province of the Upper Ens, extending over 330 square miles, and containing three market-towns and seventy-two villages, with 15,600 inhabitants. It is a most picturesque district, five sixths of the surface being covered with Alpine mountains, and watered by the romantic river Traun, issuing from the beautiful lake of that name, which was a favourite retreat of the late Sir Humphry Davy to enjoy fishing. The capital is the town of Ischl, where a large quantity of salt is refined.

SALVADOR, ST, or BAHIA, a large and important province of Brazil, extending from the Belmonte, in latitude 15° 25′ south, to the Rio Real, which divides it from Seregipe d'el Rey, in latitude 11° 38′ south. The river St Francisco separates it from Pernambuco on the west and north-west, while on the south-west it touches on Minas Geraes. It is divided into three comarcas, Bahia, Ilheos, and Jacobina; the former two comprising the coast, and the latter the western part of the province. The eastern is divided from the western portion by a chain of mountains of considerable elevation, from the eastern side of which proceed the numerous streams flowing into the prolific district of Reconcave, or forming the rivers of Ilheos. A considerable portion of Jacobina is occupied with cattle-plains, which are not susceptible of cultivation. It was formerly rich in gold, and, according to Cazal, it still produces that metal, and also silver, copper, iron, saltpetre, and crystals. This comarca comprehends the country on which the Rio St Francisco enters when it leaves the province in which it originates. The inhabitants are scattered everywhere over its surface, and occupy themselves chiefly in breeding cattle. "The regular winter or wet season," says Southey, "extends only some thirty leagues from the coast; and what rain falls in the interior comes only in thunder-showers, which are of course irregular, in no part frequent, and occur seldomer in the northern part of the province than in the south. After rain, the ground is presently covered with rich verdure, and the cattle fatten; but when drought succeeds to this season of abundance, they are reduced to browse upon such shrubs as resist the burning sun. The streams fail, and if the tanks which the thunder-showers had filled are also dried, a dreadful mortality ensues. Because of the frequency of this evil, the province cannot depend upon its own pastures, but looks to Goyaz and Piauhy for a regular supply." Jacobina, the capital of the comarca, is still a town of some importance, although the mines have ceased to be productive, and its smelting-house is broken up. It is situated near the left bank of the southern branch of the Ilapicuru, three miles below a lake which communicates with the river. Its inhabitants cultivate wheat, which is not found farther north, and the fruits as well as the pulse and grain of Portugal flourish in this elevated district. They export in particular large quantities of quince marmalade. There are some other towns in the comarca, but few of any material importance. Rio de Contas, a town situated about a hundred and thirty miles south of Jacobina, lies on the high road from Bahia to Goyaz. It owed its origin to its gold mines, which were discovered in 1718. But these have failed, and the inhabitants have betaken themselves to the more advantageous occupation of agriculture. Fifty miles west-south-west of Contas is Villa Nova do Principe, formerly called Caytete, the inhabitants of which are employed in raising cotton and breeding cattle.

The comarca of the Ilheos begins at Belmonte, and extends northward to the river Jiquirica. The Rio Pardo, which, according to Prince Maximilian, is the limit between the province of Porto Seguro and this comarca, rises in Serro Frio, and falls into the sea by three branches.

The Bay of Bahia, or All-Saints, has been pronounced one of the finest harbours in the world. The entrance, which is nearly three leagues wide, is from the south, having the continent on the right hand, and the long island of Itaparica on the left. According to Mr Henderson, this island forms two entrances, the eastern or proper entrance being eight miles in width, and the western or false bar being less than two miles across. The bay is twelve leagues in diameter, and thirty-six leagues in circumference, without including the islands or remote parts. The anchorage is secure. Vessels are here sheltered from every wind, and there is accommodation for the united navies of the world. This little Mediterranean is spotted with above a hundred islands, many of which are cultivated and inhabited. The city of St Salvador, better known by the name of Bahia, is, with the exception of Rio, the largest and most flourishing city in Brazil. In ecclesiastical dignity it claims the precedency, being an archiepiscopal see. It has also a higher antiquity, and was long the capital of the empire. Notwithstanding the removal of the seat of government to Rio, the natural advantages of Bahia will enable it, under all changes, to preserve its rank as the second city in Brazil. It is situated on the right side of the bay, where the land, at a small distance from the shore, rises steeply to a high ridgy hill, on the summit of which the city is chiefly erected. From the inequality of the ground, and the plantations interspersed, it occupies a considerable space, its length from north to south being four miles. The buildings are chiefly of the seventeenth century, the churches being of course the most conspicuous edifices. The town has a magnificent appearance from the water, but when entered, its interior is found not to correspond with its imposing aspect at a distance. In the lower town, where the port is situated, the houses are high, and the streets confined and narrow, wretchedly paved, and kept in a very filthy state. The upper town, from its height, and from the slope of the streets, is much cleaner than the port, and although far from being well built, has a number of handsome private houses and public buildings. Here are the cathedral, the archiepiscopal palace, the governor's palace, the ex-Jesuits' church (built entirely of marble brought from Europe, but now degraded into barracks for soldiers), the misericordia with its hospital, and various other edifices. The cathedral, and several other churches, are handsome, and richly ornamented. The city is protected by a number of forts and batteries, some of which are garrisoned. Society is not considered so polished here as at Rio. Gaming, the resource of vacant minds, is eagerly followed by both sexes. Intellectual pursuits seem to be little cultivated; and a large library, containing some valuable manuscripts respecting the interior of America, is allowed to remain in a neglected state. Bahia contains thirty-six churches, a number of monasteries, has a university, a number of schools of instruction, a foundling hospital, the library already mentioned, a few printing-presses, and is the centre of a very considerable trade. There are about a hundred and twenty wholesale merchants, and amongst other manufactures carried on are those of cotton, glass, rum, and sugar. There are companies engaged in the whale-fishery, and in ship-building.

The best idea of the great importance of the trade of Bahia will be formed from the following statements of the exports and imports. A statement of the quantities of Brazilian produce exported from the port of Salvador or Bahia in the year ending the 1st of October 1835: Sugar, 47,428 cases of thirteen hundredweights, 474 half cases, and 3071 barrels; cotton, 40,320 bags of about 160 pounds; 148,752 hides; coffee, 12,601 sacks and 131 barrels; tobacco, 54,419 bales, 172 sacks, and 5739 barrels; rum, 6129 pipes; molasses, 315 pipes; besides many other smaller articles. The number of vessels which cleared from the port was 244.

A statement of the value of merchandise imported into the port of Bahia or Salvador in the year ending the 1st of July 1835: Cotton manufactures to the value of L.664,104, of which Great Britain furnished L.573,097; woollen goods to the value of L.67,517, of which Great Britain supplied L.64,740 worth; linen manufactures to the value of L.77,863, Great Britain supplying L.57,497 worth; silk L.42,086, of which Great Britain supplied L.5657 worth, and France L.25,053; and numerous other articles, of which a large proportion is furnished by Great Britain; the total value of the imports being L.1,412,521.

The population of this city is estimated at 150,000. The environs of Bahia are very beautiful; and being constantly refreshed by land and sea breezes, the climate is deemed very healthy. The Reconcave, as the country which extends round the whole sweep of this beautiful bay is denominated, is one of the richest and most populous parts of Brazil. It varies in breadth from twelve to forty miles. Upon the rivers which intersect it, and fall into the bay, are situated many flourishing towns, which carry on a considerable trade with the capital. One of the largest is Cachoeira, situated on the river Paraguassu, which divides it into two parts. Near this town was found a mass of native copper, weighing a ton and a half. Fifteen miles below Cachoeira, on the same river, is Maragogype, also a considerable town. The other chief towns are St Amaro, on the right bank of the Serigy or Serzipe, twelve miles from its mouth, and forty north-west of Bahia; and Jaguaripe, on the right bank of the river of the same name, seven miles from its mouth, the inhabitants of which are chiefly manufacturers of earthenware. On the island of Itaparica, which is twenty-three miles in length from north to south, and ten in breadth, is a considerable town, with 16,000 inhabitants, who engage in the whale-fishery. The population of the whole province of St Salvador is estimated at 600,000.

SALVATION means the safety or preservation of any thing which is or has been in danger, and is generally used in a religious sense, when it means preservation from eternal death, or reception to the happiness of heaven, which is now offered to all men by the Christian religion upon certain conditions. See THEOLOGY.

SALVIANUS, an ancient father of the Christian church, who flourished in the fifth century, and was well skilled in the sciences. He acquired such reputation for his piety and learning, that he was named the Master of the Bishops. He wrote a Treatise on Providence; another on Avarice; and some epistles, of which Baluze has given an excellent edition. That of Conrad Rittershusius, in two volumes 8vo, is also esteemed.

SALUTE, in military matters, a discharge of artillery, or small arms, or both, in honour of some person of extraordinary quality. The colours likewise salute royal persons, and generals commanding in chief, which is done by lowering the point to the ground. In the field, when a regiment is to be reviewed by the king or his general, the drums beat a march as he passes along the line, and the officers salute one another, bowing their half-pikes or swords to the ground, then recover and take off their hats. The ensigns salute all together, by lowering their colours.

SALUTE, in the navy, a testimony of deference or homage rendered by the ships of one nation to those of another, or by ships of the same nation to those of a superior or equal. This ceremony is variously performed, according to the circumstances, rank, or situation, of the parties. It consists in firing a certain number of cannon, or volleys of small arms; in striking the colours or top-sails; or in one or more general shouts of the whole ship's crew, mounted for that purpose on the masts or rigging.

SALWATTY, an island in the Pacific Ocean, near the north-west coast of New Guinea, from which it is separated by a narrow channel. It is about ninety miles in circumference. Long. 131. 15. E. Lat. 1. 6. S.

SALZBURG. At present this district forms a circle of the Austrian province of Upper Ens, extending over 2836 square miles. It was formerly one of the most valuable of the independent ecclesiastical states of Germany, in the circle of Bavaria, under its own archbishop, whose revenues and dignity were of the highest class. It then contained sixteen cities, twenty-three market-towns, and 250,000 inhabitants. Owing to a severe persecution of the Protestants, which the archbishop instituted between 1729 and 1733, many of that religious party emigrated, and established themselves in other parts of Germany, and thereby the population was more than one third reduced; and those who had abandoned it were the most active portion of the community. During the French revolution, the country was secularized, and by the treaty of 1802 was, with Eichstadt, Berchtolsgaden, and a part of Passau, given to the archduke of Austria, Ferdinand, as an indemnification for the loss of Tuscany. By the peace of Presburg in 1805, Salzburg was secured to the emperor of Austria, and Eichstadt, with Passau, ceded to Bavaria. The treaty of 1809 left Salzburg at the disposal of Napoleon, who, in 1810, transferred it to the kingdom of Bavaria; but by the general peace of 1815 it was again delivered over to the Austrian monarchy, of which it still forms a portion. It is a most romantically interesting country, very rich in the long valley through which the river Salza flows, and in the smaller valleys which proceed from it, especially on the southern side of that stream. On both sides of these valleys are lofty mountains, forming a part of the Noric Alps, whose tops, especially that of the Nokchorn, which is 10,380 feet in height, are covered with perpetual snow, and exhibit, like the Alps in Switzerland, the striking objects which attract such numerous visitors. There are various mines in the territory, the most prolific of which are those of rock-salt, which yield more than sufficient for the consumption of the inhabitants. Formerly, several mines of gold were worked, and some of silver; but of late years that employment has been diminished, and applied to other subterranean objects. These are iron, arsenic, rock-crystal, marble, serpentine, saltpetre, cobalt, and asbestos. The iron is made into cutlery and other hardwares for domestic use, but no raw iron is exported. The circle yields flax and hemp, which, with the wool of their sheep, is spun and woven by the peasantry during the winter months, and converted by themselves into the necessary articles of clothing. The whole number of the inhabitants at present is 152,000.

SALZBURG, a city, the capital of the Austrian circle of the same name. It stands on the beautiful valley of the Saltz, on both sides the river of that name, over which there is a beautiful bridge three hundred and seventy feet long and forty feet broad. The city is surrounded with walls, but the suburbs are more extensive and more elegant, and extend to a considerable distance, containing the best of the modern residences. The streets within the city are narrow and crooked, but there are several handsome open plazas or squares, and a great number of those large and striking buildings which are tokens of its former ecclesiastical sovereigns. On a hill overlooking the city, and six hundred feet above it, is the ancient fortress of Moncksberg, now dismantled of its artillery; but it is an object of curiosity from a road having been hewn out of the solid rock on which it stands, forming an archway a hundred and fifty yards in length and eight in breadth, which terminates in a most delightful prospect of the surrounding country. It contains, with the suburbs, 16,500 inhabitants, who have little trade except at two large fairs, which become entrepôts for exchanging the productions of Italy with those of Germany. The environs are highly enchanting from the scenery they exhibit. Long. 13. 54. 5. E. Lat. 47. 43. 10. N.

SALZWEDEL, a city of Prussian Saxony, in the government of Magdeburg, the capital of a circle of the same name, which extends over 454 square miles, and contains a population of 31,600 persons. It is situated on the river Jeeke, which is navigable thus far, is surrounded with walls, and contains 930 houses, with 6300 inhabitants, employed in linen, cotton, and woollen manufactures, and in making leather, shoes, gloves, and refining salt.

SAMADONG, a large town in the island of Java, situated in a country of luxuriant fertility, 144 miles south-east from Batavia.

SAMAK, an island in the south-western part of the Gulf of Persia, about twelve leagues in circumference.

SAMANA, a town of Hindustan, in the province of Delhi, possessed by native chiefs in alliance with the British, 122 miles north-west from Delhi. Long. 75. 48. E. Lat. 30. 2. N.

SAMANAP, a large and populous town on the south-eastern coast of the island of Madura, and the residence of a prince. It is situated on a fine bay, which, though rather shallow, will admit of large brigs or country prows lying close to the town. It carries on an extensive commerce, and the country abounds in rice, and teak-timber for building. Long. 114. E. Lat. 7. 5. S.

SAMAND, a town of Hindustan, in the province of Moultan, and district of Bahar, which is tributary to the Afghans. It is situated on the eastern side of the river Indus. Long. 19. 57. E. Lat. 28. 11. N.

SAMANEANS, in *Antiquity*, a kind of magicians or philosophers, who have been confounded by some with the Brahmins. They proceeded from Ariana, a province of Persia, and the neighbouring countries, spread themselves in India, and taught new doctrines.

The Brahmins, before their arrival, it is said, were in the highest period of their glory the only oracles of India; and their principal residence was on the banks of the Ganges and in the adjacent mountains, whilst the Samaneans were settled towards the Indus. Others say that the Brahmins acquired all their knowledge from the Samaneans, before whose arrival it would be difficult to prove that the Brahmins were the religious teachers of the Indians. The most celebrated and ancient of the Samanean doctors was Boutta, or Buddha, who was born 683 years before Christ. His scholars paid him divine honours; and his doctrine, which consisted chiefly in the transmigration of souls, and in the worship of cows, was adopted not only in India, but also in Japan, China, Siam, and Tartary. It was propagated, according to M. de Sainte Croix, in Thibet, in the eighth century, and succeeded there the ancient religion of Zamolxis. The Samaneans, or Buddhists, were entirely destroyed in India by the Brahmins; but several of their books were preserv-

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Samarang.

ed, and still continue to be respected on the coasts of Malabar.

SAMAR, one of the Philippine Islands, 140 miles in length by sixty in average breadth. It is situated south-east from the large island of Luzon, from which it is separated by a strait five leagues in breadth. It is of an extremely fertile soil, which, besides other grain, produces abundance of rice, that is wholly appropriated to the use of the parochial clergy. The common food of the natives consists chiefly in a species of potato, yams, and a sort of root named gaby. The soil is favourable for the production of the sugar-cane, and fruits, such as lemons, melons, figs, of which there are about fourteen different species, the pumplemous, a species of orange, which is nearly five inches in diameter, and other vegetables besides, namely, cabbages, garlic, onions, and the like. Pepper, honey, and wax are found in the woods; and from the sap of the cocoa, nipe, and cabonegro trees, excellent materials are found for the manufacture of brandy. The woods afford an excellent cover for many animals, and monkeys abound; also a remarkably large deer, wild buffaloes, and other quadrupeds. They swarm also with every description of birds, particularly the common fowl. There are three species of the turtle-dove. The parroquet, cockatoo, and another pretty little bird of the same genus, and of the size of a linnet, are quite common. A diminutive bird, of the size of a wasp, is also seen, of the most vivid and beautiful colours, consisting of a shade of yellow mixed with red and blue. There is a curious production found in this island. It consists in numerous folds of the bark of a tree, which in a certain period of putrefaction are separable without art or difficulty. These pieced together afford a species of fine linen, harsh, indeed, and disagreeable to the skin, but which is softened by a preparation of lime. Besides serving as the materials of linen, it is likewise useful for the purposes of cordage. The iron-tree, ebony, and dyeing-wood, grow everywhere; and gold dust is found in small quantities in the interior.

The natives, especially those who reside upon the sea-coast, were formerly Mahommedans; but being converted by the missionary Jesuits, they embraced the religion and submitted to the authority of Spain. Their houses are constructed of bamboos, and being raised a few feet from the ground, they admit a circulation of air from beneath. The natives are extremely simple in their habits, and are clothed with very little trouble or expense. The priests exercise over them both spiritual and temporal authority. They give them advice and admonition, which is always accompanied with presents of wine and medicines, or food; and when punishment is necessary, it is promptly inflicted. Long. 124. 15. to 125. 52. E. Lat. 11. 15. to 12. 45. N.

SAMARA, a town of Irak Arabi, on the Tigris, revered by Mussulmen as containing the tomb of Mahommed al Mahudi, the twelfth imam. It was known in antiquity, and was in the ninth century the residence of several caliphs of the house of Abbas. It now only contains about four hundred houses. It is sixty miles north of Bagdad.

SAMARANG, a fortified town on the north-east coast of the island of Java, and the principal central station in the island, being the capital of a large district. It has a considerable European population, and ranks next in importance to Batavia. The town is defended by a stone parapet, with bastions and a wet ditch; but is in no condition to withstand a siege by European troops, being only calculated for defence against a native power. It has a good hospital, and a public school, chiefly for the teaching of mathematics, where numbers of Dutch and half-caste children were formerly educated for the military profession; and also a theatre, a fine large church, and a variety of other public buildings, both elegant and commodious, within and without the city. Between the town and the sea-coast is an impassable morass, through which the access to the town is by two fine roads east and west, both of which are raised, and communicate with each other. Owing to shoals, ships are obliged to lie at the distance of five or six miles from the shore, the anchorage being six fathoms, with a muddy bottom. The river is navigable for prows and coasting vessels as far as the town. In blowing weather the bar at the mouth is very dangerous. The surrounding country is remarkably fertile, and provisions in the town are consequently abundant and cheap. The climate is more healthy than that of Batavia, and the European inhabitants have more active habits. In the environs are numerous villas, which, from their elevated situation, command a view of the neat garden-houses and beautifully verdant fields below. There is here a numerous population of natives and Chinese, and crowded villages overspread the neighbourhood. Samarang was always the seat of a separate governor, who was called the governor of Java, his authority extending from Cheribon to the eastern extremity of the island. This government is one of the most lucrative in the gift of the Dutch East India Company, and is surpassed only by that of the governor-general. It is 343 miles east from Batavia. Long. 110. 38. E. Lat. 6. 54. S.

Samarcand
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SAMARCAND. This city, which was once the capital of Independent Tartary, and the favourite residence of the great Timour, is now little better than a mass of ruins. Until the time of Shah Murad, the place was not only ruinous, but desert, the haunt of the wolf and the lion. That sovereign used all his efforts to restore and to repeople this place; and though it is still small, it is daily increasing. It formerly covered more ground than Bokhara; and although the original walls, which tradition declares, though this is no doubt an exaggeration, to have been forty-eight miles in circuit, have mouldered into dust, Clavijo, a Spanish ambassador, who visited it about the year 1400, estimates the population of the city at 150,000; and a considerable number besides, for want of habitations, were obliged to shelter themselves in the caves of the surrounding rocks. The surrounding country also had a flourishing and populous appearance, being entirely covered with large villages, gardens, and country-houses, the residence of Tartar chiefs. A great proportion of the inhabitants consisted of persons who had been collected by Timour from every part of Asia, whose policy it was to bring hither all who were famous for the exercise of any art not followed in Samarcand. It carried on, besides, a great inland commerce with Russia, Tartary, India, Turkey, and particularly China. The splendour of Timour's court is said to have surpassed description, and his palaces vied with each other in magnificence. They were adorned with the spoils of conquered countries, and were resplendent with hangings of silk, gold and silver embroidery, tables of solid gold, and a display of rubies and precious stones that formed a dazzling scene. The city is still protected with a mud-wall, and has a citadel of the same materials; but the principal buildings and most of the houses are constructed of stone. The mausoleum of Timour may still be seen here. It is a large building, with a very lofty dome, which was once covered with gold; but this covering has since been taken off by Shah Murad. Within this building is the tomb, covered by a large flag of green stone, adorned with jewels, and sculptured over with the genealogical tree of the great Timour. Here, too, was the observatory of Oolugh Beg, which was destroyed by one of the many barbarous invaders of this country, and it is now a heap of dust. There were here also the tombs of many other distinguished persons, but they are all going to decay. Samarcand was a seat of religion and learning as well as of an extensive commerce; and it contained many colleges, the finest of which was the Khanums, which is now all in ruins, and its extensive buildings laid waste. Some, however, are still inhabited.

There is still in the town a very large dome, having six sides, each side forming a bazaar; regular horse-markets are held here on Sundays and Wednesdays, and horses are cheaper than at Bokhara. It has the reputation of being a pleasant place, having a small stream running through it from the mountains, a fine country around it, and a fine climate. At a little distance flows the river Kohuk, which falls into the Zurusshan, the latter passing by Bokhara, and flowing into the Oxus. It is about 150 miles due east from Bokhara, and 180 miles south of Balkh. Long. 64. 9. E. Lat. 39. 37. 23. N.

SAMARIA, in *Ancient Geography*, one of the three larger Cisjordan districts, situated in the middle between Galilee to the north and Judæa to the south, beginning at the village Ginæa, in the Campus Magnus, and ending at the toparchy called Acrobatena. Its soil differs in nothing from that of Judæa, both being equally hilly and champaign, and both equally fertile in corn and fruit. It is called the *kingdom of Samaria in Ephraim*, comprehending the ten tribes, and consequently all the country to the north of Judæa and east and west of Jordan.

Samaria, the capital city of the kingdom of Samaria, or of the ten tribes. It was built by Omri king of Israel, who began to reign in the year of the world 3079, and died 3086.

SAMARITANS. The Samaritans are the people of the city of Samaria, and the inhabitants of the province of which Samaria was the capital city. In this sense, it should seem that we might give the name of Samaritans to the Israelites of the ten tribes, who lived in the city and territory of Samaria. However, the sacred authors commonly apply the name of Samaritans only to those strange people whom the kings of Assyria sent from beyond the Euphrates to inhabit the kingdom of Samaria, when they took captive the Israelites that were there before. Thus we may fix the epoch of the Samaritans at the taking of Samaria by Salmaneser, in the year of the world 3283. This prince carried away captive the Israelites that he found in the country, and assigned them dwellings beyond the Euphrates, and in Assyria. He sent other inhabitants in their stead, of which the most considerable were the Cuthites, a people descended from Cush, and who are probably of the number of those whom the ancients knew by the name of Scythians.

After Salmaneser, his successor Esarhaddon was informed that the people who had been sent to Samaria were infested by lions that devoured them. This he imputed to the ignorance of the people in the manner of worshipping the god of the country. Esarhaddon therefore sent a priest of the God of Israel, that he might teach them the religion of the Hebrews. But they thought they might blend this religion with that which they had previously professed; so they continued to worship their idols as before, in conjunction with the God of Israel, not perceiving how absurd and incompatible these two religions were.

It is not known how long they continued in this state; but at the return from the captivity of Babylon, it appears they had entirely quitted the worship of their idols; and when they asked permission of the Israelites that they might labour with them at the rebuilding of the temple of Jerusalem, they affirmed, that from the time when Esarhaddon had brought them into this country they had always worshipped the Lord. And indeed, after the return from the captivity, the Scripture does not anywhere reproach them with idolatrous worship, though it does not dissemble either their jealousy against the Jews, or the ill offices they had done them at the court of Persia by their slanders and calumnies, or the stratagems they contrived to hinder the repairing of the walls of Jerusalem.

It does not appear that there was any temple in Samaria, in common to all these people who came thither from beyond the Euphrates, before the arrival of Alexander the Great into Judæa. Before that time, every one was left to his own discretion, and worshipped the Lord wherever he thought fit. But they presently comprehended, from the books of Moses which they had in their hands, and from the example of the Jews their neighbours, that God was to be worshipped in that place only which he had chosen; so that since they could not go to the temple of Jerusalem, which the Jews would not allow of, they bethought themselves of building a temple of their own upon Mount Gerizim, near the city of Shechem, which was then their capital. Sanballat, governor of the Samaritans, therefore applied himself to Alexander, and told him he had a son-in-law, called Manasses, son of Jaddus the high priest of the Jews, who had retired to Samaria with a great number of other persons of his own nation; that he desired to build a temple in this province, where he might exercise the high priesthood; and that this undertaking would be to the advantage of the king's affairs, because in building a temple in the province of Samaria, the nation of the Jews would be divided, who are a turbulent and seditious people, and by such a division would be made weaker, and less in a condition to undertake new enterprises. Alexander readily consented to what Sanballat desired, and the Samaritans presently began building the temple of Gerizim, which from that time they have always frequented, and still frequent to this day, as the place where the Lord intended to receive the adoration of his people. It is of this mountain and of this temple that the Samaritan woman of Sychar spoke to our Saviour.

But the Samaritans did not long continue under the obedience of Alexander. They revolted from him the very next year, and Alexander drove them out of Samaria, put Macedonians in their place, and gave the province of Samaria to the Jews. This preference which Alexander gave to the Israelites contributed not a little to increase that hatred and animosity that had already obtained between these two people. When any Israelite had deserved punishment for the violation of some important point of the law, he presently took refuge in Samaria or Shechem, and embraced the method of worship according to the temple of Gerizim. When the Jews were in a prosperous condition, and affairs were favourable to them, the Samaritans did not fail to call themselves Hebrews, and pretended to be of the race of Abraham. But no sooner were the Jews fallen into discredit or persecution, than the Samaritans immediately disowned them, would have nothing in common with them, and acknowledged themselves to have been originally Phœnicians, or that they were descended from Joseph and Manasseh his son. This was their practice in the time of Antiochus Epiphanes.

The Samaritans, having received the Pentateuch, or the five books of Moses, from the priest that was sent by Esarhaddon, continued to preserve it in the old Hebrew or Phœnician character, which we now call the Samaritan, to distinguish it from the modern Hebrew character, which we find in the books of the Jews. These last, after their captivity, changed their old characters, and took up those of the Chaldaic, which they had been used to at Babylon, and which they continue still to use. It is wrong, says Calmet, to give this the name of the Hebrew character, for that can be said properly to belong to the Samaritan text. The critics have taken notice of some variations between the Pentateuch of the Jews and that of the Samaritans; but these varieties of reading chiefly regard the word Gerizim, which the Samaritans seem to have purposely introduced to favour their pretensions that Mount Gerizim was the place in which the Lord was to be adored. The other various readings are of little importance.

As to their belief, it is objected to them, that they receive only the Pentateuch, and reject all the other books of Scripture, chiefly the prophets, who have more expressly declared the coming of the Messiah. They have also been accused of believing God to be corporeal, and of denying the Holy Ghost, and the resurrection of the dead.

Joseph Scaliger, with the view of informing himself respecting their usages and opinions, wrote to the Samaritans of Egypt, and to the high priest of the whole sect, who resided at Neapolis in Syria. They returned two answers to Scaliger, dated in the year of the Hejira 998. These were preserved in the French king's library, translated into Latin by Father Morin, and printed in England in the collection of that father's letters, in 1682, under the title of *Antiquitates Ecclesiæ Orientalis.*

There are still some Samaritans at Shechem, which is otherwise called Naplous; and they have priests there, who say they are of the family of Aaron. They have a high priest, who resides at Shechem, or at Gerizim, who offers sacrifices there, and who declares the feast of the passover, and all the other feasts, to all the dispersed Samaritans. Some of them are to be found at Gaza, others at Damascus, and others at Grand Cairo.

SAMAVAT, a town of the Syrian desert, to the west of the Euphrates, once a considerable city, but now only containing 300 Arabs, who levy exorbitant contributions on all pilgrims who take this route to the holy city. It is ninety miles west of Meshed Ali.

SAMBACCA, a town of the island of Sicily, in the province of Mazzara, and fifty miles from Palermo. It is in a healthy situation on a hill, eight miles from the sea-shore, and contains 9600 inhabitants.

SAMBAH, a town of Hindustan, in the Sikh territories, and province of Lahore, situated on the eastern side of the small river Deeg, fifty-five miles north-north-east from the city of Lahore. Long. 74. 8. E. Lat. 32. 34. N.

SAMBAR POINT, the south-west point of the large island of Borneo.

SAMBASS, a town and river on the west coast of the island of Borneo. The town is about forty miles up the river. It is built, as the seaport towns in Borneo generally are, of timber and bamboos, and is raised on wooden stalks and piles, on low swampy morasses. The river is wide at its entrance, which is in long. 109. 5. E. and lat. 1. 12. N. The inhabitants here, as in other towns on the coast, were much addicted to piracy. They were in the practice of darting out on defenceless vessels, so that it became quite unsafe for the European trader to venture near so dangerous a coast. It was on account of these piracies that the place was attacked by the British in 1812, who were repulsed with loss, and suffered still more severely from the pestilential effects of the climate. In 1813, a second attack was made by a British armament, which proved completely successful.

SAMBAYA, a river on the north coast of the island of Java, which is navigable in the rainy season as far as the residence of the Emperor of Solo; and a recent survey, made by Captain Colebrooke, shows that the impediments to its further navigation might be easily removed.

SAMBELONG ISLANDS, two or three islands among the Nicobar Islands, a little to the north of the Great Nicobar. Long. 100. 36. E. Lat. 41. 20. N.

SAMBER, a Rajpoot town of Hindustan, in the province of Ajmeer, and district of Jyepoor. It is situated in the vicinity of a salt lake, from which the greater part of Hindustan is supplied with salt, which is a source of great prosperity to the town.

SAMBHAR CAPE, on the south-western coast of the island of Borneo. Long. 109. 50. E. Lat. 2. 52. S.

SAMBOANGAN, a Spanish fortress and settlement on the south-west extremity of the island of Magindanao. The town is situated on the banks of a small rivulet which flows into the sea, and contains a thousand inhabitants, including officers, soldiers, and their respective families. Here are erected, on posts twelve feet high, small look-out houses, in all of which a constant guard is kept by the Spaniards, against the inroads of the natives, with whom they are in a state of perpetual hostility. The military force consists of 150 to 200 soldiers, natives of Manilla, who have no discipline. To this place criminals are sent into banishment from the Philippines. The adjacent country is extremely fertile, and cattle have multiplied everywhere in the woods. Pirates swarm in the neighbourhood, and frequently plunder and cut off vessels richly laden, while lying in the harbour. They frequently make descents close to the fort, and carry off the inhabitants, whom they sell into slavery. Long. 122. 10. E. Lat. 6. 45. N.

SAMBOR, a circle of the Austrian kingdom of Gallicia, extending over 2050 square miles, comprising ten cities and towns, and 352 villages, with 250,700 inhabitants, about one fifth of whom are Jews. The capital is the city of the same name, which is situated on the river Dniester. It stands on a fine plain, is tolerably well built, and has a gymnasium, one Greek and three Catholic churches, 1170 houses, and 6950 inhabitants. Long. 23. 30. 31. E. Lat. 49. 31. 30. N.

SAMBUCA, σαμϐυκη, appears to have been an instrument of the harp kind, of a triangular form, and having strings of unequal length and thickness, said to have been invented by Ibycus of Messina, a lyric poet, contemporary with Anacreon; more probably, we think, an oriental instrument adopted by the ancient Greeks. (Consult Athenæus, l. 4 and l. 14.)

SAMGAUM, a town of Hindustan, in the province of the Carnatic, and district of Nelloor, situated on the north bank of the Pennar river. Long. 70. 44. E. Lat. 14. 33. N.

SAMMAN, a town in the interior of Lasha, in Arabia, fifty miles west-north-west of El Katif.

SAMOGITIA, a province of Poland, bounded on the north by Courland, on the east by Lithuania, on the west by the Baltic Sea, and on the south by Regal Prussia, being a hundred and seventy-five miles in length and a hundred and twenty-five in breadth.

SAMOIEDA, a country of the Russian empire, between Asiatic Tartary and Archangel, lying along the sea-coast as far as Siberia. The inhabitants are extremely rude and barbarous, travelling on the snow in sledges drawn by an animal like a rein-deer, but with the horns of a stag. Their chief employment consists in hunting and fishing.

SAMON, an island in the Eastern Seas, to the north-west of Timor. It is hilly, and covered with wood. The tides run very strong, and occasion ripplings, which have the appearance of breakers.

SAMOS, a Greek island on the shore of Asia Minor, from which it is separated by a very narrow and crooked channel called the Little Boghaz, near to which are the ruins of Ephesus and the celebrated Cape Mycale. It is celebrated as the birthplace of Pythagoras, and was the most powerful and important of the Ionian Islands, distinguished by the number and skill of its seamen, who, 566 years before the Christian era, navigated the Mediterranean to the pillars of Hercules, and are said to have ascended the river Guadalquivir in Spain. Some degree of independence was maintained until the reign of the Emperor Vespasian, about the year 70. Up to that time it had been celebrated for being a great school of statuary, and for preparing bronze images, in which art Rhoekos, and his two sons Theodoros and Telekles, were distinguished masters. In the middle ages the island was successively governed by Arabs, Venetians, Genoese, and Turks, and continued a portion of the empire of the latter till the recent Grecian revolution broke out. The islanders on that occasion took part with their countrymen as soon as the news reached them of the execution of their patriarch. Fortifications were erected towards the channel of the Boghaz, which rendered an invasion from the continent of Anatolia too hazardous for the Turks to attempt. Under the command of the archbishop, ten thousand men were instantly armed and formed into regiments, bearing the cross as their standard. Three vessels were equipped as ships of war, and well manned with the best of seamen, who carried on predatory excursions with great success on the neighbouring continental shores. The conduct of the Sameotes produced unbounded rage in the Turkish government, and a powerful fleet and a numerous body of armed men were collected to insure the subjugation in 1821; but it failed, principally owing to the Greek fleet having been posted in the channel between Cape Mycale, where the Turkish land force was assembled. In that contracted spot the heavy Turkish ships could not approach, and the active and brave Greek seamen attacked the crowded transports, some of which were sunk, and others of them burned by fire-ships. The Capitan Pasha withdrew with his fleet, followed by the Greeks with their fire-ships; and the land-forces returned as they could along the shore to Constantinople.

Though repulsed and disgraced, the Turks, having captured and desolated Scio, and the island of Ispara, near to Samos, resolved on another attempt on that island in the year 1824. It was arranged that the Turkish force should be joined by the fleet of the pasha of Egypt. When the junction was effected, the Turks sent a flag of truce, offering an amnesty and proposing to treat; but the Sameotes, warned by the atrocities committed at the Isle of Scio in spite of a treaty, resolved to defend their possessions, or to dedicate their lives to its defence. The females, and the children, with their provisions, were removed to the mountains, and the men stood armed on the shore. The Turks had placed their ships in the narrowest part of the Boghaz, where they formed a kind of bridge for the troops to pass over. Upon the bridge or line of shipping the small vessels of the Greeks opened a most destructive fire, some were sunk and others burned, while the larger ships of the Turks, drawing too much water, remained in a state of total inactivity. A retreat was commenced, at which time another Greek fleet, under Miaulis, reached the scene of contest. The unwieldy and ponderous ships of the Turks could not withstand the attacks of this new enemy, whose ships, from being small, and the men agile, gave them a great superiority. The Turks were driven out to sea, where, by means of their enemy's fire-ships, they lost one man-of-war of fifty-four guns, and a corvette, brig, and several gun-boats of the Egyptian fleet. After this attack the Sameotes were unmolested, and are now in alliance with the kingdom of Greece.

The island is twenty-seven miles in length, being of an irregular shape, and very various breadth. The chief town is Vathi, in latitude 37° 46′ and longitude 26° 58′. The island is represented by those who have visited it to have contained from 50,000 to 60,000 inhabitants, living in comfort, industry, and abundance, and all of them Greek Christians. The only town is Vathi, built on the descent of some mountains, sloping down to the port, and tolerably well built, but with narrow streets. The port is beautiful, being the segment of a long oval, stretching inland towards the south-east, covered with trees, and well cultivated. It is protected from all winds but the south-west. The most important production is the rich Muscato wine, known in Europe by the name of Malmsey. A great quantity of raisins are furnished for exportation, as well as much oil. In the preparation of the latter much pains are taken, and it equals that from Lucca. Though the apprehension of the horrors exhibited at Scio by the Turks caused many families to fly, yet some of them have returned, and the prosperity of the island is returning.

SAMOYEDES, one of those barbarous tribes who range over the vast and frozen deserts of Asia, which are bounded by the Northern Ocean. They cover a space along the shores of that ocean which extends east and west about two thousand miles, nearly as far as the river Mesen on the west, which falls into the White Sea; and eastward to the Olenek and almost to the Lena, comprising the space between the 40th and 120th degrees of east longitude. From north to south this territory extends from 300 to 600 miles; yet on this extensive area there are not more than 20,000 inhabitants. They are divided into three principal tribes, namely, the Vanoites, who inhabit the banks of the Petchora and the Obi; the European tribe, who are found on the Mesen and in the interior of the government of Archangel; and the Khirutches, who wander over the remoter wastes of Siberia. They bear the stamp of their ungenial climate in their small and stunted proportions, being in general not above four or five feet in height. Their features are extremely coarse, resembling those of the Tungouses, while their neighbours the Ostiaks bear the stamp of the Finnish race. The face is flat, round, and broad, the lips large and thick, the nose wide and open, and the beard small, with a small quantity of rough and black hair carefully arranged. The dress of the men differs little from that of the Ostiaks. But the females do not wear any veil; they keep the head and face uncovered, unless during their winter journeys. The Ostiaks are in regular subjection to the Russians, have adopted many of their customs, and are reckoned to have made greater advances in civilization than their neighbours. The Samoyedes, though included within the nominal limits of Russian authority, are left at liberty to roam at large over the desert, the vast extent and poverty of which would not maintain a military force. They live by hunting, and are continually moving about on their sledges from place to place. The animal they hunt is the wild deer, which is their chief subsistence; they eat the flesh, make clothes of the skin, and use the nerves as thread for sewing. They also hunt the white fox, and employ themselves in summer in fishing in the lakes. Like most savage nations, they are extremely superstitious, and have very rude ideas of the Supreme Being. They however acknowledge the Deity as the ruler of the universe, who cannot be represented by any image; and under him numerous inferior deities, spirits, and demi-gods, who are divided into celestial and terrestrial, and are the inferior agents who distribute good and evil among men. These are represented by little wooden idols, finely clothed and ornamented, placed in houses or in woods, to which sacrifices are offered. They have their magicians or shamans, who are general throughout Northern Asia, and are distinguished by their drums, and by a dress adorned with rings and pieces of iron. These persons have a terrific aspect, which frightens even the Russians; and their practice is to work themselves up into such an irritable state of nerves, that a sudden cry, a blow, or even a touch, raises them to a state of frenzy, and they seize the first deadly weapon they can lay hold of in order to massacre the person who is the cause of their agitation. On the subject of death they have many superstitions. They cover the deceased with all his clothes, put a caldron over his head, and, wrapping him in deer-skins, they drag him out by an opening made in the tent for the express purpose, lest, as they fear, he should drag out any one after him. In winter they place the body in a ditch, and cover it over with leaves and branches of trees. In winter a wooden cottage is constructed, in which they place the dead with his axe, knife, bow, arrows, tobacco, and pipe. Their dead bodies are consequently in most cases devoured by the wild beasts. They have a superstitious dread of ghosts, and have recourse in this case to magicians, who array themselves in charms, and exorcise the spirit, exhorting him not to revisit the earth and disturb his surviving friends, or envy them the possession of those hunting grounds which he has left. It is considered of evil omen to pronounce the name of the deceased; and this is viewed by the relatives as a deadly injury. They are in general a peaceable and harmless race, prone to intoxication, as most savages are, and immoderately fond of tobacco. Their favourite amusements are wrestling and dancing.

SAMPANMANGO Cape, the north-west point of the island of Borneo. Long. 116. 52. E. Lat. 7. 0. N.

SAMPIT, a town of the island of Borneo, on the south coast, near a river of the same name, 140 miles west of Banjar Massam.

SAMPOO, a small island in the Eastern Seas, near the south coast of Java. Long. 112. 26. E. Lat. 8. 23. S.

SAMRONGUR, a town of Hindustan, in the district of Nepaul. It has a large artificial reservoir in the vicinity, which shows the country to have been better cultivated than at present. Long. 85. 30. E. Lat. 26. 45. N.

SAMSOE, an island belonging to the kingdom of Denmark, in the Cattegat, between Zealand and Jutland. It is forty-five square miles, or 28,800 acres, in extent, and is divided into six parishes, containing 2400 inhabitants. It is of moderate fertility, producing both corn, butter, and cheese, and occupying a part of the people in the fisheries.

SAMSON, one of the judges of Israel, memorable for his supernatural strength, his victories over the Philistines, and his tragical end, as related in the book of Judges.

Samson's Post, a sort of pillar erected in a ship's hold, between the lower deck and the kelson, under the edge of a hatchway, and furnished with several notches that serve as steps to mount or descend, as occasion requires. This post being firmly driven into its place, not only serves to support the beam and fortify the vessel in that place, but also to prevent the cargo or materials contained in the hold from shifting to the opposite side, by the rolling of the ship in a heavy sea.

SAMSOON, a port on the southern shore of the Black Sea, to the westward of Trebisond. It contains many well-built houses, seven mosques, one Armenian church, and 500 Mahommedan and 200 Christian families. The vicinity has long been noted for silver and copper mines, two of which, lying between Samsoon and Kabback, and near the river Saraez Gourkhan, are deemed of great antiquity, and are called Malett and Jumbish. They have been recently opened anew. From the earliest times all these districts, to the very margin of the Euxine, have also been famous for workers in iron, and they bear the same reputation now as in ancient times.

SAMUEL, Books of, two canonical books of the Old Testament, being usually ascribed to the prophet Samuel. The books of Samuel and the books of Kings are a continued history of the reigns of the kings of Israel and Judah; for which reason the books of Samuel are likewise styled the first and second books of Kings. Since the first twenty-four chapters contain all that relates to the history of Samuel, and the latter part of the first book and all the second include the relation of events that happened after the death of that prophet, it has been supposed that Samuel was author only of the first twenty-four chapters, and that the prophets Gad and Nathan finished the work. The first book of Samuel comprehends the transactions under the government of Eli and Samuel, and under Saul, the first king, and also the acts of David whilst he lived under Saul; and is supposed to contain the space of a hundred and one years. The second book contains the history of about forty years, and is wholly spent in relating the transactions of David's reign.

SAMULCOTTA, a town of Hindustan, in the province of the Circars, and district of Rajamundry. Pepper grows wild on the neighbouring hills. It is situated on the north bank of a small river, a few miles from the sea. Long. 82. 30. E. Lat. 17. 5. N.

SAMUR, a river of Persia, in the province of Shirvan, which rises in the mountains of Lesghistan, and falls into the Caspian. At its mouth there is a small town of the same name, fifteen miles south of Derbend.

SAN, a river of China, which rises on the frontier of Tartary, and falls into the Gulf of Leatong. Long. 117. 28. E Lat. 39. 9. N.

SAN del Bose, an elevated island in the Eastern Seas. Long. 120. 31. E. Lat. 10. 27. S.

SAN Paloi, a small island near the west coast of Luzon. Long. 120. 10. E. Lat. 14. 45. N.

San Juan de Puerto Rico. See Porto Rico.

SAN Lucar de Barrameda, a city of Spain, in the province of Andalusia. It is a good port, at the entrance of the river Guadalquivir, and the city is built on its eastern bank. The trade of Seville in a great degree centres here, as the larger vessels belonging to that city cannot ascend higher up the river. It is well fortified towards the sea. The country around it is cultivated quite to the shore, and produces rich crops of grapes, olives, and the other fruits of the climate, but little or no corn. It contains 15,200 inhabitants.

San Sebastian, a city of Spain, in the province of Guipuscoa, at the mouth of the river Urumea, which runs from Navarre. Its harbour is excellent, and, as well as the city, is defended by the strong fortress La Mota, which overlooks both; and it has other powerful fortifications towards the land as well as the sea. It has considerable trade by means of ships of great burden. The mole is a magnificent and well-executed work, as is the lighthouse, which is visible at sea at nine leagues distance. San Sebastian has always been considered, for its extent, the most commercial city of Spain, and its trade is as ancient as its foundation. The city contains about seven hundred houses, mostly containing two or more families, and the population is 13,100 souls; but the country around it is thickly studded with country residences, and is well peopled. The land in its neighbourhood is not fertile, but the hills which surround it abound with iron, and are a great source of wealth to the inhabitants. It is in latitude 43. 19. 39. north, and longitude 1. 30. 35. west from London.

SANA, the capital of the province of Yemen, in Arabia, and the residence of the Imam. It is situated in a barren and stony valley amidst lofty hills, and is surrounded in its immediate vicinity with fine gardens and luxuriant woods. It contains many handsome stone houses, and others substantially built of brick, and is said by Sir Henry Middleton to be somewhat larger than Bristol, in space at least, if not in population. It is defended by a strong mud-wall. Fruits are plentiful in the neighbourhood. It is 128 miles north-north-east of Mocha. Long. 44. 9. E. Lat. 15. 21. N.

SANADON, Noel Etienne, a Jesuit, and a distinguished professor of humanity at Caen, was born at Rouen in 1676. He there became acquainted with Huet, bishop of Avranches, whose taste for literature and poetry was similar to his own. Sanadon afterwards taught rhetoric at the university of Paris, and upon the death of Du Morceau he was intrusted with the education of the prince of Conti. In 1728 he was made librarian to Louis XIV., an office which he retained to his death, which took place on the 21st of September 1733, in the fifty-eighth year of his age.

His works are, 1. Latin Poems, in 12mo, 1715, reprinted by Barbou, in 8vo, 1754. His style possesses the graces of the Augustan age. His language is pure and nervous, his verses are harmonious, and his thoughts are delicate and well chosen, but sometimes his imagination flags. His Latin poems consist of odes, elegies, epigrams, and others, on various subjects. 2. A translation of Horace, with remarks, in two vols. 4to, printed at Paris in 1727. The best edition of this work, however, was printed at Amsterdam in 1735, in eight vols. 12mo, in which are also inserted the versions and notes of M. Dacier. In general, his version is rather a paraphrase than a faithful translation. Learned men have justly censured him for the liberty which he has taken in making considerable changes in the order and structure of the odes; and he has also given offence by his uncouth orthography. 3. A Collection of Discourses delivered at different times, which afford strong proofs of his knowledge of oratory and poetry. 4. A book entitled *Prières et Instructions Chrêtiennes.*

SANASHYGOTTA, a flourishing town of Bengal, in the district of Purneah, on the Mahanuddy river, much frequented by Hindu pilgrims on their route to the places of ablution in the Northern Mountains, from which circumstance it takes its name. Long. 88. 32. E. Lat. 26. 35. N.

SANBALLAT, the chief or governor of the Cuthites or Samaritans, was always a great enemy to the Jews. He was a native of Horon, or Horonaim, a city beyond Jordan, in the country of the Moabites. He lived in the time of Nehemiah, who was his great opponent, and from whose book we learn his history. There is one circumstance related of him which has occasioned some dispute among the learned. When Alexander the Great came into Phœnicia, and sat down before the city of Tyre, Sanballat quitted the interests of Darius king of Persia, and went at the head of eight thousand men to offer his service to Alexander. This prince readily entertained him, and being much solicited by him, gave him leave to erect a temple upon Mount Gerizim, where he constituted his son-in-law Manasseh the high priest. But this story carries with it a flagrant anachronism. For a hundred and twenty years before this, that is, in the year of the world 3550, Sanballat was governor of Samaria; wherefore Dr Prideaux, in his Connexion of the Histories of the Old and New Testament, supposes two Sanballats, and endeavours to reconcile it to truth and probability by showing it to be a mistake of Josephus. This author makes Sanballat to flourish in the time of Darius Codomannus, and to build his temple upon Mount Gerizim by license from Alexander the Great; whereas it was performed by leave from Darius Nothus, in the fifteenth year of his reign. This takes away the difficulty arising from the great age of Sanballat, and brings him to be contemporary with Nehemiah, as the Scripture history requires.

SANCERRE, an arrondissement of the department of the Cher, in France, extending over 209,684 hectares, equal to 737 square miles. It comprehends eight cantons, and seventy-six communes, and in 1836 the inhabitants amounted to 70,907. The capital is the city of the same name, upon an elevation rising from the river Loire. In 1836 it contained 3482 inhabitants, who are chiefly employed in making hats and hosiery, and in working some marble quarries in the neighbourhood. Long. 2. 45. 15. E. Lat. 47. 16. 53. N.

SANCHEZ, François, called in Latin *Sanctius*, was a native of Las Brocas, in Spain, and has been dignified by his own countrymen with the pompous titles of father of the Latin language and doctor of all kinds of letters. He wrote, 1. An excellent treatise entitled Minerva, or *De Causis Linguæ Latinæ*, which was published at Amsterdam in 1714, in 8vo; 2. The Art of Speaking and the Method of translating Authors; 3. Several other learned pieces on grammar. He died in the year 1600, in his seventy-seventh year.

We must be careful to distinguish this author from another François Sanchez, who died at Toulouse in 1632. This last was a Portuguese physician, who settled at Toulouse, and, though a Christian, was born of Jewish parents. He is said to have been a man of genius, and a philosopher. His works have been collected under the title of *Opera Medica*. They were printed at Toulouse in 1636.

SANCHONIATHO, a Phœnician philosopher and historian, who is said to have flourished before the Trojan war, and about the time of Semiramis. Of this most ancient writer the only remains extant are various fragments of cosmogony, and of the history of the gods and first mortals, preserved by Eusebius and Theodoret, both of whom speak of Sanchoniatho as an accurate and faithful historian; and the former adds, that his work, which was translated by Philo-Byblius from the Phœnician into the Greek language, contains many things relating to the history of the Jews which deserve great credit, both because they agree with the Jewish writers, and because the author received these particulars from the annals of Hierombalus, a priest of the god Jao.

Several modern writers of great learning, however, have called in question the very existence of Sanchoniatho, and have contended, with much plausibility, that the fragments which Eusebius adopted as genuine upon the authority of Porphyry, were forged by that author or by the pretended translator Philo, from enmity to the Christians, and that the Pagans might have something to show of equal antiquity with the books of Moses. These opposite opinions have produced a controversy that has filled volumes, and of which our limits would hardly admit of an abstract. We shall therefore in few words state what appears to us to be the truth, and refer such of our readers as are desirous of fuller information to the works of the authors mentioned below.[1]

The controversy respecting Sanchoniatho resolves itself into two questions: First, was there in reality such a writer? and, second, was he of the very remote antiquity which his translator claims for him?

Now that there was really such a writer, and that the fragments preserved by Eusebius are indeed parts of his history, interpolated perhaps by the translator, we are compelled to believe by the following reasons.[2] Eusebius, who admitted them into his work as authentic, was one of the most learned men of his age, and a diligent searcher into antiquity. His conduct at the Nicene council shows, that on every subject he thought for himself, neither biassed by authority on the one side, nor carried over by the rage of innovation on the other. He had better means than any modern writer can have of satisfying himself with respect to the authenticity of a very extraordinary work, which had then but lately been translated into the Greek language, and made generally known; and there is nothing in the work itself, or at least in those parts of it which he has preserved, that could induce a wise and good man to obtrude it upon the public as genuine, had he himself suspected it to be spurious. Too many of the Christian fathers were indeed credulous, and ready to admit the authenticity of writings without duly weighing the merits of their claim; but then such writings were always believed to be favourable to the Christian cause, and inimical to the cause of Paganism. That no man of common sense could suppose the cosmogony of Sanchoniatho favourable to the cause of revealed religion, further proof cannot be requisite than what is furnished by the following extract.

"He supposes, or affirms, that the principles of the universe were a dark and windy air, or a wind made of dark air, and a turbulent evening chaos; and that these things were boundless, and for a long time had no bound or figure.

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[1] Bochart, Scaliger, Vossius, Cumberland, Dodwell, Stillingfleet, Mosheim's Cudworth, and Warburton.

[2] Of these indeed there are several proofs. Philo makes Sanchoniatho speak of Byblus as the most ancient city of Phœnicia, which, in all probability, it was not. We read in the book of Judges of Berith or Berytus, the city where Sanchoniatho himself lived; but not of Byblus, which was the native city of Philo, and to which he is therefore partial. He makes him likewise talk of the Greeks at a period long before any of the Grecian states were known or probably peopled.

Sanchoniatho.

But when this wind fell in love with his own principles, and a mixture was made, that mixture was called desire or cupid (ποθος).

" This mixture completed, was the beginning of the (κτισεως) making of all things. But that wind did not know its own production; and of this with that wind was begotten *Mot*, which some call *Mua*, others the putrefaction of a watery mixture. And of this came all the seed of this building, and the generation of the universe.

" But there were certain animals which had no sense, out of which were begotten intelligent animals, and were called *Zophesemin*, that is, the spies or overseers of heaven; and were formed alike in the shape of an egg. Thus shone out *Mot*, the sun and the moon, the less and the greater stars.

" And the air shining thoroughly with light, by its fiery influence on the sea and earth, winds were begotten, and clouds and great defluxions of the heavenly waters. And, when all these things first were parted, and were separated from their proper place by the heat of the sun, then all met again in the air, and dashed against one another, and were broken to pieces, whence thunders and lightnings were made; and at the stroke of these thunders the fore-mentioned intelligent animals were awakened, and frighted with the sound, and male and female stirred in the earth and in the sea. This is the generation of animals."

After these things Sanchoniatho goes on to say, " These things are written in the Cosmogony of Taautus, and in his memoirs; and out of the conjectures and surer natural signs which his mind saw, and found out, and wherewith he has enlightened us."

Afterwards declaring the names of the winds north and south, and the rest, he makes this epilogue: " But these first men consecrated the plants shooting out of the earth, and judged them gods, and worshipped them; upon whom they themselves lived, and all their posterity and all before them; to these they made their meat and drink offerings." Then he concludes: " These were the devices of worship, agreeing with the weakness and want of boldness in their minds."

Let us suppose Eusebius to have been as weak and credulous as the darkest monk in the darkest age of Europe, a supposition which no man will make who knows any thing of the writings of that eminent historian, what could he see in this senseless jargon, which even a dreaming monk would think of employing in support of Christianity? Eusebius calls it, and calls it truly, direct atheism; but could he imagine that an ancient system of atheism would contribute so much to make the Pagans of his age admit as divine revelations the books of the Old and New Testaments, that he should be induced to adopt, without examination, an impudent forgery, not two hundred years old, as genuine remains of the most remote antiquity?

If this Phœnician cosmogony be a fabrication of Porphyry, or of the pretended translator, it must surely have been fabricated for some purpose; but it is impossible for us to conceive what purpose either of these writers could have intended to serve by forging a system so extravagantly absurd. Porphyry, though an enemy to the Christians, was not an atheist, and would never have thought of making an atheist of him whom he meant to obtrude upon the world as the rival of Moses. His own principles were those of the Alexandrian Platonists; and had he been the forger of the works which bear the name of Sanchoniatho, instead of the incomprehensible jargon about dark wind, evening chaos, Mot, the overseers of heaven in the shape of an egg, and animation proceeding from the sound of thunder, we should doubtless have been amused with refined speculations concerning the operations of the Demiurgus and the other persons in the Platonic Triad.

Father Simon of the oratory imagines,[1] that the purpose for which the history of Sanchoniatho was forged, was to support Paganism, by taking from it its mythology and allegories, which were perpetually objected to it by the Christian writers. But this learned man totally mistakes the matter. The primitive Christians were too much attached to allegories themselves to rest their objections to Paganism on such a foundation. What they objected to that system was, the immoral stories told of the priests. To this the pagan priests and philosophers replied, that these stories were only mythological allegories, which veiled all the great truths of theology, ethics, and physics. The Christians said this could not be; for that the stories of the gods had a substantial foundation in fact, these gods being only dead men deified, who in life had like passions and infirmities with other mortals. This, then, was the objection which the forger of the works of Sanchoniatho had to remove, if he really forged them in support of Paganism; but instead of doing so he gives the genealogy and history of all the greater gods, and shows that they were men deified after death for the exploits, some of them grossly immoral, which they had performed in this world. We have elsewhere (see POLYTHEISM) given his account of the deification of Chrysos, and Ouranos, and Gé, and Hypsistos, and Muth.; but our readers may not perhaps be ill pleased to accompany him through the history of Ouranos and Kronus, two of his greatest gods; whence it will appear how little his writings are calculated to support the tottering cause of Paganism against the objections which were then urged to it by the Christian apologists.

" Ouranos," says he, " taking the kingdom of his father, married Gé, his sister, and by her had four sons; Ilus, who is called Kronus; Betylus; Dagon, who is Siton, or the god of corn; and Atlas. But by other wives Ouranos had much issue, wherefore Gé, being grieved at it and jealous, reproached Ouranos, so as they parted from each other. But Ouranos, though he parted from her, yet by force invading her, and lying with her when he listed, went away again; and he also attempted to kill the children he had by her. Gé also often defended or avenged herself, gathering auxiliary powers unto her. But when Kronus came to man's age, using Hermes Trismegistus as his counsellor and assistant (for he was his secretary), he opposed his father Ouranos, avenging his mother. But Kronus had children, Persephone and Athena; the former died a virgin, but by the counsel of the latter Athena, and of Hermes, Kronus made of iron a scimitar and a spear. Then Hermes, speaking to the assistants of Kronus with enchanting words, wrought in them a keen desire to fight against Ouranos in the behalf of Gé; and thus Kronus, warring against Ouranos, drove him out of his kingdom, and succeeded him in the imperial power of office. In the fight was taken a well-beloved concubine of Ouranos, big with child. Kronus gave her in marriage to Dagon, and she brought forth at his house what she had in her womb by Ouranos, and called him Demaroon. After these things Kronus builds a wall round about his house, and founds Byblus, the first city in Phœnicia. Afterwards Kronus, suspecting his own brother Atlas, with the advice of Hermes, throwing him into a deep hole of the earth, there buried him, and having a son called Sadid, he despatched him with his own sword, having a suspicion of him, and deprived his own son of life with his own hand. He also cut off the head of his own daughter, so that all the gods were amazed at the mind of Kronus. But in process of time, Ouranos, being in flight, or banishment, sends his daughter Astarte, with two other sisters, Rhea and

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[1] *Bib. Crit.* vol. i. p. 140.

Dione, to cut off Kronus by deceit, whom Kronus taking, made wives of these sisters. Ouranos, understanding this, sent Eimarmene and Hore, Fate and Beauty, with other auxiliaries, to war against him; but Kronus, having gained the affections of these also, kept them with himself. Moreover, the god Ouranos devised Bætulia, contriving stones that moved as having life. But Kronus begat on Astarte seven daughters called Titanides or Artemides; and he begat on Rhea seven sons, the youngest of whom, as soon as he was born, was consecrated a god. Also by Dione he had daughters, and by Astarte, moreover, two sons, Pothos and Eros, that is, Cupid and Love. But Dagon, after he had found out bread-corn, and the plough, was called Zeus Aratrius. To Sydyc, or the just, one of the Titanides bare Asclepius. Kronus had also in Peræa three sons, first, Kronus, his father's namesake; second, Zeus Belus; and, third, Apollo."

Is it conceivable, that a writer so acute as Porphyry, or indeed that any man of common sense, either in his age or in that of Philo, would forge a book filled with such stories as these, in order to remove the Christian objections to the immoral characters of the Pagan divinities? The very supposition is impossible to be made. Nor let any one imagine that Sanchoniatho is here writing allegorically, and by his tales of Ouranos, and Gé, and Kronus, is only personifying the heaven, the earth, and time. On the contrary, he assures us, that Ouranos, or Epigeus, or Autochthon (for he gives him all these names), was the son of one Eliaun or Hypsistos, who dwelt about Byblus, and that from him the element which is over us was called heaven, on account of its excellent beauty, as the earth was named Gé after his sister and wife. And his translator is very angry[1] with the Neotoric Greeks, as he calls them, because that, "by a great deal of force and straining, they laboured to turn all the stories of the gods into allegories and physical discourses." This proves unanswerably that the author of this book, whoever he was, did not mean to veil the great truths of religion under the cloak of mythological allegories; and therefore, if it was forged by Porphyry in support of Paganism, the forger so far mistook the state of the question between him and his adversaries, that he contrived a book, which, if admitted to be ancient, totally overthrew his own cause.

The next thing to be inquired into with respect to Sanchoniatho is his antiquity. Did he really live and write at so early a period as Porphyry and Philo pretend? We think he did not; and what contributes not a little to confirm us in our opinion, is that mark of national vanity and partiality, common to after-times, in making the sacred mysteries of his own country original, and conveyed from Phœnicia into Egypt. This, however, furnishes an additional proof that Porphyry was not the forger of the work; for he well knew that the mysteries had their origin in Egypt (see MYSTERIES), and would not have fallen into such a blunder. He is guilty, indeed, of a very great anachronism, when he makes Sanchoniatho contemporary with Semiramis, and yet pretends that what he writes of the Jews is compiled from the records of Hierombalus the priest of the god Jao; for Bochart has made it appear in the highest degree probable,[2] that Hierombalus or Jeromb-baal is the Jerub-baal or Gideon of Scripture.

Between the reign of Semiramis and the Trojan war a period elapsed of near eight hundred years, whereas Gideon flourished not above seventy years before the destruction of Troy. But supposing Sanchoniatho to have really consulted the records of Gideon, it by no means follows that he flourished at the same period with that judge of Israel. He speaks of the building of Tyre as an ancient thing, while our best chronologers[3] place it in the time of Gideon. Indeed, were we certain that any writings had been left by that holy man, we should be obliged to conclude, that a large tract of time had intervened between the death of their author and their falling into the hands of Sanchoniatho; for, surely, they could not, in a short period, have been so completely corrupted as to give any countenance to his impious absurdities. His atheistic cosmogony he does not indeed pretend to have got from the annals of the priest of Jao, but from records which were deposited in his own town of Berytus by Thoth, a Phœnician philosopher, who was afterwards made king of Egypt. But surely the annals of Gideon, if written by himself, and preserved pure to the days of Sanchoniatho, must have contained so many truths of the Mosaic religion, as must have prevented any man of sense from adopting so impossible a theory as Thoth's, although sanctioned by the greatest name of profane antiquity. Stillingfleet indeed thinks it most probable that Sanchoniatho became acquainted with the most remarkable passages of the life of Jerub-baal from annals written by a Phœnician pen. He observes, that immediately after the death of Gideon, the Israelites, with their usual proneness to idolatry, worshipped Baal-berith, or the idol of Berytus, the town in which Sanchoniatho lived; and from this circumstance he concludes, that there must have been such an intercourse between the Hebrews and Berytians, that in process of time the latter people might assume to themselves the Jerub-baal of the former, and hand down his actions to posterity as those of a priest instead of a great commander. All this may be true; but if so, it amounts to a demonstration that the antiquity of Sanchoniatho is not so high by many ages as that which is claimed for him by Philo and Porphyry; though he may still be more ancient, as we think Vossius has proved him to be, than any other profane historian whose writings have come down to us either entire or in fragments.

But granting the authenticity of Sanchoniatho's history, what, it may be asked, is the value of his fragments, that we should be at any trouble to ascertain whether they be genuine remains of high antiquity, or the forgeries of a modern impostor? We answer, with the illustrious Stillingfleet, that though these fragments contain such absurdities as it would be a disgrace to reason to suppose credible, though the whole cosmogony is the grossest sink of atheism, and though many persons make a figure in the history, whose very existence may well be doubted; yet we, who have in our hands the light of divine revelation, may in this dungeon discover many excellent relics of ancient tradition, which throw no feeble light upon many passages of holy scripture, as they give us the origin and progress of that idolatry which was so long the opprobrium of human nature. They furnish, too, a complete refutation of the extravagant chronology of the Chaldæans and Egyptians, and show, if they be genuine, that the world is indeed not older than it is said to be by Moses.

SANCOT, a town of Hindustan, in the province of Serinagur, situated in a well-cultivated and fertile country. It is tributary to the Ghoorkali rajah of Nepaul. Many of the inhabitants are affected with tumours in their neck.

SANCROFT, WILLIAM, archbishop of Canterbury, was born at Fresingfield in Suffolk in 1616, and admitted into Emanuel College, Cambridge, in 1633. In 1642 he was elected a fellow; but was ejected from his fellowship for refusing to take the covenant. In 1660 he was chosen one of the university preachers, and in 1663 was nominated to the deanery of York. In 1664 he was installed dean of St Paul's. In this situation he set himself with unwearied diligence to repair the cathedral, till the fire of London in 1666 employed his thoughts on the more noble undertaking of rebuilding it, to which he gave L.1400. He also rebuilt the deanery, and improved its revenue. In 1668 he was admitted archdeacon of Canterbury, upon the king's presentation. In 1677, being now prolocutor of the convocation, he was unexpectedly advanced to the archbishopric of Canterbury. In 1687 he was committed to the Tower, with six other bishops, for presenting a petition to the king against reading the declaration of indulgence. Upon King James II.'s withdrawing himself, he concurred with the lords in a declaration to the Prince of Orange for a free parliament, and due indulgence to the Protestant dissenters. But when that prince and his consort were declared king and queen, his grace refused to take the oath to their majesties, and was suspended and deprived. He lived in a very private manner till his death, which took place in 1693. His learning, integrity, and piety, made him an exalted ornament of the church. He published a volume in 12mo, entitled Modern Politics, taken from Machiavelli and other select authors; and also Familiar Letters to Mr North. Three of his sermons were printed together after his death.

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[1] Apud Eusebium, *Præp. Evang.* lib. i. cap. vi.

[2] *Geogr. Sac.* p. 2, book ii. lib. ii. cap. xvii.

[3] Scaliger.

SANCTIFICATION, the act of sanctifying, or rendering a thing holy. The reformed divines define sanctification to be an act of God's grace, by which a person's desires and affections are alienated from the world; and by which he is made to die to sin, and to live to righteousness, or, in other words, to feel an abhorrence of all vice, and a love of religion and virtue.

SANCTION, the authority given to a judicial act, by which it becomes legal and authentic.

SANCTORIUS, or SANCTORIO, an ingenious and learned physician, was professor in the university of Padua in the beginning of the seventeenth century. He contrived a kind of statical chair, by means of which, after estimating the aliments received, and the sensible discharges, he was enabled to determine with great exactness the quantity of insensible perspiration, as well as what kind of victuals and drink increased or diminished it. On these experiments he erected a curious system, which he published under the title of *De Medicina Statica*, and which has been translated into English by Dr Quincy. Sanctorius published several other treatises, which showed great abilities and learning.

SANCTUARY, among the Jews, called also *Sanctum Sanctorum*, or Holy of Holies, was the holiest and most retired part of the temple of Jerusalem, in which the ark of the covenant was preserved, and into which none but the high priest was allowed to enter, and that only once a year, to intercede for the people.

Some distinguish the sanctuary from the *Sanctum Sanctorum*, and maintain that the whole temple was called the sanctuary.

To try and examine any thing by the weight of the sanctuary, is to examine it by a just and equal scale; because among the Jews it was the custom of the priests to keep stone weights, to serve as standards for regulating all weights by, though these were not at all different from the royal or profane weights.

SANCTUARY, in the Roman Catholic church, is also used for that part of the church in which the altar is placed, being encompassed with a rail or balustrade.

SANCTUARY, according to our ancient customs, is the same with asylum.

SAND, in *Natural History*, properly denotes small particles of siliceous stones. Sands are subject to be variously blended with different substances, as that of talcs, &c. Hence, as well as from their various colours, they are subdivided into, 1. white sands, whether pure, or mixed with other arenaceous or heterogeneous particles, of all which there are several kinds; 2. the red and reddish sands, both pure and impure; 3. the yellow sands, whether pure or mixed, which are also very numerous; 4. the brown sands, distinguished in the same manner; 5. the black sands, of which there are only two varieties, a fine shining grayish-black sand, and another of a fine shining reddish-black colour; and, 6. the green kind, of which there is only one known species, namely, a coarse variegated dusky green sand, common in Virginia.

Sand is of great use in the glass manufacture; a white kind of sand being employed for making the white glass, and a coarse greenish-looking sand for the green glass. In agriculture it seems to be the office of sand to render unctuous or clayey earths fertile, and fit to support vegetables, by making them more open and loose.

SAND-Stone, a compound stone, of which there are numerous varieties, arising not only from a difference of external appearance, but also from the nature and proportions of the constituent parts. See GEOLOGY and MINERALOGY.

SANDA, a town of Hindustan, in the province of Sinde, situated on the south bank of the Goonee river, which is there a hundred yards broad, on the route from Hyderabad, the capital of Sinde, to Luckput Bunder, and afterwards to Mandavee, on the Gulf of Cutch. Lat. 25. 6. N.

SANDAL, in *Antiquity*, a rich kind of slipper worn on the feet by the Greek and Roman ladies. It was made of gold, silk, or other precious stuff, and consisted of a sole, with an hollow at one extreme to embrace the ancle, but leaving the upper part of the foot bare.

SANDAL is also used for a shoe or a slipper worn by the pope and other Catholic prelates when they officiate. It is likewise the name of a sort of slipper worn by several congregations of reformed monks. This last consists of no more than a mere leathern sole, fastened with latches or buckles, all the rest of the foot being left bare. The Capuchins wear sandals, and the Recollects clogs; the former being of leather, and the latter of wood.

SANDANAH CAPE, the point of the high land that forms the north-eastern end of the island of Java, and the northern entrance of Baly Straits, on the west and north-west side. Long. 114. 35. E. Lat. 7. 46. S.

SANDARLIE, a small place on the western coast of Asia Minor, near the head of a bay called the Gulf of Sandarlie, fifty miles north-north-west of Smyrna.

SANDBACH, a market-town of the county of Chester, in the hundred of Northwich, 162 miles from London. It is situated on a small brook, which runs into the river Dane and into the navigable canal. It has a fine large church with a lofty tower, a good market which is held on Thursday, and is in a district of considerable fertility, celebrated for the excellence of its malt liquor. The population amounted in 1801 to 1844, in 1811 to 2311, in 1821 to 2905, and in 1831 to 3710.

SANDEC, a circle in the Austrian kingdom of Gallicia, extending over 1147 square miles. It contains eight cities, five market-towns, and 386 villages, with 198,750 inhabitants. The capital is the city of New Sandec, situated on the river Dunajec, and contains 490 houses, with 3840 inhabitants.

SANDEL, or SUNDANA, ISLAND, in the Eastern Seas, about eighty miles in length, and from fifteen to thirty-six in breadth. Long. 119. 33. to 120. E. Lat. 9. 35. to 10. 15. S.

SANDELWOOD ISLE, an island in the Eastern Seas, a hundred miles in length by thirty in average breadth. It is situated to the south of the island of Flores, about the tenth degree of north latitude.

SANDEMANIANS, in *Ecclesiastical History*, a sect that originated in Scotland about the year 1728, and was afterwards distinguished by the name of *Glassites*, from its founder Mr John Glass, who was a minister of the established church of that kingdom. Being charged with a design of subverting the national covenant, and sapping the foundation of all national establishments by the kirk judicatory, he was expelled by the synod from the Church of Scotland. But his sentiments are fully explained in a tract published at that time, entitled The Testimony of the King of Martyrs, and preserved in the first volume of his works. In consequence of Mr Glass's expulsion, his adherents formed themselves into churches, conformable in their institution and discipline to what they considered to be the plan of the first churches, as recorded in the New Testament. Soon after the year 1755, Mr Robert Sandeman, an elder in one of these churches in Scotland, published a series of letters addressed to Mr Hervey, occasioned by his Theron and Aspasio, in which he endeavours to show that his notion of faith is contradictory to the Scripture account of it, and could only serve to lead men, professedly holding the doctrines commonly called Calvinistic, to establish their own righteousness upon their inward feelings and various acts of faith. In these letters Mr Sandeman attempts to prove that faith is neither more nor less than a simple assent to the divine testimony concerning Jesus Christ, recorded in the New Testament; and he maintains, that the word faith, or belief, is constantly used by the apostles to signify what is denoted by it in common discourse, namely, a persuasion of the truth of any proposition, and that there is no difference between believing any common testimony and believing the apostolic testimony, except that which results from the nature of the testimony itself. This led the way to a controversy among those who were called Calvinists, concerning the nature of justifying faith; and those who adopted Mr Sandeman's notion of it, and who took the denomination of *Sandemanians*, formed themselves into a church order, in strict fellowship with the churches in Scotland, but holding no kind of communion with other churches. The chief opinions and practices in which this sect differs from other Christians are, their weekly administration of the Lord's Supper; their love-feasts, of which every member is not only allowed but required to partake, and which consists in their dining together in the interval between the morning and afternoon service; their kiss of charity used on this occasion, at the admission of a new member, and at other times when they deem it to be necessary or proper; their weekly collection before the Lord's Supper for the support of the poor, and defraying other expenses; mutual exhortation; abstinence from blood and from things strangled; washing each other's feet, the precept concerning which, as well as other precepts, they understand literally; community of goods, in so far as that every one is to consider all that he has in his possession and power as liable to the calls of the poor and church; and the unlawfulness of laying up treasures on earth, by setting them apart for any distant, future, and uncertain use. They allow of public and private diversions, so far as they are not connected with circumstances really sinful; but apprehending a lot to be sacred, they disapprove of playing at cards, dice, and the like. They maintain a plurality of elders, pastors, or bishops, in each church; and the necessity of the presence of two elders in every act of discipline, and at the administration of the Lord's Supper. In the choice of these elders, want of learning and engagements in trade are not a sufficient objection; but second marriages disqualify for the office; and they are ordained by prayer and fasting, imposition of hands, and giving the right hand of fellowship. In their discipline they follow strictly what they consider to be the rules of Scripture, and think themselves obliged to separate from the communion and worship of all such religious societies as appear to them not to profess the simple truth for their only ground of hope, and who do not walk in obedience to it.

SANDING ISLES, PULO SANDING, or SANDIANG, two small islands, which are both inhabited, and are situated off the south-west coast of Sumatra, near the south-eastern extremity of the Nassau or Poggy Isles, in which group they are sometimes included. They produce the wild nutmeg and some good timber.

SANDOMIR, one of the provinces into which the kingdom of Poland is divided. It extends in north latitude from 50° 25′ to 51° 52′, and in east longitude from 19° 43′ to 21° 52′, consisting of 5590 square miles; and it contains 378,000 inhabitants, mostly adhering to the Catholic church, except the Jews, who form the majority in the towns. It is a level district, situated on the left bank of the Vistula, and bears the best white wheat, which brings the highest price in the markets of Dantzig or of Odessa, to both of which it is sent, as the prices are most favourable. This province provides iron from its mines to the rest of the kingdom. It is divided into four circles, and the capital is Radom.

SANDPU, or SANPOO, the vulgar name of a river in the East Indies, which is one of the largest in the world. It is better known by that of *Brahmaputra*, or *Burrampooter*, to which the reader is referred.

SANDWICH, a town of the county of Kent, in the hundred of Eastry, and lathe of St Augustine, sixty-eight miles from London. It is situated on the river Stour, two miles from its entrance into the sea. It was once accessible by ships, but the sand has nearly choked the passage, though some plans are at present in contemplation to improve it. It is one of the Cinque Ports, and as such, is governed by a corporation composed of a mayor, a recorder, twelve jurats, and twenty-four common-council men, who have jurisdiction over Deal, Fordwich, Ramsgate, Reculver, Sarre, Stower, and Walmer. It was once fortified, and a portion of its walls is still standing. Sandown Castle, a strong fortress within the parish, commands the anchorage of the Downs. It is rather a decayed town, but has a market on Wednesday and Saturday. It returns two members to parliament, and confers on the family of Montague the title of earl. The population amounted in 1801 to 2452, in 1811 to 2735, in 1821 to 2912, and in 1831 to 3136.

SANDWICH, an island in the Eastern Seas, opposite to the island of New Ireland. It is covered with trees, and its general appearance is picturesque and pleasing. Long. of the most westerly point 50. 54. 15. E. Lat. 2. 59. 26. S.

SANDWICH ISLANDS. These islands, which are situated in the Pacific Ocean, are eleven in number. They were discovered by Captain Cook and Captain King in the year 1778, and have been subsequently visited by Vancouver, Meares, Turnbull, and various other navigators. These islands received their name from the Earl of Sandwich, during whose administration they were discovered. In their climate they resemble the West India islands, which lie in the same latitude, although, on the whole, the temperature is more moderate; nor are they subject to the dreadful hurricanes which desolate the West India Islands. The thermometer during the day never rises higher than 88°, but its mean height at noon is about 83°. There is a constant land and sea breeze every night. The vegetable productions differ little from those in the rest of the South Sea islands. The bread-fruit thrives, the sugar-canes are of unusual size, and large vegetable roots are produced, shaped like a yam, and from six to eight pounds in weight, which yield a juice that was found to be an excellent substitute for sugar. These islands are evidently peopled by the same race which is found in the islands of New Zealand, the Society and Friendly Islands, and the Marquesas; a race that possesses, without any intermixture, all the known lands between the latitudes of 47° south and 20° north, and between the longitudes of 184° and 260° east. The natives are in general above the middle size, graceful in all their movements, and capable of bearing great fatigue. They are of a much darker complexion than the Otaheitans, and are altogether an inferior people, though many have fine open countenances, and a number of the women have a sweetness and sensibility which renders them very engaging. They are distinguished from Europeans by one peculiarity, namely, a fulness of the nostril, without any flatness or spreading of the nose. They are praised by Captain King for their mild and affectionate dispositions; yet it is difficult to reconcile such dispositions with the habits of savage life, which are always ferocious and cruel. Humanity, mildness, and all the gentler sympathies of the human heart, are fostered by civilization. They are the result of cultivation, and not the spontaneous produce of the human heart; and, accordingly, they come to no maturity in the adverse soil of barbarism. Besides, they are inferior to the other islanders in that sure test of humanity, namely, respect for women. It has even been suspected, though no positive evidence of the fact has been found, that they are or have been in the practice of eating the bodies of their enemies; and it is well known, that the sacrificing of human victims was commonly practised among them, which is certainly no index of any mildness in their manners; and the same ferocious spirit is indicated by their wearing, as ornaments the most precious and invaluable, which are handed down as a sort of heir-looms in families, the bones of their enemies slain in battle, which are fashioned into various forms. Their natural capacity when they were first visited by Europeans was found to be good; they had made some improvements in agriculture and manufactures; and the eager curiosity with which they attended the armourer's forge, and the many expedients they invented for working the iron procured from Europeans, afforded strong proofs of their docility and their ingenuity. They had, however, all the peculiar customs of the most savage nations, and are still in the practice, along with all the other inhabitants of these islands, notwithstanding the example and exhortations of the missionaries settled among them, of tatooing their bodies, and also their face, which is peculiar to them and to the New Zealanders. The common dress of all ranks of people consists only of a piece of thick cloth ten or twelve inches broad, which they pass between the legs and tie round the waist. They have another dress appropriated to ceremonial occasions, which consists of a feathered cloak and helmet, and which is remarkable for its beauty and magnificence, and is reserved chiefly for persons of high rank. The common people chiefly subsist on fish and vegetables, such as yams, sweet potatoes, tamow, plantains, sugar-canes, and bread. To these the people of a higher rank add the flesh of hogs and dogs, dressed in the same manner as at the Society Islands. They also eat fowls. For further particulars, and a more full account of these islands, see POLYNESIA.

SANDY, a town of Hindustan, in the district of Khyrabad, belonging to the nabob of Oude, situated in a bleak and desolate country, without a tree or a shrub to shade the arid soil. In the vicinity is an extensive lake. Sandy is twenty-five miles south-east from Furruckabad. Long. 70. 58. E. Lat. 27. 18. N.

SANDY DESERT, an extensive tract in Hindustan, so named in the maps, bounded on the south by the province of Cutch, on the east by that of Gujerat, on the west by Sinde, and on the north by Ajmeer. This region is but little known to Europeans; but, from the accounts of those by whom it has been traversed, it does not appear to be such a uniform and barren wilderness as it has been represented, being interspersed with many fertile spots, the seats of petty chiefships or stationary tribes. The most powerful of these chiefs are the Beloochee Kosahs, who settled in the country a good many years ago, and are a race of sanguinary thieves, who infest the district of Parkur, and extend their ravages to the Joudpour territories. They amount to about 12,000. They disown all allegiance to any superior, subsisting by their horses and their swords, and hiring out their services to the different predatory chieftains. The only produce of this tract is a coarse species of grain, which only grows where the sandy soil is a little mixed with clay. Water-melons grow abundantly and in great perfection throughout the whole of this parched region, and furnish a most grateful refreshment. The river Loonee, which comes from Marwar, runs through the Gurrah district, and is said to fall into the Run, which bounds Cutch to the north. The route across this tract of country from Rahdunpore is fifty coss, and is said to be good the whole way. Thirty coss west from Pareenuggur is situated Islamnaggur. The intervening country consists of sand-hills, in traversing which the traveller is exposed to great hardship from the heat, the glare, and the want of water. All over this sandy tract are to be found scattered jungle, and coarse vegetation of different sorts, which supply the cattle with food. Islamnaggur is described as a strong fort, situated in the desert, and destitute of water without the walls. The country north from Parkur, towards Amercote, is called Dhat, and the distance is eighty coss. The country is of the same character as that already described, being composed of sand-hills and jungle, with occasional wells. In many parts there is no cultivation, and the inhabitants subsist on the produce of their numerous flocks of cattle, and camels. The natives are described as pacifically inclined, possessing few horses, and armed with swords only. It was in this tract that the army of the celebrated Mahmoud of Ghizni was nearly lost.

SANDY ISLAND, a small island near the west coast of Sumatra. Long. 100. 18. E. Lat. 1. 50. S. It is another in the Eastern Seas. Long. 112. 48. E. Lat. 10. 40. N. Also a small island in the Chinese Sea, near the coast of Cochin China. Long. 109. 12. E. Lat. 12. 28. N.

SANDYS, SIR EDWIN, second son of Dr Edwin Sandys, archbishop of York, was born about 1561, and educated at Oxford under Mr Richard Hooker, author of the Ecclesiastical Polity. In 1581 he was collated to a prebend in the cathedral of York. He travelled into foreign countries; and, upon his return, became famous for learning, prudence, and virtue. While he was at Paris, he drew up a tract, published under the title of *Europæ Speculum*. In 1602, he resigned his prebend; and the year following he was knighted by King James I., who employed him in several important affairs. He was dexterous in any great employment, and a good friend and patriot. Opposing the court, however, with vigour in the parliament in 1621, he, with Mr Selden, was committed to custody for a month. He died in 1629, having bequeathed L.1500 to the university of Oxford, for the endowment of a metaphysical lecture.

SANDYS, *George*, brother of Sir Edwin, and youngest son of Archbishop Sandys, was born in 1577. He was a very accomplished man, travelled over several parts of Europe and the East, and published a relation of his journey in folio in 1615. He made an elegant translation of Ovid's Metamorphoses; and composed some poetical pieces of his own, which were greatly admired at the time in which they were written. He also paraphrased the Psalms; and has left behind him a translation, with notes, of one Sacred Drama, written originally by Grotius, under the title of *Christus Patiens*, on which, with *Adamus Exul*, and *Masenius*, is founded Lauder's impudent charge of plagiarism against Milton. Our author became one of the privy chamber to Charles I., and died in 1643.

SANGA, a regularly-built seaport of Japan, in the island of Ximo, with wide streets, and defended by a citadel. It is forty miles north-east of Nangasaki.

SANGAMSERE, a small town of Hindustan, in the province of Bejapore, and district of the Concan, situated on the banks of the Jaigur river. Long. 73. 15. E. Lat. 17. 11. N.

SANGANEER, a town of Hindustan, in the province of Ajmeer, and district of Kotah, fortified by a strong stone-wall and ditch, and garrisoned by the troops of the rajah of Kotah. It is situated on the Upper Chumbul river.

SANGAR, a town of Hindustan, in the province of

Malwah, situated on a plain surrounded by a range of low hills. Long. 78. 50. E. Lat. 23. 50. N.

SANGARA, a town of Hindustan, in the province of Nandere, belonging to the nizam. It is situated at the junction of the Manzora with the river Godavery, forty-three miles from the town of Nandere. Long. 78. 12. E. Lat. 18. 49. N.

SANGBARAH, a town of Hindustan, tributary to the Mahrattas, in the province of Gujerat, 112 miles north-west from Ahmedabad. Long. 74. 13. E. Lat. 23. 37. N.

SANGIR, an island in the Eastern Seas, thirty miles in length by ten in average breadth. It is high land, well wooded, and the coast has better harbours, and is less dangerous from hidden rocks and shoals, than most of the eastern islands. The country is populous, and affords refreshments of various kinds to ships, such as bullocks, hogs, goats, and poultry. Cocoa-nut oil is exported, and spices are also procured. About the middle of the west coast of the island is the town, bay, and harbour of Taroona. This island was formerly under the dominion of the Dutch, who had a small garrison here. It is situated between the 3d and 4th degrees of north latitude, and the 125th and 126th degrees of east longitude. The population is estimated at 12,000.

SANGUR, a town and fortress of Hindustan, in the province of Allahabad, and district of Bundelcund. It is tributary to the Mahrattas. It is a hundred miles south-west from Chatterpoor. Long. 78. 50. E. Lat. 23. 50. N.

SANHEDRIM, or SANHEDRIN, from the Greek word *Συνεδριον*, which signifies a council or assembly of persons sitting together, was the name by which the Jews called the great council of the nation, assembled in an apartment of the temple of Jerusalem to determine the most important affairs of their church and state. This council consisted of seventy senators. The room they met in was a rotunda, half of which was built without the temple, and half within; that is, one semicircle was within the compass of the temple, the other semicircle was built without, for the senators to sit in, it being unlawful for any one to sit down in the temple. The Nasi, or prince of the sanhedrim, sat upon a throne at the end of the hall, having his deputy at his right hand, and his sub-deputy at his left. The other senators were ranged in order on each side.

The rabbin pretend, that the sanhedrim has always subsisted in their nation from the time of Moses down to the destruction of the temple by the Romans. They date the establishment of it from what happened in the wilderness, some time after the people departed from Sinai, in the year of the world 2514. Moses, being discouraged by the continual murmurings of the Israelites, addressed himself to God, and desired to be relieved at least from some part of the burden of the government. Then the Lord said to him, "Gather unto me seventy men of the elders of Israel, whom thou knowest to be the elders of the people, and officers over them; and bring them unto the tabernacle of the congregation, that they may stand there with thee: And I will come down and talk with thee there; and I will take of the spirit which is upon thee, and will put it upon them; and they shall bear the burden of the people with thee, that thou bear it not thyself alone." The Lord, therefore, poured out his spirit upon these men, who began at that time to prophesy, and have not ceased ever since. The sanhedrim was composed of seventy counsellors, or rather seventy-two, being six out of each tribe; and Moses, as president, made up the number to seventy-three. To prove the uninterrupted succession of the judges of the sanhedrim, there is nothing unattempted by the partisans of this opinion. They find a proof where others cannot so much as perceive any appearance or shadow of it. Grotius may be consulted in many places of his commentaries, and in his first book *De jure belli et pacis* (c. iii. art. 20), and Selden *De Synedriis veterum Hebræorum;* also Calmet's Dissertation concerning the Polity of the ancient Hebrews, printed before his Commentary upon the Book of Numbers.

As to the personal qualifications of the judges of this bench, their birth was to be untainted. They were often taken from the race of the priests or Levites, or out of the number of the inferior judges, or from the lesser sanhedrim, which consisted only of twenty-three judges. They were to be skilful in the law, as well traditional as written. They were obliged to study magic, divination, fortune-telling, physic, astrology, arithmetic, and languages. The Jews say they were to know to the number of seventy tongues; that is, they were to know all the tongues, for the Hebrews acknowledged but seventy in all, and perhaps this is too great a number. Eunuchs were excluded from the sanhedrim because of their cruelty, usurers, decrepid persons, players at games of chance, such as had any bodily deformities, those that had brought up pigeons to decoy others to their pigeon-houses, and those that made a gain of their fruits in the sabbatical year. Some also exclude the high priest and the king, because of their power; but others will have it that the kings always presided in the sanhedrim whilst there were any kings in Israel. Lastly, it was required that the members of the sanhedrim should be of a mature age, of a handsome person, and of considerable fortune. We speak now according to the notions of the rabbin, without pretending to warrant their opinions.

The authority of the great sanhedrim was very extensive. This council decided such causes as were brought before it by way of appeal from the inferior courts. The king, the high priest, and the prophets, were under its jurisdiction. If the king offended against the law, for example, if he married above eighteen wives, if he kept too many horses, if he hoarded up too much gold and silver, the sanhedrim had him stripped and whipped in their presence. But whipping, they say, among the Hebrews was not at all ignominious; and the king bore this correction by way of penance, and himself made choice of the person that was to exercise this discipline over him. The general affairs of the nation were also brought before the sanhedrim. The right of judging in capital cases belonged to this court, and the sentence could not be pronounced in any other place, but in the hall called *Laschat-haggazith*, or the *hall paved with stones*, supposed by some to be the *Λιθοστρωτος*, or pavement, mentioned in John xix. 13. Hence it came to pass, that the Jews were forced to quit this hall when the power of life and death was taken out of their hands, forty years before the destruction of their temple, and three years before the death of Jesus Christ. In the time of Moses this council was held at the door of the tabernacle of the testimony. As soon as the people were in possession of the land of promise, the sandhedrim followed the tabernacle. It was kept successively at Gilgal, at Shiloh, at Kirjath-jearim, at Nob, at Gibeon in the house of Obed-edom; and, lastly, it was settled at Jerusalem until the Babylonish captivity. During the captivity it was kept up at Babylon. After the return from Babylon, it continued at Jerusalem until the time of the Sicarii or Assassins. Then finding that these profligate wretches, whose number increased every day, sometimes escaped punishment by favour of the president or judges, it was removed to Hanoth, which were certain abodes situated, as the rabbin tell us, upon the mountain of the temple. From thence they came down into the city of Jerusalem, withdrawing themselves by degrees from the temple. Afterwards they removed to Jamia, thence to Jericho, to Uzzah, to Sepharvaim, to Bethsanim, to Sephoris, last of all to Tiberias, where they continued till the time of their utter extinction. And this is the account the Jews themselves give us of the sanhedrim.

But the learned do not agree with them in all this. Father Petau fixes the beginning of the sanhedrim not till Gabinius was governor of Judæa, who, according to Josephus, erected tribunals in the five principal cities of Judæa; at Jerusalem, at Gadara, at Amathus, at Jericho, and at Sephora or Sephoris, a city of Galilee. Grotius places the origin of the sanhedrim under Moses, as the rabbin do; but he makes it terminate at the beginning of Herod's reign. Mr Basnage at first thought that the sanhedrim began under Gabinius; but afterwards he places it under Judas Maccabæus, or under his brother Jonathan. We see, indeed, under Jonathan Maccabæus, in the year 3860, that the senate along with the high priest sent an embassy to the Romans. The rabbin say, that Alexander Jannæus, king of the Jews, of the race of the Asmonæans, appeared before the sanhedrim, and claimed a right of sitting there, whether the senators would or not. Josephus informs us, that when Herod was but yet governor of Galilee, he was summoned before the senate, where he appeared. It must be therefore acknowledged that the sanhedrim was in being before the reign of Herod. It was in being afterwards, as we find from the Gospel and from the Acts. Jesus Christ in St Matthew (v. 22) distinguishes two tribunals. "Whosoever is angry with his brother without a cause shall be in danger of the judgment;" this, they say, is the tribunal of the twenty-three judges. "And whosoever shall say to his brother Raca, shall be in danger of the council;" that is, of the great sanhedrim, which had the right of life and death, at least generally, and before this right was taken away by the Romans. Some think that the jurisdiction of the council of twenty-three extended to life and death also; but it is certain that the sanhedrim was superior to this council.[1]

From all this it may be concluded, that the origin of the sanhedrim is involved in uncertainty; for the council of the seventy elders established by Moses was not what the Hebrews understand by the name of sanhedrim. Besides, we cannot perceive that this establishment subsisted either under Joshua, the judges, or the kings. We find nothing of it after the captivity till the time of Jonathan Maccabæus. The tribunals erected by Gabinius were very different from the sanhedrim, which was the supreme court of judicature, and fixed at Jerusalem, whereas Gabinins established five at five different cities. Lastly, it is certain that this senate was in being in the time of Jesus Christ; but the Jews themselves inform us that they had then no longer the power of life and death (John, xviii. 31).

SANJORE, a Rajpoot town of Hindustan, in the province of Ajmeer and district of Saroway, situated on the east side of the river Bah, 115 miles west-south-west from Odeypoor. It is surrounded with the Beloochee plunderers, so that the road to it is impassable without a large escort. It is subject to the rajah of Joudpoor, who keeps a garrison stationed in it. It is 115 miles west-south-west from Odeypoor. Long. 72. 16. E. Lat. 25. 3. N.

SANKAN, a town of Arabia, in the province of Yemen, near the coast of the Red Sea, thirty-five miles north-north-west of Abu-Arisch.

SANNAZARIUS, JAMES, a celebrated Latin and Italian poet, born at Naples in 1458. He by his wit ingratiated himself into the favour of King Frederick; and when that prince was dethroned, he attended him into France, where he staid with him until his death, which happened in 1504. Sannazarius then returned into Italy, where he applied himself to polite literature, particularly to Latin and Italian poetry. His gay and facetious humour made him be sought for by all companies; but he was so afflicted at the news that Phillibert prince of Orange, general of the emperor's army, had demolished his country-house, that it threw him into an illness, of which he died in the year 1530. It is said that, being informed a few days before his death, that the Prince of Orange was killed in battle, he called out, "I shall die contented, since Mars has punished this barbarous enemy of the Muses." He wrote a great number of Italian and Latin poems. Among those in Latin, his *De Partu Virginis* and Eclogues are chiefly esteemed; and the most celebrated of his Italian pieces is his *Arcadia*.

SANOK, a circle of the Austrian kingdom of Gallicia, extending over 2151 square miles, containing ten cities, ten market-towns, and 431 villages, with 230,600 inhabitants. The capital is the city of the same name, situated on the river San. It is a poor place, with but little trade, containing a castle, and 220 houses, with 1640 inhabitants. Long. 22. 7. E. Lat. 49. 31. 5. N.

SANQUHAR, a royal burgh in Scotland, on the left bank of the Nith, between the counties of Dumfries and Ayr. The town most probably owes its origin to a castle of some note, the ruins of which are still extant, on a high bank overlooking the river Nith. This castle was the chief residence of the Queensberry family, before William, the first duke, built the noble mansion of Drumlanrig. It is a place of little trade. The population in 1831 was 1527. It is one of the district of burghs which jointly with Dumfries sends a member to parliament.

SANTA CATALINA, one of the Solomon Islands, in long. 162. 31. 30. E. and lat. 10. 53. 50. S.

SANTA CATHARINA, a province of Brazil, comprehending the island of the same name, and a territory of sixty leagues in length from north to south on the neighbouring continent, reckoning from the Sahy Grande, which separates it from St Paulo on the north, to the Mampituba, which divides it from Rio Grande on the south. On the west, the heads of the Cordillera divide it from the same provinces, its greatest width not exceeding twenty leagues. The above limits include a territory extending from 25° 50′ to 29° 20′ of south latitude. On the continent, four miles south-east of the capital, stands the town of San Jose, the inhabitants of which are principally occupied in sawing timber into planks, making bricks, and growing rice. To the north of this town the shores are studded with houses, pleasantly situated amid bananarias, orangeries, and plantations of rice, coffee, and mandioca. Nine leagues from San Jose is the village of Armaçao, situated at the extremity of the Bay of St Miguel. It is a fishing station for whales, which were formerly very numerous on the coast, and in the bays that indent it. The conveniencies for the manufacture of oil are extensive and well contrived, and all the fish on the coast are brought to this quarter. Beyond the point of Armaçao is that of Dos Ganchos, forming the southern extremity of the spacious Bay of Tejuco or Tejucas, into which a river of the same name, fifty fathoms wide, discharges itself. Ten leagues north of this place is the fine capacious harbour of Guaroupas, with its handsome town. Further northward is the Bay of St Francisco, in which there is an island with a town, both of the same name. The harbour is fine, and has three entrances, defended by forts. Ship-building is carried on at this place to some extent; the cutting of the fine timber in the neighbourhood, and other labours connected with this art, being the chief occupation of the inhabitants, who may amount to about two thousand. The largest continental town in the province is Laguna, prettily situated upon the eastern margin of the lake from which it derives its name, two miles from the bar, and sixty miles south of Desterro. In the months of November, and December particularly, a prodigious quantity of a long fish, with a forked tail, called *bagre*, enter the lake, supplying a lucrative branch of commerce. This place contains four thousand inhabitants. Fifteen miles north of Laguna is Villa Nova, or Santa Anna, situated on an elevation near the northern extremity of the same lake. More flax is manufactured here than in any other part of the province. The other towns or villages of Santa Catharina are small and of little importance. In 1812 the population, according to Cazal, was 31,530; but it has greatly increased. The province is divided into seven parishes, three of which are situated on the island of Santa Catharina, and four on the continent. The whole are included within the see of Rio de Janeiro. For a description of the island of Santa Catharina, see the article CATHERINE, ST.

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[1] See also Mark, xiii. 9, xiv. 55, xv. 1; Luke, xxii. 52, 66; John, xi. 47; Acts, iv. 15, v. 21; where mention is made of the synedrion or sannedrim.

SANTA CRUZ, or *St Croix*, a small and unhealthy island, situated in about sixty-four degrees west longitude and eighteen north latitude. In 1643 it was inhabited by the Dutch and the English, who soon became enemies to each other; and in 1650 they were both driven out by twelve hundred Spaniards, who arrived there in five ships. The triumph of these lasted but a few months. The remains of that numerous body, which were left for the defence of the island, surrendered without resistance to a hundred and sixty French, who had embarked, in the year 1651, from St Christopher's, to make themselves masters of the island. It continued without inhabitants and without cultivation till 1733, when it was sold by France to Denmark for L.30,750. Soon afterwards the Danes built there the fortress of Christianstadt. It was then that this northern power seemed likely to take deep root in America; but, unfortunately, she laid her plantations under the yoke of exclusive privileges. Industrious people of all sects, particularly Moravians, strove in vain to overcome this great difficulty. Many attempts were made to reconcile the interests of the colonists and their oppressors, but without success. The two parties kept up a continual struggle of animosity, and not of industry. At length the government purchased, in 1754, the privileges and effects of the company. The price was fixed at L.412,500; and the navigation of the islands opened to all the subjects of the Danish dominions. It is the most valuable of the Danish possessions in the West Indies. The soil is fertile and well cultivated, and the principal productions are sugar, rum, and coffee. It is about eighty-one square miles in extent, and contains about 37,000 inhabitants, of whom 3000 are whites, 1200 free blacks and mulattoes, and the remainder slaves.

SANTA CRUZ, a small island among the Philippines, near the south coast of Luzon. Long. 121. 52. E. Lat. 13. 42. N. Also an island near the south-west coast of Mindanao. Long. 122. 12. E. Lat. 6. 40. N.

SANTA FE, a city of Spain, on the plains of Granada, and in the province of Andalusia. When, under Ferdinand and Isabella, the court of Spain determined to reduce to the Christian dominion the last refuge of the Moors in the city of Granada, as the siege was likely to be very protracted, this city was founded near it, as the head-quarters of the Catholic forces. It is in a fine situation, surrounded by the best cultivation, and enjoying the best soil in Spain, perhaps in the world; and its powers of irrigation are always greater in proportion to the heat of the weather, as the waters are supplied from the melting of the snows on the summit of the Sierra Nevada. This city has been frequently injured by earthquakes, which have at times almost destroyed its edifices. One in 1807 was especially destructive; but, from the richness of the soil, it has speedily risen from its ruins, and been as flourishing as before the visitation. It is said that a narrow strip of land, extending the whole distance across the plain, and on one part of which this city is built, is periodically subject to this calamity, which, however the inhabitants may dread it, has not power to drive them from it. Near to this place is the residence and estate granted by the Spanish government to the Duke of Wellington for his services during the war. It is called the Sota de Roma, and is finely situated.

SANTA FE DE BOGOTA, a town of South America, and capital of New Granada, is situated at the foot of a steep mountain, at the entrance of a vast plain. It is the residence of a viceroy and an archbishop, and the seat of an audiencia and a university, and contains magnificent houses, five bridges, and thirty thousand inhabitants. The air is constantly temperate. The wheat of Europe and the sesame of Asia produce abundant crops, and at all seasons. The plateau on which the town of Santa Fe de Bogota is situated bears a resemblance in several respects to that which encloses the Mexican lakes. They are both more elevated than the convent of St Bernard, the former being 8190, the latter 7008 feet above the level of the sea. Long. 74. 10. W. Lat. 4. 35. N.

SANTANDER, a city of Spain, in the province of Old Castille. It is situated on the northern coast, on the Bay of Biscay, and is one of the best ports on that shore. It carries on considerable commerce in fine wools, and imports large quantities of the salted fish of Newfoundland. The commerce with the interior has induced the construction of a good road to Reynosa, in spite of the rocks and quagmires which intervene. It is the see of a bishop, and has an ancient cathedral and several richly adorned churches. It is in north latitude 43. 28. 20. and west longitude 3. 5. 6. from London. It contains 10,000 inhabitants, one sugar refinery, some breweries, founderies, a royal one for anchors, and several tanneries.

SANTAREM, a city of Portugal, in the province of Estremadura. It is situated on a hill, which is washed by the river Tagus, and from it, such is the gradual declivity of the country, that the towers of Lisbon, though at fifty miles distance, are visible through the translucent atmosphere. The prospects from the heights above the city, either up or down the river, are enchanting. The place contains about eight thousand inhabitants, who, with the exception of a numerous body of ecclesiastics, are by no means rich. The number of churches and other religious houses is out of all proportion to the number of the inhabitants, there being thirteen churches and fourteen convents, besides places for divine worship in several of the hospitals. Great part of the town is in ruins; and though no place may be kept clean at less expense, it is excessively filthy, both in its streets and its houses. Some parts of the country about the city are highly fertile, and yield abundant crops of grapes, olives, maize, and some wheat. It was long the station of a part of the British army during the late contest, and it was several times occupied by the French.

SANTEUIL, or **SANTEUL, JEAN BAPTISTE DE**, an excellent Latin poet, was born at Paris in the year 1630. Having finished his studies, he applied himself entirely to poetry, and celebrated in his verse the praises of several great men, by which he acquired universal applause. He enriched Paris with a great number of inscriptions, which are to be seen on the public fountains and the monuments consecrated to posterity. At length, some new hymns being to be composed for the Breviary of Paris, Claud Santeuil his brother, and M. Bossuet, persuaded him to undertake that work; and he succeeded in it with the greatest applause. On this the order of Clugny having desired him to compose some for their Breviary, he complied with their request; and that order, out of gratitude, granted him letters of filiation, with an annual pension. Santeuil was caressed by all the learned men of his time, and had as his admirers the two princes of Condé, father and son, from whom he frequently received favours. Louis XIV. also gave him a proof of his esteem, by bestowing upon him a pension. He attended the Duke of Bourbon to Dijon, when that prince went thither in order to hold the states of Burgundy, and died there in 1697, as he was preparing to return to Paris. Besides his Latin hymns, he wrote a great number of Latin poems, which have all the marks of genius discoverable in the works of true poets.

SANTIAGO, a large city of Spain, in the province of

Galicia, of which it is the capital. It is about six leagues from the sea, on a little river not navigable, called the Sar, which unites with another called the Sancta, and then flows into the Ulla, and joins the river Arosa, which has at its entrance to the ocean some secure harbours for small vessels. This is an archiepiscopal city, and is one of the most richly endowed of all the cathedrals of the kingdom. In former times this church was the resort of pilgrims from every part of Spain, and a great part of the rest of Europe. The votive offerings have therefore been prodigious, and though the veneration for the shrine of St Iago has been on the decline for many years, yet the accumulation of past periods now serves to keep in idleness, if not in profligacy, a great number of ecclesiastics. The city contains a university of considerable celebrity, a very large and well-regulated hospital, and several smaller ones, besides other sumptuous public edifices. It contains about 25,000 inhabitants, the greater part of whom depend on the religious houses, especially some thousands of poor, who are not disposed to work, because the donations in food and in money from the different pious establishments are sufficient to keep them alive, and allow them to indulge in their habitual indolence. There are indeed some few manufactories of linens, laces, and tapes; they languish, however, and give employment but to very few. The surrounding country is cold and sterile, and therefore the donations of the pious are expended in obtaining necessaries from the more distant parts of the province.

Santiago, or *St Jago*, the capital of the republic of Chili, in South America, is delightfully situated in an extensive plain on the southern shore of the river Mapocho, on each side of which large mounds of stone have been raised as a security against inundation. On the opposite side of the river lie the suburbs of Chimba, Cannadilla, and Renca, which are connected with the city by means of a beautiful bridge. The streets are straight, wide, well paved, and cross each other at right angles, which divides the city into quadras or solid squares. Water is conveyed from the river by means of aqueducts, which not only supply the inhabitants, but, running through the streets, keep the town very clean. The houses are flat-roofed, of one story, and, being white-washed, give the town a very gay appearance. They are built in a quadrangular form, and all the rooms may be entered from a square court in the middle, or from doors of communication from one to the other. The entrance from the street is by a broad porch, on either side of which are stables, &c. The great square is 450 feet on each side, in the middle of which there is a fine bronze fountain. The north side is occupied by the directorial palace, a splendid building, having the city prison under the same roof. On the western side are the cathedral, and a mean-looking palace of the bishop. The most remarkable edifices are the cathedral, the church of St Dominick, the great college, which formerly belonged to the Jesuits, and the town-hall. The mint is situated in an obscure part of the town. Being the centre of the commerce of Chili, it abounds with all sorts of provisions, which are very cheap. The inhabitants are gay, hospitable, more inclined to hold intercourse with strangers, and less bigoted, than their countrymen generally are. The population is about 45,000. It is thirty leagues distant from the Pacific Ocean, seven from the Andes, and fifty-five miles east-south-east from the port of Valparaiso. Long. 70. 44. W. Lat. 33. 26. S.

SANTIPONTE, or Santiponce, a town of Spain, in the division of Andalusia and government of Seville, about five miles from that city, situated on the right bank of the river Guadiana. It is celebrated for its antiquity, having been the seat of the old Roman Italica, the city of which the Emperor Trajan was a native. The remains of Roman magnificence still visible prove it to have been a place of considerable importance. The most remarkable object is the amphitheatre, which, though in ruins, still shows its dimensions and the plan of its original construction. It is formed of Roman bricks for the foundation, and stone benches of ten rows rising one above the other, so as to seat conveniently ten thousand spectators. The ruins of the ancient city are scattered over the fields near the amphitheatre, and abundance of coins and inscriptions are to be found. A beautiful tessellated pavement, lately discovered, has upon it figures which represent the Muses and the signs of the zodiac, the outlines of which are correct, and the colours fresh and brilliant. There is, or was till lately, a rich convent of St Jerome, with many hospitable monks. A very large fair is annually held at this place, and the church of the monastery has several exquisite paintings.

SANTIPORE, a town of Bengal, in the district of Kishenagur, situated on a sandy soil, two miles east of the Bhagurutty river. Long. 28. 34. E. Lat. 23. 13. N.

SANTORIN, one of the Greek islands in the Ægean Sea, and among the richest and best peopled of their number. It is about seventy-eight square miles in extent. Its appearance is that of a mountain perpendicularly cut downwards from the sea, composed of various volcanic matters, such as basalt, puzzolana, and pumice. The surface is much covered with the latter substance in almost every part, but mixed with good vegetable mould. This soil is peculiarly adapted to the growth of wine, of which a vast quantity is made, and forms the chief drink, as there is little and in many parts no good water, but rain that is preserved. Some barley is grown, but far short of what is consumed. There are some figs, almonds, and pulse, and a little cotton wool, raised. The inhabitants amount to twelve thousand, all Greeks, some adhering to the Greek religion, but some are Catholics, and each sect has its own bishop. There are five small towns and several villages. The capital is on the east side, and called Emporia. Long. 26. 15. E. Lat. 36. 21. N.

SANTUR, a Turkish stringed instrument, resembling that kind of German psaltery which is especially used in Hungary in the dances of the common people.

SAONE, a considerable river of France, which has its source in the Vosges, near Darney, and falls into the Rhone at Lyons.

Saone, Upper, a department of France, formed out of a part of the ancient province of High Burgundy, or Franche Comté. It is bounded on the north by the Upper Marne and the Vosges, on the east by the Upper Rhine, on the south by the Doubs and the Jura, and on the west by the Côte d'Or and the Upper Marne. It extends, according to the *Statistique de la France*, over 530,990 hectares, equal to 1867 square miles, and is divided into three arrondissements, twenty-eight cantons, and 651 communes, with a population of 343,298 persons. The chief river is that from which the name is taken, which rises in the Vosges, and is navigable for only a short portion of its course through this department. The other rivers are the Oignon, the Drageon, the Amance, the Auterne, the Saolon, and the Branchin. The surface consists of mountains, hills, and valleys. A spur from the Vosges Mountains enters the eastern side of the department, but to the south-west it is quite level. The soil for the most part consists of clay, and is very stony; but much of it is fertile, and a great part covered with woods. Although the husbandry is conducted in a slovenly manner, yet it yields sufficient corn for the consumption, and more of wheat than of rye. There are abundance of good meadows which afford pasturage for cows, and the dairies produce excellent butter. Fruit is plentiful, especially walnuts, from which much valuable oil is extracted. The vine is extensively cultivated, the vineyards occupying about 20,000 acres, which enables the inhabitants to export some wine. There are mines of iron and of coal at work, which afford employment to many hands. Much of the iron is converted near the mines into the heavier hardware articles. There are some manufactures produced, but the establishments are upon a small scale, furnishing tiles, glass, paper, and liqueurs. There is also some trade in timber, and in pot and pearl ashes, from the more wooded divisions of the department.

Saone and Loire, a department of France, formed out of some portions of the ancient duchy of Burgundy, then distinguished as the Autunois, the Charollais, and the Chalonnais. It is bounded on the north by the departments of the Nievre and the Côte d'Or; on the east by that of Jura; on the south by those of the Aine, the Rhone, and the Loire; and on the west by the Allier and the Nievre. It extends over 856,472 hectares, which are equal to 3009 square miles, is divided into five arrondissements, forty-eight cantons, and 592 communes, and in 1836 it contained a population of 538,507 persons. Its inhabitants have increased since the peace at a far greater rate than the other parts of France, having been in 1818 only 470,085. The chief rivers are the two which confer their names on the department, but there are others of great value, such as the Doubs, the Arroux, the Seille, and the Garonne. It is favoured, too, by the Canal of Digoin, and the Central Canal, which commences at Digoin, and terminates in the Saone at Chalons. The surface is covered with hills, some of which are 2400 feet in height, with rich valleys between them. The soil, upon the whole, is highly fruitful, though in parts chalky, stony, or sandy. The strip from Chalons to Maçon, along the Loire, is one of the finest in France, consisting, on one side of the river, of extensive rich natural meadows, and on the other of gentle acclivities covered with corn and vines. The agriculture has been much increased by bringing into cultivation large portions of land before covered with woods. There are some mines of iron and coal, but their product is not large. There are some manufactures, chiefly for home consumption. The trade consists chiefly in exporting the fruits of the soil, especially corn, wine, hay, wool, and some timber and coal. The capital of the department is the city of Maçon, which in 1836 contained 11,944 inhabitants.

SAP, the juice found in vegetables. See Vegetable Physiology.

Sap, in sieges, is a trench, or an approach made under cover, of ten or twelve feet in breadth, when the besiegers come near the place, and the fire from the garrison grows so dangerous that they are not able to approach uncovered. There are several sorts of saps; the single, which has only a single parapet; the double, having one on each side; and the flying, made with gabions. In all saps traverses are left to cover the men.

SAPAROUA, one of the Amboyna Isles, about twenty miles in circumference. It formerly yielded to the Dutch East India Company one half of the cloves exported from the Amboyna government.

SAPATA, a small island in the Eastern Seas, elevated and barren, and white like the cliffs of Dover, with innumerable flocks of sea-fowl screaming over it. Long 109. 10. E. Lat. 10. 4. N.

SAPPAN, a river in the peninsula of Malacca, which falls into the straits, in long. 101. 47. E. and lat. 2. 37. N.

SAPPERS are soldiers belonging to the royal artillery, whose business is to work at the saps. A brigade of sappers generally consists of eight men, divided equally into parties; and whilst one of these is advancing the sap, the other is furnishing the gabions, fascines, and other necessary implements. They relieve each other alternately.

SAPPHIRA was the wife of a rich merchant in Gueldres, and equally distinguished for her beauty and her virtue. Rhinsauld, a German officer, and governor of the town of Gueldres, fell in love with her; and not being able, either by promises or presents, to seduce her, he imprisoned her husband, pretending that he kept up a traitorous correspondence with the enemies of the state. Sapphira yielded to the passion of the governor in order to relieve her husband from chains; but private orders had already been given to put him to death. His unhappy widow, overwhelmed with grief, complained to Charles duke of Burgundy. He ordered Rhinsauld to marry her, after having made over to her all his possessions; and as soon as the deed was signed, and the marriage over, Charles commanded him to be put to death. Thus the children of a wife whom he had seduced, and of a husband whom he had murdered, became lawful heirs to all his wealth.

SAPPHO, a celebrated poetess of antiquity, who for her excellence in the art has been called the *Tenth Muse*, was born at Mitylene, in the isle of Lesbos, about 610 years before Christ. She was contemporary with Stesichorus and Alcæus.

Of her numerous poems there is nothing remaining but some small fragments, which the ancient scholiasts have cited; a hymn to Venus, preserved by Dionysius of Halicarnassus; and an ode.

Ovid introduces her as making a sacrifice to Phaon, one of her paramours. She fell desperately in love with Phaon, and did all she could to win him, but in vain; upon which she threw herself headlong from a rock, and died. The Mitylenians held her in such high esteem that they paid her sovereign honours after her death, and stamped their money with her image. The Romans erected a noble statue of porphyry to her; and the ancients as well as moderns have done honour to her memory. Vossius says that none of the Greek poets excelled Sappho for sweetness of verse; and that she made Archilochus the model of her style, but at the same time took care to soften the severity of his expression. It must be granted, from what is left us of Sappho, that Longinus had great reason to extol the admirable genius of this woman; for there is in what remains something delicate, harmonious, and impassioned to the last degree.

SAPY Straits. These are between the east end of the island Sumbawa, and the west side of Commodo or Rotten Island. The southern entrance is in long. 119. 20. E. and lat. 8. 40. S. Numerous small islands are found in this strait, which by contracting, increase the rapidity of the current, and render navigation dangerous.

SARABAND, in Spanish *zarabanda*, a Spanish dance in $\frac{3}{4}$ time, formerly danced with castanets. The movement is rather slow. In the music of Corelli and other old masters, sarabands are of frequent occurrence.

SARABAT, a considerable river of Asia Minor, which rises in the Morad Dag, and passing by Sart and Magnesia, falls into the Gulf of Smyrna, in latitude 38. 40. N.

SARACENS, the inhabitants of Arabia, so called from the word *saru*, which signifies a desert, as the greater part of Arabia is; and this being the country of Mahommed, his disciples were called Saracens.

SARAGOSSA. See Zaragoza.

SARANGPOOR, a town and district of the Mahratta territories, in the province of Malwah, situated about the twelfth degree of north latitude. It is hilly, yet being watered by numerous branches of the Sopra and Gilly Sinde rivers, it is fertile and productive. The chief towns are Sarangpoor, Rajegur, and Sher.

Sarangpoor, the capital of the above district, situated on the north side of the river Sopra, is fifty-five miles north-east from Oojain. Long. 76. 30. E. Lat. 23. 38. N.

SARANGUR, a town of Hindustan, in the province of Gundwana, possessed by independent Goand chiefs, fourteen miles south-west from Bustar. Long. 82. 26. E. Lat. 19. 40. N.

SARAPILLY, a town of Hindustan, in the Carnatic, thirteen miles south from the town of Nelloor. Long. 79. 58. E. Lat. 14. 14. N.

SARATOV, a large province or government, partly in the south-east of Europe, and partly in Asia. Its form is that of a triangle on both sides of the Volga, having on the one side the country of the Don Cossacks, and on the other that of Astracan. It is very thinly peopled, containing an area of 91,000 square miles, and the population not exceeding 1,000,000, in consequence of the barrenness of the soil and the unpropitious climate. Great part of the soil is of a saline quality, and unfit for the growth of vegetables. There are several salt lakes, the most productive of which is that of Elton or Ulton. The country lying to the west of the Volga is less level, but has no hills of any great height. The ground is partly arable and partly pastoral. German colonists have been settled in the country, but with little success. The capital is of the same name, and is situated on the Volga. It is neatly built, and has wide, straight streets; but the houses are mostly of wood. The position of the place between Moscow and Astracan is favourable to trade, and it has, besides, the command of water-carriage on the Volga. The principal articles of its trade, which are not derived from the two cities already named, are fish, comar, and salt. The population is 5000. It is 374 miles north by west of Astracan, and 465 south-east of Moscow. Long. 46. 0. E. Lat. 51. 31. N.

SARAWAN, the most northerly division of Beloochistan, composed entirely of vast mountains and deserts, and divided into districts, each of which furnishes its military quota to the Mahommedan armies.

SARBATCHOU SAHA, a small island in the Sea of Japan, near the coast of Corea. Long. 131. 37. E. Lat. 42. 54. N.

SARBO, an island in the Red Sea, near the coast of Abyssinia. Lat. 15. 8. N.

SARCASM, in *Rhetoric*, a keen and bitter expression, which has the true point of satire, by which the orator scoffs and insults his enemy. Such was that which the Jews said to our Saviour: "He saved others, himself he cannot save."

SARCHAD, a town of Syria, in the district beyond Jordan.

SARCOPHAGUS, in *Antiquity*, a sort of stone coffin or grave, in which the ancients deposited the bodies of the dead which were not intended to be burned. The word, as derived from the Greek, literally signifies *flesh-eater*, because originally a kind of stone was used for tombs, which quickly consumed the bodies. One of the most celebrated specimens of antiquity is the great sarcophagus, which is commonly called the tomb of Alexander the Great. It fell into the hands of the British at the capitulation of Alexandria in Egypt in 1801, and is now deposited in the British Museum.

SARCOPHAGUS, or *Lapis Assius*, in the natural history of the ancients, a stone much used amongst the Greeks in their sepultures, is recorded to have always perfectly consumed in forty days the flesh of human bodies buried in it. This property it was much famed for, and all the ancient naturalists mention it. There was also another very singular quality in it, but whether in all, or only in some peculiar pieces of the stone, is not known; that is, its turning into stone any thing that was put into vessels made of it. This is recorded only by Mutianus and Theophrastus, except that Pliny had copied it from these authors, and some of the later writers on these subjects from him. The account Mutianus gives of it is, that it converted into stone the shoes of persons buried in it, as also the utensils which it was in some places customary to bury with the dead, particularly those which the person while living most delighted in. The utensils this author mentions are such as must have been made of very different materials; and hence it appears that this stone not only had a power of consuming flesh, but its petrifying quality extended to substances of very different kinds. Whether it ever really possessed this last quality has been much doubted.

SARDANAPALUS, the last king of the Assyrians, was the thirtieth from Ninus, of whom Herodotus merely mentions that he concealed his treasure in subterranean vaults. The character usually ascribed to him is that of a luxurious and slothful prince, who spent the greater part of his time in the harem among his women. But it is difficult to reconcile this statement with the brave and obstinate resistance he made to the attack of the rebel Arbaces, prince of Media. He defeated Arbaces twice, but at last was shut up within Ninus (Nineveh), where he destroyed himself and treasures on a funeral pile. There was, however, another Sardanapalus, the son of Anacyndaraxes, who is said to have founded Tarsus and Anchialë in one day, and whose epitaph is frequently quoted, and it is not unlikely that Ctesias, from whom Diodorus quotes, has mixed up the events that happened to these two. The second is thought to be the Esarhaddon of the Scriptures, and the first to be the Saracus of Abydenus.

SARDINIA. This kingdom is composed of two portions. One is the island bearing that name, which has long been entitled to the distinctive title of a kingdom; and the other consists of portions of the north-west of Italy, which at different periods had been distinguished as feudal or independent sovereignties under various forms of government as well as titles.

The existence of the island of Sardinia is noticed casually in the ancient writers, so as to justify the opinion of some authors on its antiquities, that it was peopled about 1700 years before our era, by a party of Etruscans; but others have contended for an origin 500 years later, and for its first colonists having been Libyans under Sardis, a descendant of the Theban Hercules, who gave his name to the island. Without entering on the dark subject of the first peopling of this island, the high antiquity of its settlement is attested by durable monuments, the materials, height, and construction of which are different from almost any other that are to be found. These Cyclopean structures are very numerous, between five and six hundred of them being to be seen on the island. They are called *nuraggis*, both by ancients and moderns, being in height about fifty feet, and in diameter at the base about ninety feet. They are strong buildings, in the form of a truncated cone, composed of masses of stone from two to five or six feet square, arranged in layers, without cement. The materials are lava, freestone, porphyry, or such other substances as the respective sites afford; and they generally crown the summits of hills, commanding plains where they are seen in every state, some being nearly complete, and others a mere heap of rubbish. On entering these edifices, which is effected by a low door, the structure is found to extend below the surface of the surrounding earth. The interior space is almost invariably divided into two floors, each consisting of a vaulted room, to which access is gained from a ramp between two concentric walls, and leading to the summit, where a flight of steps completes the ascent. The nuraggis are of two distinct kinds. Those which are the most common have no marks of the chisel, and are constructed of massive blocks, with irregular faces, and smaller stones in the interstices; the materials of the others exhibit exteriors formed by tools, though the stones are not exactly square, but are placed with a stricter regard to keeping the horizontal layers, and gradually diminish in size towards the summit.

There have been various conjectures respecting the probable object of these buildings. The darkness of their interior, and the fragments of terracotta found in them, would indicate their having been monuments for the dead, a belief so general that they have obtained in their neighbourhood the name of *Domu de Orcu*, or the house of death; but the pottery being evidently Roman, and in some instances accompanied by coins of the lower empire, indicates only that such was the use made of them at a late period. Captain Smyth, who examined these ancient monuments, says, "From their laborious construction, their number, and their general situation on *curcureddus* or eminences, more or less distant from each other, I cannot but suppose they were designed to answer the double purpose of mausolea for the eminent dead, and as asyla for the living, especially as many of them are flanked with smaller nuraggis having a subterraneous communication. But the mystery in which they are involved will probably remain impenetrable, since none of them exhibit the least trace of either literal or symbolical characters."

At whatever periods these remarkable works were erected, a long time elaspsed before any precise notice is to be discovered of the history of Sardinia, until about the year 560 before Christ, when the Carthaginians under Machæus, after a victorious campaign in Sicily, attempted the conquest of the island. They were repulsed with such loss, however, as left it in repose until the contests commenced between the Punic and Roman republics.

By successive conquests it passed into the hands of the Vandals, the Mahommedans, and the Spaniards, in whose power it remained from 1324 till the period of the disputed succession of the crown of Spain between the houses of Bourbon and Austria in 1708, when the Austrian party, with the assistance of the English fleet under Sir John Leake, succeeded in obtaining possession of the island. In 1720 it was ceded by treaty to Victor Asmodeus, who assumed the title of king of Sardinia. After this event, notwithstanding the wars which agitated the rest of Europe, Sardinia experienced a peace of seventy years, during which period the princes of the house of Savoy, especially Charles Emanuel, made the greatest exertions to ameliorate the condition of the people.

The success of the French arms in Italy by the year 1798 had been such as to compel the king, Charles Emanuel IV., to abandon the capital, Turin, and the whole of his continental dominions. He withdrew to Leghorn, where he received with delight deputies from the stamente of Sardinia, assuring him of the entire devotion of the people to his person and government. Satisfied with these assurances, he embarked, and, escorted by an English frigate, arrived at Cagliari on the 3d of March 1799, where he was welcomed with the most enthusiastic affection.

The successes of the Russian General Suwarof induced his majesty to return to the Continent, till, hearing in Tuscany of the battle of Marengo, and being inconsolable for the death of his wife, the sister of Louis XVI., he abdicated in favour of the Duke of Aosta in March 1802, and resided in privacy at Rome, where he died in 1819. His successor, Victor Emanuel, remained some time in Italy in the hope of gaining his continental dominions; but seeing little prospect of succeeding, he left Naples, where he had resided since his accession, and arrived in Sardinia on the 17th of February 1806, where he remained secure under the protection of England.

The son of Charles Emanuel followed the footsteps of his father in opposing the principles of the French revolution, which was then spreading its direful effects over all Europe, and nowhere more generally than in the continental part of the kingdom of Sardinia. The events of that period are to be found in this work in the historical parts of the two articles Europe and France. We need only state here, therefore, that the king of Sardinia returned to his continental capital in 1814, and by the treaty of Vienna the duchy or ancient republic of Genoa was added to his dominions; and that by the same treaty he ceded to the state of Geneva the circles of Carouge and Chesne, containing 12,700 inhabitants. On the restoration of Victor Emanuel, he re-established, as far as could be done, the old constitution; again introducing the Jesuists, and becoming a zealous member of the Holy Alliance. He confirmed to those who had made purchases under the French confiscation the property they had gained; restored to their owners the few estates that had not been sold; and allotted the annual sum of 400,000 lire as some compensation for the plunder which they had suffered. He however established a very severe censorship of the press, and introduced such restrictions on the process of education in the universities and the other seminaries as he judged necessary to check the prevailing tendency to infidelity and immorality. These measures, and the predisposition to revolution indulged throughout Italy, caused an insurrection in 1821, the particulars of which are narrated in this work under the head of Italy. The prosperity of the kingdom has been proceeding with regularity since the return of tranquillity, owing in a great measure to the increased demand for silk in England, Germany, France, and Russia, and in no inconsiderable degree from the annexation of Genoa to the territory, by which a trade is now carried on to almost every part of the habitable world.

The extent of the several divisions of this kingdom, and their population in 1833, were as follow:—

Provinces.	Extent in Square Miles.	Population.	Cities.	Towns.	Villages.
Turin	3,278	808,526	12	54	347
Cuneo	2,684	521,631	13	53	303
Alessandro	2,420	547,622	11	40	453
Novara	2,596	437,576	5	44	426
Aosta	1,408	71,096	1	1	78
Savoy	4,092	504,165	19	36	594
Nice	1,496	204,538	6	16	160
Genoa	2,288	583,233	19	25	700
Island of Sardinia	9,856	491,050	9	15	377
Island of Capraja	484	1,500	0	1	3
	30,602	4,170,937	95	285	3441

The whole of the inhabitants of this kingdom adhere to the Roman Catholic church, with the exception only of about 30,000 Jews, who have a restricted toleration, and some Protestants, well known under the name of Waldenses, who are settled, after long and frequent persecutions, in the valleys of Lucerne, Perusa, and St Martin, in the western part of Piedmont. According to their own account, they occupy thirteen villages, and number nearly 20,000 souls, who are allowed the free exercise of their own mode of religious worship.

The religious establishment of the kingdom is very extensive, comprehending no less than nine archbishoprics and thirty-four bishoprics, who have under them ninety-seven chapters of ecclesiastics in the cities, with 3619 parish priests in the towns and villages, besides 300 monasteries of various orders, and about eighty nunneries for females. The state of education is generally very low, and few of the peasantry can either read or write. There is a university at Turin with about eight hundred students, another at Genoa with about four hundred, and a third in the island of Cagliari with two hundred and fifty. There are also about eighty colleges where Latin is taught, and forty seminaries for the education of the ecclesiastics.

The government is an absolute and hereditary monarchy, although in the island of Sardinia the assembly of the ancient states is still continued; but their power extends only to objects of a local and insignificant nature. In Genoa, too, some shadow of the ancient republican aristocracy exists, but it has little or no influence on the determinations of the monarch. The revenues of the kingdom are stated to amount to about two millions sterling annually, and the expenditure to be nearly the same. In the latter is included the interest on a national debt of five millions, a large portion of which is owing to foreigners, and among others to the capitalists of Geneva and other parts of Switzerland; but by means of a sinking fund it is yearly diminishing. An army of thirty-five thousand men is maintained in time of peace, and a naval force, consisting of six frigates, three corvettes, six brigs, and several schooners and other small craft.

The continental parts of this kingdom present a face of the greatest possible variety. The part to the north, formerly the duchy of Savoy, is in appearance more a part of Switzerland than of Italy. It is an alpine land, separated from the plains of the peninsula by an enormous chain of mountains known as the Gray Alps. It is peculiarly interesting, from the lofty heights, whose tops are covered with snow and ice, from the narrow and deep valleys, from its perpendicular cliffs, from the numerous cascades, and from the deep lakes; and it is especially distinguished by the raging winds and violent storms of hail, rain, and snow, which occur with frequency in the more elevated regions.

The provinces of Piedmont, Milan, and Montserrat, form a vast valley, or rather plain, which was probably once covered with water, and which begins at the pass of Susa, and only terminates on the easternmost frontier of Italy. The river Po divides this valley into two nearly equal portions. Its northern side extends to the foot of the Alps, which separate it from Switzerland, some great projections of which enter it at Aosta and Ossola. The southern part of this valley is bordered in its whole length by the range of the Apennines, which separates it from the provinces on the sea-coast. This valley is bounded on the part in contact with France by the Cottian Alps.

The provinces on the sea-shore, comprehending Genoa and Nice, which surround the Gulf of Genoa, are separated from the other parts of the kingdom by the Apennines. They are collectively mountainous districts, which extend to the sea, and have only narrow valleys or strips on the shore, in which marshes, heaths, and sandy tracts of land, yielding but little, and thinly inhabited, are in fact the most cold, dreary, and uncomfortable of any part of the Apennine ranges.

The soil of Savoy is everywhere stony, and consequently not favourable to agriculture upon a great scale. There are few plains of any extent, the valleys are narrow, and the earth is very thin on the rocks, which, by the force of the mountain torrents, is often washed away, leaving the bare stone. The deposited soil in the great valley which contains Piedmont, Montserrat, and Milan, is in most parts rich and deep, except that at the foot of both the Apennines and the Alps there are vast accumulations of banks of pebbles, to which the practices of agriculture cannot be applied with any profit. The height of the mountains, which enclose the valley, give such force to the streams of water that rush down, as to prevent them from being generally under the direction of human art; but in many instances the water has been turned into channels and canals, where, by the help of sluices, it has been applied beneficially to the purpose of irrigation, and, as far as it has been accomplished, with beneficial effect.

The provinces on the borders of the Mediterranean Sea have no resemblance to Piedmont, either in respect to the soil, the climate, or the vegetation. The soil is stony and poor, the stones are in enormous blocks, and in a few parts only is it adapted for cultivation; but the olive and the vine are found to flourish.

In the island of Sardinia the land is generally rather hilly than mountainous. Several ranges of hills intersect the whole land, and two large streams cause in many parts extensive marshes, while the scarcity of water in other parts causes cultivation to be much neglected. The soil is, however, productive, and is capable of becoming, with good management, much more than sufficient for the subsistence of the inhabitants. At present it is said that scarcely one third of the land is cultivated, whereas, if the whole were, it might become, as in the time of the Romans and Carthaginians, a granary for the countries on the Continent.

The mountains within the Sardinian dominions are objects which excite the greatest interest; but a description of them will be found in this work under the general article Alps. The chains of mountains may be viewed as the cisterns for collecting those vast bodies of water which empty themselves into the Mediterranean and Adriatic Seas. The first of these seas receives the waters of the Rhone, which rises in Savoy, and at first forms the boundary towards France.

The river Var constitutes the boundary between Nice and France; and the Paglion is a river of short course in the province of Nice, which rises near to Luce, and falls into the sea at a short distance from the capital. The great river of Sardinia, however, is the winding and lengthened Po, of which an account has been given under that head.

The larger lakes of the Alps belong only in part to this kingdom. The Leman, or lake of Geneva, is divided between Sardinia and the canton of Switzerland, the southern bank of it only belonging to the kingdom. Lake Maggiore has also only its western shores in the Sardinian dominions, the eastern side belonging to the Austro-Venetian kingdom of Lombardy, and the upper part forming a portion of Switzerland. The lakes exclusively Sardinian are of smaller extent than those which are but partly in the kingdom. The lake of Bourget, in Savoy, scarcely exceeds 100,000 acres in extent, but is about 240 feet in depth, and being connected by the Canal of Savières, discharges much water into the Rhone. The lake of Annency, in Savoy, is 1350 feet above the level of the sea, and is 180 feet in depth. It has an outlet by the rivers Thon and Fier into the Rhone. The lake of Orta is a long narrow piece of water by the side of Lake Maggiore, into which its surplus water is discharged. There are some smaller lakes, a few of which are dried up in the summer; and others of them are on elevations of great height, the most remarkable of which is one on Mont Cenis, 5740 feet above the level of the sea.

The several states abound in mineral springs of great use to the healing art. In Savoy the sulphureous wells of Bonneval have attained great celebrity; but their reputation is excelled by that of the warm baths of Aix. In the valley of Aosta are the medicinal springs of St Vincenzio and of Cormaggiore, and the baths of Pré and of St Didier. In the province of Piedmont are the baths of Aqui, Balieri, and Vinadio, and the springs of St Genesio.

The mountains on the island are small chains. The most remarkable of them are, Monti di Limbara in Gallura; Monti di Villanova, between Alghieri and Bosa; Monti Genargento, between Oleastra and the Barbagien; and the Monti Arizzo and Founi, in the Barbagien itself. None of the mountains are of a height to be covered with perpetual snow. The general elevation of the range is from 1000 to 3000 feet; but the peak of Limbara is 3686 feet, and that of Genargento has an altitude of 5276, and enables the people of the neighbouring town, Aritzu, to trade in snow for the consumption of the capital. These mountains are almost covered with wood to their summits, and the lower parts have olive-woods, yielding good oil.

The rivers of the island are the Oristano, which rises near Buboso, runs from north-east to south-east, and enters the sea at the town of its name; the Flumendoso, which springs from Monti Genargento, waters the district of Barbagien, and falls into the sea at Muravera; and the Quoquinos, which rises near Tirso, and, taking a northerly direction, falls into the sea about seven miles from Castel Sardo. The lakes of Sardinia are insignificant; they are mostly formed by rain in winter, and are dried up in summer; or by the overflowing of the sea from the dilapidated state of the embankments.

Mineral springs are numerous on the island, but are for the most part neglected. The principal are those of Sardara, Villa Cidro, and Fordongianus, in the Capo de Sotto; and those at the foot of Castel Doria, at Codrongianus, and the Benetutti springs of the Goceana Mountains, on the Capo di Sopra. In a secondary rank may be noticed the thermal waters of Marrubin, of Iglesias, and of St Antonio. Aqua Cotta, at the eastern base of an insulated hillock near Villa Cidro, is a small but constantly limpid spring, of about 105° of Fahrenheit, close by a stream of potable water having a temperature of 60°, whilst that of the atmosphere is 64°. Here most of the cloth of the Campedano is fulled, the makers of it paying to the proprietor for the use of the water.

The climate of this kingdom varies excessively in the different provinces which compose it. In Savoy, in the valley of Aosta, and between the Alps of Piedmont, a real Swiss climate prevails. Often is to be seen in those valleys the summer in its glorious garb, when the surrounding hills have their tops and sides covered with snow. The air on them is too raw to bring forth the more tender fruits of Italy; but in favoured spots the grapes ripen, and the sides of the hills yield abundance of chestnuts. Though changeable, the air in these districts is on the whole pure and healthful. The valley of Piedmont, according to Saussure's division, has the climate of the north region of Italy, where the quicksilver falls below ten degrees. Even in the midst of summer the benumbing Tramonta winds descend from the heights, and night-frosts, which begin in November, continue till April. It is not unusual, in the neighbourhood of the mountains, to see the ground covered with snow during ten or twelve days. It is, however, not subject to the inconveniences of Southern Italy; and neither the burning atmosphere of Calabria, nor the Sirocco, nor earthquakes, are experienced, nor the annoyance of the sharp-biting musquito. The mulberry trees, the vines, and the maize, flourish; and the air, when not in the vicinity of rice-fields, has a balmy fragrance, and is remarkably pure and healthful. The coasts of the kingdom, from Nice to Genoa, are protected by the Apennines from the Tramonta winds, and the climate is that distinguished by Saussure as the second region of Italy, in which the olives and the agrumens attain perfection; but the evils of the Sirocco or Mistrol winds are too often felt in the whole of the district.

The island of Sardinia has some peculiarities of climate. In times of antiquity, the unhealthiness of the island is alluded to by Martial, Cicero, Pausanias, Cornelius Nepos, Strabo, Tacitus, and Claudian; and in later times the same character is given it by Dante. The chief agent of this insalubrity is found in the feculent miasma of marshes, beds of rivers and torrents, stagnant pools, and putrescent vegetation, in the vicinity of which it is always found deleteriously active, and which are well known to be quite adequate to the generation of malignant fevers. The common disease, called here *intemperie*, appears to be somewhat different from the *malaria* of Sicily and Italy; for although equally or more acrimonious in effect, it does not produce the swelled bodies and sallow skins which are the pathognomonic symptoms of the latter. Both diseases usually commence when the summer heat, assisted by slight showers, disengages the impure gases from the low grounds; and continue till the end of November, when the heavy rains have precipitated the miasma, and purified the air. But they differ, in as much as malaria is generally supposed to be weak in its effects, unless imbibed during sleep; whereas *intemperie*, though worst at night, is dangerous at all times. Instances have been known of strangers landing for a few hours only, from Italian coasters, who were almost immediately carried off by its virulence; indeed the very breathing of the air by a foreigner at night, or in the cool of the evening, is considered as certain a death in some parts, as if he had swallowed some poisonous drug. While the atmosphere is in this state, the natives never move abroad until an hour after sunrise, and they hasten home before sunset, carefully closing every door and window, or, if obliged to go out, carefully holding a handkerchief before the mouth. The extreme heat of the day is also carefully avoided, for they are apprehensive of the *colpo di sole*, or stroke of the sun, attributing its frequency and fatal effects to the malignancy of the *intemperie*.

It is agreed on all sides that fire is an excellent antidote to this evil; and it is recorded that the Lords of Oristano were wont, during the unhealthy season, to burn large fires around the town every night, to rarefy the mephitic exhalations. Most of the people remove from the plains to the higher grounds on St John's day in June, when the air begins to be unsafe, although it does not become dangerous before August. Those who, from their circumstances, are obliged to remain, keep themselves well clad in thick woollens, to avert the ardent rays of the sun. Exertion, exposure to summer showers, and fatigue of every kind, are studiously avoided; and a spare but good diet is adopted, with cool acidulated drinks. The migrations consequent on this distressing visitation, with the want of cottages, pastures, and enclosures, and the many extensive commons, give the plains of Sardinia a depopulated aspect, and may be adduced, among other causes, as a reason for the comparatively low consideration in which this once most fertile of the Tyrrhenian islands has been held. The contempt in which the inhabitants of the plains are held by those of the mountains, with the large fiefs in the hands of some of the non-resident nobles, are also serious obstacles to improvement.

The chief occupation of the inhabitants of this kingdom consists in the cultivation of the land, and is accordingly as varied as the surface of the soil, and as that of the climate, which depends on the elevation. Under the head of LOMBARDY will be found a detailed account of the agriculture of this district, the greater part of which may be adverted to as a description of what takes place in the richer portion of Sardinia, which belongs to the basin of the river Po, comprehending the greater part of the provinces of Turin, Cuneo, and Alessandria. In Savoy generally the cultivation is badly conducted. The cultivable land is divided into large portions, belonging to a few great proprietors, and is subdivided into smaller portions to tenants, who, without leases, transmit their lots from one generation to another, who pay neither money-rent nor labour to their superiors, but deliver to them or their agents one half the produce of the fields, whatever it may be, in its several kinds. The cattle on these lands are commonly the property of the lord, and are maintained on the produce of the soil, before the division is made of what it yields. The power of the tenants to transmit the land to their successors is combined with the power of subdividing it among their several children; and this is carried to such an extent, as in Ireland and in some other countries, that it has led, and is leading, to such a subdivision that a great number of the farms barely raise sufficient food for the occupants, though their provisions are of the most humble and penurious kind. Savoy is annually deficient in corn to the extent of nearly one third of its consumption. This is in some measure made up by using chestnuts and potatoes as substitutes for bread; though in Aosta and in some other parts the potato is little cultivated, and in them corn must be drawn from the neighbouring countries. The land on the coast of Nice and Liguria consists chiefly of narrow strips of valley, which in the greater portion is composed of sand, and not very appropriate for the growth of grain, though a little is grown in some of the more fertile of the valleys; but the common people only eat bread on Sundays and holidays, and at other times subsist on chestnuts obtained from the Apennines, and on inferior cheese made by themselves. They derive a part of their subsistence from fish, especially sardinias, which at some seasons are abundant; and oil, a useful accompaniment, is at a very moderate price.

The agriculture of the island of Sardinia differs so much from that of the rest of the kingdom, that it merits a special notice, the more so from its having been, in ancient times, the source of supplies of grain to the continent of Italy, and occasionally of Spain. The lands are divided into feudal and non-feudal. The former comprise those belonging to the respective nobles, as well as those sold to individuals, but recognising the feudal lord. Those not feudal belong to communities or to individuals; for landed property can be let or sold, or given away, with the consent of the tribunals, or of the husband if belonging to married females. The first lands as to importance, though the least in extent, are those called *tanche*, or enclosed lands, which are generally well cultivated. But the far larger proportion are those called *vidazzone*, or belonging to communities. They are chiefly divided into three parts, each of which is cultivated in its turn, and, while under culture, is enclosed with a line of hurdles; but the rest being fallow, lies open to the ravages of wandering flocks, and the blast of every wind that blows.

The foreign commerce of Sardinia, both by sea and by land, with the countries contiguous to it, naturally demands observation. The number and tonnage of the vessels belonging to the kingdom are shown in the following table, furnished by the British consul.

Vessels belonging to the Kingdom of Sardinia.

Year.	From one to thirty tons.	From thirty to sixty tons.	From sixty to a hundred tons.	Above a hundred tons.	Number of the Crews.
1827	1874	172	232	546	31,201
1828	1899	161	222	595	30,671
1829	1931	170	214	602	31,577
1830	1903	158	214	616	32,176
1831	1965	157	215	629	32,842

The accounts for the last seven years are not to be procured; but there is reason to believe that no very material increase has taken place during that period, and that the proportion of the national vessels of the larger class has been more augmented, while that of the smaller class has somewhat declined, as is observable in the preceding table of the five years from 1827 to 1831.

The chief articles which Sardinia imports from foreign countries are sugar, coffee, spices, cotton wool, cotton manufactured, indigo, cochineal, and other dyeing drugs, corn chiefly from the Black Sea, salted fish, salt, hides and leather, iron, steel, lead, copper, pitch and tar, tobacco, and timber. There are many smaller articles of luxury, whose aggregate amount bears but a trifling proportion in value to those here enumerated. The commerce in grain is casual, depending in a great degree on the productiveness of the harvests in Switzerland, to which country, when the domestic supply is found to be insufficient, the corn, chiefly wheat from the ports of Odessa and Taganrog, is transmitted to the Swiss districts bordering on the Sardinian territory.

A Statement of the Number and Tonnage of Vessels, distinguishing the Countries to which they belonged, which entered inwards and cleared outwards at the port of Genoa in the year 1834, *exclusive of Coasters.*

Countries.	Inwards.		Outwards.	
	Ships.	Tons.	Ships.	Tons.
British	96	15,014	95	14,973
Sardinian	998	121,000	996	117,000
American	18	3,800	25	5,398
Austrian	8	1,390	8	1,673
Danish	4	695	4	695
Dutch	11	1,400	15	1,836
French	258	19,000	256	18,597
Greek	1	83	1	83
Neapolitan	149	19,100	151	19,334
Russian	1	420	3	1,077
Spanish	148	6,400	153	6,491
Swedish	10	2,100	16	2,918
Tuscan, Roman, and Lucchese	160	3,900	179	4,882
Bremen and Lubeck	4	610	6	733
Hanoverian	1	167	2	278

The variations in the years preceding and succeeding 1834 are so little as to render our filling the pages of this work with lengthened accounts quite unnecessary; and the particular year selected is sufficient to show the general nature and extent of the trade, and the respective countries with which it is carried on.

The cities of this kingdom whose population amounts to more than 10,000 souls, are the following.

Turin	120,596	Chieri	14,000
Genoa	94,000	Savona	13,400
Alessandria	36,000	Carmagnola	13,200
Cagliari	29,000	Saluzzo	13,200
Nice	27,000	Pinerola	12,500
Asti	23,000	Boghera	12,147
Sassari	21,000	Chamberi	12,060
Cuneo	20,000	Bra	11,300
Savigliano	19,000	St Remo	11,200
Casale	18,000	Novi	11,100
Mondovi	17,000	Racconigi	11,000
Novara	16,400	Chiavari	10,800
Bercelli	16,000	Rapello	10,150
Vigevano	15,000	Tortona	10,015
Fossano	14,300		

The most valuable product of Sardinia which is exported is silk, but it has little connection with maritime commerce. The greater part of it, which goes to other countries, is transported by land-carriage, in order to supply the manufacturers of France, of Prussia, of Belgium, of Holland, and in some measure of England; for even to the latter country much is now sent by land through France, or by the Rhine. Oil is one of the greater productions exported from Genoa, after being collected there by means of the numerous coasting vessels with which the shores of Sardinia abound. The larger portion of this article is sent to England, where it is used by the wool-combers in the manufacture of cloth; but a considerable quantity of it is sent to Holland, and from thence into the interior of Germany, where it is applied to the same purposes. Rice is also exported by sea to France, though it can scarcely sustain the competition with that which is produced in the East Indies or in Carolina. Though much wine is made, it is almost wholly consumed at home, the quantity exported being trifling. Fruit is an article of foreign trade; and soap, white lead, essences, and perfumery, may be enumerated as the most prominent of the smaller articles of export. There is, however, a considerable transit trade carried on through Genoa, by which many of the products of the other parts of Italy are exchanged with those of France, to the advantage of the commission-houses in that city.

Before the seventeenth century, Genoa was the centre or channel of all the supply of manufactured silks and velvets to the other parts of Europe; but at present the manufacturing industry, as regards silk, is reduced to the point which the internal consumption demands, or to the process of preparing the raw material for the manufacturers of France, England, Holland, Germany, and Russia. For domestic use, Sardinia has sufficient manufactories to supply with silk, linen, or woollen goods, the demand for clothing. Their silks are handsome and strong, especially the stockings; but, in the absence of the best descriptions of machinery, they are dearer than elsewhere. Leather, iron goods, copper ware, glass, pottery, and the smaller articles of the household, are made at home.

As to the islanders, they are in so rude a state, that, in a commercial view, they scarcely require to be noticed; as must be the case where every man is his own tailor, shoemaker, spinner, weaver, tanner, carpenter, mason, and blacksmith, and wants nothing but his fire-arms, or other weapons of defence.

SARDIS, or Sardes. See Sart.

SARDONIUS Risus, *Sardonian Laughter*, a convulsive involuntary laughter, so named from the *herba sardonia*, which is a species of ranunculus, and is said to produce such convulsive motions in the cheeks as resemble those motions which are observed in the face during a fit of laughter. This complaint is sometimes speedily fatal. If the ranunculus happens to be the cause, the cure must be attempted by means of a vomit, and frequent draughts of hydromel with milk.

SARDONYX, a precious stone, consisting of a mixture of the calcedony and carnelian, sometimes in strata, but at other times blended together.

SARFEND, supposed to be the ancient Sarepta, a village of Palestine, eight miles south of Saida.

SARHAUT, a town of Bengal, in the district of Birbhoom, eighty-five miles west from Moorshedabad. Long. 86. 51. E. Lat. 24. 14. N.

SARI, a town of Persia, and capital of the province of Mazanderan, once the seat of Aga Mahommed Khan, and still the residence of one of the Persian princes. It is a very ancient city, and frequently alluded to by Ferdousi. It is small, but well fortified, being surrounded by a good wall and a deep ditch. It is crowded with inhabitants, and a society of Armenians is established in the vicinity of the town. Here are many merchants of credit, who carry on a considerable trade with Astracan and with the interior parts of Persia. The palace, though small, is neat and commodious. When this place was visited by Hanway, it contained four or five temples of the ancient Persians, built of solid materials, and in the shape of rotundas, about thirty feet in diameter, and raised to the height of 120 feet. The surrounding country is flat, woody, and interspersed with streams, and bounded on the north-east and south-west by a low range of hills. Long. 52. 58. E. Lat. 35. 35. N.

SARLAT, an arrondissement of the department of the Dordogne, in France. It extends over 683 square miles, and comprehends ten cantons, divided into 133 communes, with 110,447 inhabitants. The capital is the city of the same name. It stands in a low situation, on every side surrounded with naked rocks. In the neighbourhood a great quantity of oil is expressed from nuts. It contained, in 1836, 5569 inhabitants. Long. 1. 9. E. Lat 45. 3. N.

SARMATTA Isle, a small island in the Eastern Seas, about thirty miles in circumference. Long. 129. 15. E. Lat. 8. 10. S.

SARNO, a city of Italy, in the Neapolitan province of Principato Citeriore. It is situated on a river of the same name, is the see of a bishop, with a cathedral, three parish and five conventual churches, and contains 11,930 inhabitants, who grow much good wine and oil, and make paper of various kinds.

SAROS, in chronology, a period of 223 lunar months. The etymology of the word is said to be Chaldæan, signifying restitution or return of eclipses; that is, conjunctions of the sun and moon in nearly the same place of the ecliptic. The Saros was a cycle like that of Meto.

SAROS-PATAK, a city of Hungary, in the province of the Hither Theiss, and the circle of Tokay. It stands on the river Bodrog, and is well built, being the seat of a Calvinist university, which has nine professors and 1240 students, with a library of 20,000 volumes, a museum, and physical laboratory. It has manufactures of woollen cloths, and contains 1630 houses, with 9150 inhabitants. Long. 21. 29. 57. E. Lat. 48. 18. 50. N.

SAROWY, a Rajpoot town and district of Hindustan, in the province of Ajmeer. The district is situated principally between the twenty-fifth and twenty-sixth degrees of north latitude. The country, which is occupied by Rajpoot chiefs, is hilly and unproductive, although watered by the Bah and Banass rivers. The town is forty-four miles west of Odeypoor. Long. 73. 20. E. Lat. 25. 32. N.

SARRASIN, a city of the department of the Tarn and Garonne, and in the arrondissement of the same name, of which it is the capital. It is sometimes distinguished as Castel-Sarrasin. The arrondissement in extent is 267,723 acres, or 418 square miles, and contains seven cantons and eighty communes, with 72,650 inhabitants. The city stands on the river Sanguire, has some manufactories of serges and linen goods, and contains 7408 inhabitants.

SARREBOURG, an arrondissement of the department of the Meurthe, in France, extending over 418 square miles. It is divided into five cantons, and these into 116 communes, which have a population of 75,499 persons. The capital is the city of the same name situated on the river Saar; but it contained only 2340 inhabitants. There is a military bakehouse with eight ovens, which can make bread each day sufficient for an army of 40,000 men.

SARREGUEMINES, an arrondissement of the department of the Moselle, in France, 524 square miles in extent. It is divided into eight cantons, and these into 143 communes, containing, in 1836, 125,973 inhabitants. The capital is a city of the same name, situated at the junction of the river Bise with the Saar. There is some excellent china made, and it has manufactures of lacquered ware of various kinds, and some extensive tanneries. It contained, in 1836, 4113 inhabitants. Long. 7. 5. E. Lat. 46. 8. N.

SART, a village of Asia Minor, small and insignificant; now chiefly distinguished by the ruins of Sardis, once the splendid capital of Lydia. These ruins are found confusedly scattered over a verdant plain, and consist of bricks so strongly cemented together that it is scarcely possible for any violence to disjoin them.

SARTENE, one of the arrondissements into which the island of Corsica has been divided. It extends over 648 square miles, and comprehends eight cantons, divided into forty-three communes, with 25,739 inhabitants. The chief place is the city of the same name, with 2682 inhabitants.

SARTHE, a department of the north-west of France, formed out of parts of the ancient province of the Upper Maine, of Anjou, and Perche-Gouet. It is bounded on the north by the department of the Orne, on the east by those of the Eure-Loire and the Loire-Cher, on the south by the Indre-Loire and Maine-Loire, and on the west by the Maine. It is nearly of a circular form, and extends to 1,398,600 acres, equal to 2185 square miles; and it is divided into four arrondissements, thirty-three cantons, and

394 communes. The population amounted, in 1836, to 466,888 persons. They are industrious, averse to changes, and seldom leave the places of their birth, or alter the fashion of their dress. The surface is generally level, but on the north-eastern side there is a range of hills of very moderate height. The soil varies excessively, the department comprehending some of the best as well as some of the worst land in France. The north-west part consists of good corn-land, and the north-east of valuable meadows; but the south and south-west divisions are for the most part mere sandy heaths, yielding little or no corn, but in certain districts producing good wine. The chief river is that which gives its name to the department. It is navigable in the lower part, and before it joins the Loire receives the waters of thirty-six rivers and brooks. The products are the common domestic animals, with buck-wheat, maize, wheat, barley, hemp, flax, wine, honey, and various fruits. Nearly one tenth of the surface is covered with woods, which are commonly used as fuel. There are some mines of iron, and although none of them are very extensive, yet their great number enables the department to extract a sufficient quantity of that metal for its own consumption. The manufacturing industry is not considerable, being confined to hardware, paper, woollen cloths, leather, and the spinning of linen yarn. The capital is Le Mans, in the centre of the department, with a population, in the year 1836, of 23,164. It contains scarcely any other large towns.

SARTINE ISLANDS, a cluster of small islands in the Northern Pacific Ocean, so named by Pérouse. Long. 129. 18. W. Lat. 50. 56. N.

SARUM, OLD, a place in the county of Wilts, only remarkable from the proprietor of it having retained the ancient right of returning two members to the House of Commons till 1832. Some of the most distinguished statesmen have sat for this place, among the rest Lord Chatham. There is at present but one house in it, though the remains of ancient walls and the foundation of a cathedral may still be traced.

SARUN, an extensive and valuable district in the province of Bahar, situated about the twenty-sixth degree of north latitude. Its boundaries on the north are Gorakpoor and Bettiah, on the south it has the Ganges, on the east Bettiah and Hajypoor, and on the west the Dewah or the Goggrah River. It contained, according to Major Rennell's mensuration, in 1784, 5106 square miles. For its size it is one of the most prosperous districts in the Company's dominions, being well watered by the Ganges and the Gunduck, besides numerous smaller streams. Its soil furnishes abundantly all the richest productions of the East. It is also an excellent pastoral country, producing fine cattle and horses. The saltpetre exported to Europe, and used in Bengal, is principally manufactured in this district and in that of Hajypoor. In 1801, the population of this district was, in reply to various questions circulated by the board of revenue, stated at 1,204,000, in the proportion of one Mahommedan to four Hindus. The chief town is Chuprach.

SARZEAU, a city of France, in the department of Morbihan, and the arrondissement of Vannes. It depends chiefly on the fishery, and contains, including the parish, 6126 inhabitants.

SASERAM, a town of Hindustan, in the province of Bahar, and district of Rhotas. This was the favourite residence of Shere Khan, the Afghan, who, after having defeated the Moguls, and expelled the Emperor Humayoon, the father of Akbar, from Hindustan, mounted the throne and reigned five years. He was killed at the siege of Callinger in 1545, and lies buried here in a magnificent mausoleum, built in the middle of a great reservoir of water. The monument rises from the centre of the tank. Long. 84. 5. E. Lat. 25. N.

SASHES, in military dress, are badges of distinction, worn by the officers of most nations, either round their waist or over their shoulders. Those for the British army are made of crimson silk; for the imperial army, of crimson and gold; for the Prussian army, of black silk and silver; for the Hanoverians, of yellow silk; and for the Portuguese, of crimson silk with blue tassels.

SASNEE, a town and fort of Hindustan, in the province of Agra, from which the zemindar was expelled, after a desperate resistance, by the British in 1803. It is thirty-eight miles north-north-east from the city of Agra. Long. 78. 4. E. Lat. 27. 45. N.

SASRAM, a small island in the Gulf of Siam, near the coast of Cambodia. Long. 103. 48. E. Lat. 10. N.

SASSARI, a city of the island of Sardinia. It stands on the plain of Fulmenaria, in the northern part, about nine miles from Porto Torres. The situation is pleasing and healthy, and the vicinity produces abundance of wine, oil, corn, fruit, and tobacco, and is distinguished by the excellence of its cultivation. The city is well built, and, besides the cathedral, boasts of twenty-four churches, ten convents, three nunneries, and a Tridentine seminary. A university also has been formed out of a Jesuits' college. The cathedral is a large structure, with a most elaborate façade, and an interior clean and airy. It contains 19,360 inhabitants, whose chief sources of existence arise from the agriculture around them.

SATALIA, ANTALIA, or, according to others, ADALIA, a city of Asia Minor, in Caramania, beautifully situated at the head of a gulf to which it gives name. The site is a rising ground, on which the streets are placed above each other, and form a succession of terraces. On the level summit of the hill the city is enclosed by a ditch, a double wall, and a series of square towers, which are about fifty yards asunder. In an opening between two of the towers, now closed up, appear the remains of a splendid gateway, exhibiting fourteen columns, the upper part being of the Corinthian order. The port is enclosed by two stone piers, which once had towers at the extremities; but it is now in a ruinous condition. The surrounding country is fertile and productive, and the gardens round the town, filled with trees loaded with fruit, are beautiful. The climate is delightful, and the air is refreshed by alternate breezes from the sea and from the chain of the Taurus Mountains. The town is supposed to occupy the site of the ancient Olbia. The population, two thirds Mahommedan and one third Greek, is 8000. Long. 30. 45. E. Lat. 36. 50. N.

SATANAGUR, a town of Hindustan, in the nizam's territories, and the province of Hyderabad. It is fifty-five miles north by east from the city of Hyderabad. Long. 78. 16. E. Lat. 17. 56. N.

SATARAH, a well-known town and fortress of Hindustan, in the province of Bejapoor, and the Mahratta territories. Its foundation is on a rock, which stands on the westernmost point of a hill, rising from a base of from seven to eight miles in length from east to west. The passage to it is very narrow, only admitting one person at a time. It was taken by Sevajee, the founder of the Mahratta power, in 1673, and by Aurungzebe in 1690; but was retaken soon after the death of that monarch, in 1707. It capitulated to the British after a very short resistance in 1818; and being afterwards surveyed by British officers, they declared that it might be defended by two hundred troops against any force. This place owes its celebrity chiefly to its having been the state-prison of the legitimate sovereign of the Mahrattas, who was confined here by his chief minister the peishwa, who usurped the real power, while the deposed rajah was still honoured with the empty forms of royalty, and his name inserted in all public records. The representative of the Satarah rajah, though divested of all real power, was still recognised as the pageant of royalty; and the country adjacent to Satarah, in consequence of his residence, enjoyed an exemption from all military license.

The father of the late rajah was a commandant of horse; but being unfortunately of the blood of Sevajee, he was immured in the state-prison of Satarah. He died in 1808, and the Peishwa Bajerow immediately proceeded from Poonah, his residence, to superintend his obsequies, and to invest his successor with his empty dignity, and the misery of a prison thereto annexed. The Peishwa Bajerow was expelled from his throne in 1818, in consequence of joining in the coalition of the native powers against the British; and it was determined to take the Satarah rajah from his confinement as a state prisoner, and to reinstate him in a portion of his ancient dominions. The territory granted him, and which he now enjoys, is bounded by the Western Ghaut Mountains, on the south by the Warner and Krishna rivers, on the north by the Neera and Beema rivers, and on the east by the frontier of the nizam's dominions. The whole area occupies 11,000 square miles.

SATELLITE, an island in D'Entrecasteaux Channel, Van Diemen's Land, partly covered with an impenetrable thicket.

SATGONG, formerly a large trading city, in which the Europeans had their factories; but it is now an inconsiderable village, on a small creek of the river Hooghly, about four miles to the north-west of the town of Hooghly, in Bengal.

SATIMANGALUM, a town of Hindustan, in the northern district of Coimbetoor, situated on the river Bhawani. The fort is said to have been built about two hundred years ago. The town, which formerly contained eight hundred, but has now only six hundred houses, is scattered over the plain. Here is a temple of some repute dedicated to Vishnu. Coarse cotton goods are manufactured in the town and neighbourhood. Long. 77. 20. E. Lat. 10. 28. N.

SATTERAM, a town of Hindustan, in the Mysore rajah's territories, situated twenty miles south from Seringapatam. Long. 76. 53. E. Lat. 12. 9. N.

SATTIAVERAM, a town of Hindustan, on the sea-coast of the Northern Circars. It is fifty-six miles south-west from Vizagapatam. Long. 82. 45. E. Lat. 17. 15. N.

SATURDAY, the seventh and last day of the week, so called from the idol Seater, worshipped on this day by the ancient Saxons, and thought to be the same as the Saturn of the Latins.

SATURN, in *Astronomy*, one of the planets of our solar system, revolving at the distance of more than nine hundred millions of miles from the sun.

Saturn, in *Chemistry*, is an appellation which was formerly given to lead.

Saturn, in *Heraldry*, denotes the black colour in blazoning the arms of sovereign princes.

Saturn, one of the principal of the Pagan deities, was the son of Cœlus and Terra, and the father of Jupiter. He deposed and castrated his father, and obliged his brother Titan to resign to him his crown, on condition of his bringing up none of his male issue, that the succession might at length devolve on him. For this purpose he devoured all the sons he had by his wife Rhea or Cybele; but she bringing forth at one time Jupiter and Juno, presented the latter to her husband, and sent the boy to be nursed on Mount Ida, when Saturn, being informed of her having a son, demanded the child, but in his stead his wife gave him a stone swaddled up like an infant, which he instantly swallowed. Titan, finding that Saturn had violated the contract he had made with him, put himself at the head of his children and made war on his brother, and having taken him and Cybele prisoners, confined them in Tartarus; but Jupiter being in the mean time grown up, raised an army in Crete, went to his father's assistance, defeated Titan, and restored Saturn to the throne. Some time after this, Saturn being told that Jupiter intended to dethrone him, endeavoured to prevent it; but the latter being informed of his intention, deposed his father, and threw him into Tartarus. Saturn having escaped from thence, however, fled into Italy, where he was kindly received by Janus, king of the country, who associated him in the government; and hence Italy obtained the name of *Saturnia Tellus*, as also that of *Latium*, from *lateo*, to lie hidden. There Saturn, by the wisdom and mildness of his government, is said to have produced the golden age.

Saturn is represented as an old man with four wings, armed with a scythe; and sometimes he is delineated under the figure of a serpent with its tail in its mouth. This is emblematical of the seasons, which roll perpetually in the same circle. Sometimes also Saturn is painted with a sand-glass in his hand. The Greeks say that the story of his mutilating his father and destroying his children is an allegory, which signifies, that Time devours the past and present, and will also devour the future. The Romans, in honour of him, built a temple, and celebrated a festival which they denominated *Saturnalia*. During this festival no business or profession was allowed to be carried on except cookery; all distinctions of rank ceased; slaves could say with impunity what they pleased to their masters, and they could even rally them to their faces with their faults.

SATURNALIA, in Roman antiquity, a festival observed about the middle of December, in honour of the god Saturn, whom Lucan introduces giving an account of the ceremonies observed upon this occasion. "During my whole reign," says he, "which lasts but for one week, no public business is done; there is nothing but drinking, singing, playing, creating imaginary kings, placing servants with their masters at table, &c. There shall be no disputes or reproaches, but the rich and poor, masters and slaves, shall be equal." On this festival the Romans sacrificed bareheaded, contrary to their custom at other sacrifices.

SATURNINE, an appellation given to persons of a melancholy disposition, as being supposed to be under the influence of the planet Saturn.

SATYAVRATA, or Menu, in Indian mythology, is believed by the Hindus to have reigned over the whole world in the earliest age of their chronology, and to have resided in the country of Dravira, on the coast of the eastern Indian peninsula. His patronymic name was Vaivaswata, or Child of the Sun. Sir William Jones has shown it to be in the highest degree probable, that the Satyavrata of India is the Kronus of Greece and the Saturn of Italy. See Saturn, and Asiatic Researches, vol. i. p. 230.

SATYRS, in ancient mythology, a species of demi-gods, who dwelt in the woods. They are represented as monsters, half men and half goats; having horns on their heads, and a hairy body, with the feet and tail of a goat. They are generally delineated in the train that follows Bacchus. As the poets supposed that they were remarkable for piercing eyes and keen raillery, they have placed them in the same pictures with the Graces, Loves, and even with Venus herself.

SAUL the son of Kish, of the tribe of Benjamin, was the first king of the Israelites. On account of his disobedient conduct, the kingdom was taken from his family and given to David.

SAUMUR, an arrondissement of the department of the Maine et Loire, in France, extending over 516 square miles. It is divided into eight cantons and ninety-three communes, and, in 1836, contained 91,159 inhabitants. The capital is the city of the same name, situated at the influx of the Thouet into the Loire, which here forms several islands. It contains 11,925 inhabitants. There is much linen trade carried on, some tanning, some copper and cutlery goods made, and some saltpetre refineries. Long. 0. 9. 55. W. Lat. 47. 15. 24. N.

SAUNDERS' Island, in the South Atlantic Ocean, ten leagues in circumference, and discovered by Captain Cook in 1775. Long. 26. 44. W. Lat. 57. 49. S.

SAUNDERSON, Dr Robert, an eminent casuist, was

Saunderson.

born at Rotherham, in Yorkshire, on the 19th of September 1587. He was descended of an ancient family, and attended the grammar-school at Rotherham, where he made such wonderful proficiency in the languages, that at thirteen it was judged proper to send him to Lincoln College, Oxford. In 1608 he was appointed logic reader in the same college. He took orders in 1611, and was promoted successively to several benefices. Archbishop Laud recommended him to Charles I. as a profound casuist; and that monarch, who seems to have been a great admirer of casuistical learning, appointed him one of his chaplains in 1631. Charles proposed several cases of conscience to him, and received so great satisfaction from his answers, that at the end of his month's attendance he told him that he would wait with impatience during the intervening eleven months, as he was resolved to be more intimately acquainted with him, when it would again be his turn to officiate. The king regularly attended his sermons, and was wont to say that he "carried his ears to hear other preachers, but his conscience to hear Mr Saunderson."

In 1642 Charles created him regius professor of divinity at Oxford, with the canonry of Christ Church annexed. But the civil wars prevented him until 1646 from entering on the office; and in 1648 he was ejected by the visitors which the parliament had commissioned. He must have stood high in the public opinion; for in the same year in which he was appointed professor of divinity, both houses of parliament recommended him to the king as one of their trustees for settling the affairs of the church. The king, too, reposed great confidence in his judgment, and frequently consulted him about the state of his affairs. When the parliament proposed the abolition of the episcopal form of church government, as incompatible with monarchy, Charles desired him to take the subject under his consideration, and deliver his opinion. He accordingly wrote a treatise entitled Episcopacy, as established by Law in England, not prejudicial to Regal Power. At taking leave, the king advised him to publish Cases of Conscience. He replied that "he was now grown old, and unfit to write cases of conscience." The king said, "It was the simplest thing he had ever heard from him; for no young man was fit to be a judge, or write cases of conscience." Walton, who wrote the life of Dr Saunderson, informs us, that in one of these conferences the king told Saunderson, or one of the rest who was then in company, that "the remembrance of two errors did much affect him, which were his assent to the Earl of Strafford's death, and the abolishing of Episcopacy in Scotland; and that if God ever restored him to the peaceable possession of his crown, he would prove his repentance by a public confession and a voluntary penance, by walking barefoot from the Tower of London, or Whitehall, to St Paul's Church, and would desire the people to intercede with God for his pardon."

Dr Saunderson was taken prisoner by the parliament's troops, and conveyed to Lincoln, in order to procure in exchange a Puritan divine named Clark, whom the king's army had taken. The exchange was agreed to, on condition that Dr Saunderson's living should be restored, and his person and property remain unmolested. The first of these demands was readily complied with; and a stipulation was made, that the second should be observed; but it was impossible to restrain the licentiousness of the soldiers. They entered his church in the time of divine service, interrupted him when reading prayers, and even had the audacity to take the common-prayer book from him, and to tear it to pieces.

Mr Boyle, having read a work of Dr Saunderson's, entitled *De Juramenti Obligatione*, was so much pleased that he inquired at Bishop Barlow, whether he thought that it was possible to prevail on the author to write Cases of Conscience, if an honorary pension was assigned him to enable him to purchase books and pay an amanuensis. Saunderson told Barlow, "that if any future tract of his could be of any use to mankind, he would cheerfully set about it without a pension." Boyle, however, sent him a present of L.50, sensible, no doubt, that, like the other royalists, his finances could not be great. Upon this Dr Saunderson published his book *De Conscientia.*

When Charles II. was reinstated in the throne, he recovered his professorship and canonry, and soon afterwards was promoted to the bishopric of Lincoln. During the two years and a half in which he possessed this new office, he spent a considerable sum in augmenting poor vicarages, and in repairing the palace at Budgen. He died on the 29th of January 1662–63, in his seventy-sixth year.

He was a man of great acuteness and solid judgment. "That staid and well-weighed man Dr Saunderson," says Dr Hammond, "conceives all things deliberately, dwells upon them discreetly, discerns things that differ exactly, passeth his judgment rationally, and expresses it aptly, clearly, and honestly." Being asked, what books he had read most, he replied, that "he did not read many books, but those which he did read were well chosen and frequently perused." These, he said, were chiefly three, Aristotle's Rhetoric, Aquinas's *Secunda Secundæ*, and Cicero's works, especially his Offices, which he had not read over less than twenty times, and could even, in his old age, recite without book." He added, that "the learned civilian Dr Zouch had written *Elementa Jurisprudentiæ*, which he thought he could also say without book, and that no wise man could read it too often." He was not only conversant with the fathers and schoolmen, with casuistical and controversial divinity, but he was well acquainted with all the histories of the English nation, was a great antiquary, had searched minutely into records, and was well skilled in heraldry and genealogy.

It will now be proper here to give a short account of his works. 1. In 1615 he published *Logicæ Artis Compendium*, which was the system of lectures he had delivered in the university when he was logic reader; 2. Sermons, amounting in number to thirty-six, printed in 1681, folio, with the author's life by Walton; 3. Nine Cases of Conscience resolved, first collected in one volume in 1678, 8vo; 4. *De Juramenti Obligatione*, which was translated into English by Charles I. while a prisoner in the Isle of Wight, and printed at London in 1665, in 8vo; 5. *De Obligatione Conscientiæ;* 6. Censure of Mr Antony Ascham his book of the confusions and revolutions of government; 7. *Pax Ecclesiæ*, concerning Predestination, or the five points; 8. Episcopacy, as established by Law in England, not prejudicial to the Regal Power, in 1661. Besides these, he wrote two Discourses in defence of Usher's writings.

SAUNDERSON, *Dr Nicholas*, was born at Thurlstone, in Yorkshire, in 1682, and may be considered as a prodigy for his application and success in mathematical literature, in circumstances apparently the most unfavourable. He lost his sight by the small-pox before he was a year old. But this disaster did not prevent him from searching after that knowledge for which nature had given him so ardent a desire. He was initiated into the Greek and Roman authors at a free school at Penniston. After spending some years in the study of the languages, his father, who had a place in the excise, began to teach him the common rules of arithmetic. But he soon surpassed his father, and could make long and difficult calculations without having any sensible marks to assist his memory. At eighteen he was taught the principles of algebra and of geometry by Mr Richard West of Undoorbank, who, though a gentleman of fortune, yet, being strongly attached to mathematical learning, readily undertook the education of so uncommon a genius. Saunderson was also assisted in his mathematical studies by Dr Nettleton. These two gentlemen read books to him and explained them. He was next sent to a private academy at Attercliff near Sheffield, where logic and metaphysics were chiefly taught. But these sciences not suiting his turn of mind, he soon left the academy. He lived for some time in the country without any instructor; but such was the vigour of his own mind, that few instructions were necessary. He only required books and a reader.

His father, besides the place he had in the excise, possessed also a small estate; but having a numerous family to support, he was unable to give him a liberal education at one of the universities. Some of his friends, who had remarked his perspicuous and interesting manner of communicating his ideas, proposed that he should attend the university of Cambridge as a teacher of mathematics. This proposal was immediately put in execution, and he was accordingly conducted to Cambridge in his twenty-fifth year, by Mr Joshua Dunn, a fellow-commoner of Christ's College. Though he was not received as a member of the college, he was treated with great attention and respect. He was allowed a chamber, and had free access to the library. Mr Whiston was at that time professor of mathematics, and as he read lectures in the way that Saunderson intended, it was naturally to be supposed he would view his project as an invasion of his office. But, instead of meditating any opposition, the plan was no sooner mentioned to him than he gave his consent to it. Saunderson's reputation was soon spread throughout the university. When his lectures were announced, a general curiosity was excited to hear such intricate mathematical subjects explained by a man who had been blind from his infancy. The subject of his lectures was the *Principia Mathematica*, the Optics, and the *Arithmetica Universalis*, of Sir Isaac Newton. He was accordingly attended by a very numerous audience. It will appear at first incredible to many that a blind man should be capable of explaining optics, which requires an accurate knowledge of the nature of light and colours; but we must recollect that the theory of vision is taught entirely by lines, and is subject to the rules of geometry.

While thus employed in explaining the principles of the Newtonian philosophy, he became known to its illustrious author. He was also intimately acquainted with Halley, Cotes, Demoivre, and other eminent mathematicians. When Whiston was removed from his professorship, Saunderson was universally allowed to be the man best qualified for the succession. But to enjoy this office it was necessary, as the statutes direct, that he should be promoted to a degree. To obtain this privilege, the heads of the university applied to their chancellor the Duke of Somerset, who procured the royal mandate to confer upon him the degree of master of arts. He was then elected Lucasian professor of mathematics in November 1711. His inauguration speech was composed in classical Latin, and in the style of Cicero, with whose works he had been much conversant. He now devoted his whole time to his lectures and the instruction of his pupils. In 1728, when George II. visited the university of Cambridge, he expressed a desire to see Professor Saunderson. In compliance with this desire, he waited upon his majesty in the senate-house, and was there, by the king's command, created doctor of laws. He was admitted a member of the Royal Society in 1736.

Saunderson was naturally of a vigorous constitution, but having confined himself to a sedentary life, he at length became scorbutic. For several years he felt a numbness in his limbs, which in the spring of 1739 brought on a mortification in his foot; and, unfortunately, his blood was so vitiated by the scurvy, that assistance from medicine was not to be expected. When he was informed that his death was near, he remained for a little space calm and silent; but he soon recovered his former vivacity, and conversed with his usual ease. He died on the 19th of April 1739, in the fifty-seventh year of his age, and was buried at his own request in the chancel at Boxworth. He married the daughter of Mr Dickens, rector of Boxworth, in Cambridgeshire, and by her had a son and a daughter.

Dr Saunderson was rather to be admired as a man of wonderful genius and assiduity, than to be loved for his amiable qualities. He spoke his sentiments freely of characters, and praised or condemned his friends as well as his enemies without reserve. This has been ascribed by some to a love of defamation; but it has with more propriety been attributed by others to an inflexible love of truth, which urged him upon all occasions to speak the sentiments of his mind without disguise, and without considering whether this conduct would please, or the reverse. His sentiments were supposed to be unfavourable to revealed religion. It is said that he alleged he could not know God, because he was blind, and could not see his works; and that upon this Dr Holmes replied, "Lay your hand upon yourself, and the organization which you will feel in your own body will dissipate so gross an error." On the other hand, we are informed that he had desired the sacrament to be given him on the evening before his death. He was however seized with a delirium, which rendered this impossible.

He wrote a system of algebra, which was published in two volumes 4to, at London, after his death, in the year 1740, at the expense of the university of Cambridge.

Dr Saunderson had invented for his own use a Palpable Arithmetic, that is, a method of performing operations in arithmetic solely by the sense of touch. It consisted of a table raised upon a small frame, so that he could apply his hands with equal ease above and below. On this table were drawn a great number of parallel lines, which were crossed by others at right angles; the edges of the table were divided by notches half an inch distant from one another, and between each notch there were five parallels, so that every square inch was divided into a hundred little squares. At each angle of the squares where the parallels intersected one another, a hole was made quite through the table; and in each hole were placed two pins, a large and a small one. It was by the various arrangements of the pins that Saunderson performed his operations.

His sense of touch was so perfect that he could discover with the greatest exactness the slightest inequality of surface, and could distinguish in the most finished works the smallest oversight in the polish. In the cabinet of medals at Cambridge he could single out the Roman medals with the utmost correctness; and he could also perceive the slightest variation in the atmosphere. One day, while some gentlemen were making observations on the sun, he took notice of every little cloud that passed over his disk and served to interrupt their labours. When any object passed before his face, even though at some distance, he discovered it, and could guess its size with considerable accuracy. When he walked, he knew when he passed by a tree, a wall, or a house. He had made these distinctions from the different ways his face was affected by the motion of the air.

His musical ear was so remarkably acute, that he could distinguish accurately to the fifth of a note. In his youth he had been a performer on the flute, and he had made such proficiency, that if he had cultivated his talents in this way, he would probably have been as eminent in music as he was in mathematics. He recognised not only his friends, but even those with whom he was slightly acquainted, by the tone of their voice; and he could judge with wonderful exactness of the size of any apartment into which he was conducted.

SAURIN, James, a celebrated preacher, was born at Nismes in 1677, being the son of a Protestant lawyer of considerable eminence. He applied to his studies with great success; but at length being captivated with a military life, Saurin.

he relinquished them for the profession of arms. In 1694 he made a campaign as a cadet in Lord Galloway's company, and soon afterwards obtained a pair of colours in the regiment of Colonel Renault, which served in Piedmont. But the Duke of Savoy having made peace with France, he returned to Geneva, and resumed the study of philosophy and theology under Turretin and other professors. In 1700 he visited Holland, then went to England, where he remained for several years, and married. In 1705 he returned to the Hague, where he fixed his residence, and preached with the most unbounded applause. To an exterior appearance highly prepossessing, he added a strong and harmonious voice. The sublime prayer which he recited before his sermon was uttered in a manner highly affecting. Nor was the attention excited by the prayer dissipated by the sermon. All who heard it were charmed; and those who came with an intention to criticise, were carried along with the preacher and forgot their design. Saurin had, however, one fault in his delivery; he did not manage his voice with sufficient skill. He exhausted himself so much in his prayer and the beginning of his sermon, that his voice grew feeble towards the end of the service. His sermons, especially those which were published during his life, are distinguished for justness of thought, force of reasoning, and an eloquent unaffected style. Saurin died on the 30th of December 1730, aged fifty-three years.

He wrote, first, Sermons, which were published in twelve vols. 8vo and 12mo; some of which display great genius and eloquence, and others are composed with negligence. One may observe in them the imprecations and the aversion which the Calvinists of that age were wont to utter against the Roman Catholics. Saurin was, notwithstanding, a lover of toleration; and his sentiments on this subject gave great offence to some of his fanatical brethren, who attempted to obscure his merit and embitter his life. They found fault with him because he did not call the pope Antichrist, and the Church of Rome the whore of Babylon. But these prophetic metaphors, however applicable they may be, were certainly not intended by the benevolent religion of Jesus to be bandied about as terms of reproach; which would teach those to rail who use them, and irritate, without convincing, those to whom they were applied. Saurin, therefore, while he perhaps interpreted these metaphors in the same way with his opponents, discovered more of the moderation of the Christian spirit. Five volumes of his sermons were published in his life, and the rest have been added since his decease.

Secondly, he published Discourses Historical, Critical, and Moral, on the most memorable Events of the Old and New Testament. This is his greatest and most valuable work. It was first printed in two volumes folio. As it was left unfinished, Beausobre and Roques undertook a continuation of it, and increased it to four volumes. It is full of learning, being a collection of the opinions of the best authors, both Christian and heathen; of the philosophers, historians and critics, on every subject which the author examines. He also published the State of Christianity in France, 1725, 8vo; in which he discusses many important points of controversy, and calls in question the truth of the miracle said to have been performed on La Fosse at Paris; and An Abridgment of Christian Theology and Morality, in the form of a Catechism, 1722, 8vo.

A Dissertation which he published on the Expediency of sometimes disguising the Truth, raised a multitude of enemies against him. In this discourse his plan was, to state the arguments of those who affirm that, in certain cases, it is lawful to disguise truth, and the answers of those who maintain the contrary. He does not determine the question, but seems, however, to incline to the former opinion. He was immediately attacked by several adversaries, and a long controversy ensued; but his doctrines and opinions were at length publicly approved of by the synods of Campen and the Hague.

Saurin.

The subject of this controversy has long been agitated, and men of equally good principles have supported opposite sides in it. It would certainly be a dangerous maxim that falsehood can ever be lawful. There may, indeed, be particular cases when the motives to it are of such a nature as to diminish its criminality; but to lessen its guilt is a very different thing from justifying it by the laws of morality.

Saurin, *Joseph*, a geometrician of the Academy of Sciences at Paris, was born at Courtouson, in the principality of Orange, in the year 1659. His father, who was a minister at Grenoble, was his first preceptor. He made rapid progress in his studies, and, when very young, was admitted minister of Eure in Dauphiné; but having made use of some violent expressions in one of his sermons, he was obliged to quit France in the year 1683. He retired to Geneva, and thence to Berne, where he obtained a considerable living. Scarcely was he settled in his new habitation, however, when some theologians raised a persecution against him. Saurin, hating controversy, and disgusted with Switzerland, where his talents were entirely concealed, repaired to Holland. He returned soon afterwards to France, and surrendered himself into the hands of Bossuet, the bishop of Meaux, who obliged him to make a recantation of his errors. This event took place in 1690. His enemies, however, suspected his sincerity in the abjuration which he had made. It was a general opinion, that the desire of cultivating science in the capital of France had a greater effect in producing this change than religion. Saurin, however, speaks of the reformers with great asperity, and condemns them for going too far. "Deceived in my opinions concerning the rigid system of Calvin, I no longer regarded that reformer in any other light but as one of those extravagant geniuses who are carried beyond the bounds of truth. Such appeared to me in general the founders of the reformation; and that just idea which I have now obtained of their character has enabled me to shake off a load of prejudices. I saw in most of the articles which have separated them from us, such as the invocation of saints, the worship of images, the distinction of meats, &c. that they had much exaggerated the inevitable abuses of the people, and imputed these to the Church of Rome, as if sanctioned by its doctrines; besides, that they have misrepresented those doctrines which were not connected with any abuse. One thing which surprised me much when my eyes began to open, was the false idea, though in appearance full of respect for the word of God, which the reformers entertained of the perfection and perspicuity of the Holy Scriptures, and the manifest misinterpretation of passages which they bring to support that idea (for that misinterpretation is a point which can be proved). Two or three articles still raised some objections in my mind against the Church of Rome; to wit, transubstantiation, the adoration of the sacrament, and the infallibility of the church. The adoration of the sacrament I considered as idolatry, and, on that account, removed from her communion. But soon after, the Exposition of the bishop of Meaux, a work which can never be sufficiently admired, and his Treatise concerning changes, reversed all my opinions, and rendered me an enemy to the Reformation." It is said also that Saurin appeased his conscience by reading Poiret's *Cogitationes Rationales*. This book is written with a view to vindicate the Church of Rome from the charge of idolatry.

If it was the love of distinction that induced Saurin to return to the Church of Rome, he was not disappointed; for he there met with protection and support. He was favourably received by Louis XIV., obtained a pension from him, and was treated by the Academy of Sciences with the most flattering respect. At that time (1717) geometry formed his principal occupation. He adorned the *Journal des Sçavans* with many excellent treatises;

ssure.

and he added to the memoirs of the academy many interesting papers. These are the only works which he has left behind him. He died at Paris, of a fever, on the 29th of December 1737, in his seventy-eighth year. He married a wife of the family of Crousas, in Switzerland, who bore him a son, Bernard Joseph, distinguished as a writer for the theatre.

Saurin was of a bold and impetuous spirit. He had that lofty deportment which is generally mistaken for pride. His philosophy was austere; his opinions of men were not very favourable; and he often delivered them in their presence. This created him many enemies. His memory was attacked after his decease. A letter was printed in the *Mercure Suisse*, said to be written by Saurin from Paris, in which he acknowledges that he had committed several crimes which deserved death. Some Calvinist ministers published in 1757 two or three pamphlets to prove the authenticity of that letter; but Voltaire made diligent inquiry, not only at the place where Saurin had been discharging the sacerdotal office, but at the deans of the clergy of that department. They all exclaimed against an imputation so opprobrious. It must not, however, be concealed, that Voltaire, in the defence which he has published in his general history of Saurin's conduct, leaves some unfavourable impressions upon the reader's mind. He insinuates that Saurin sacrificed his religion to his interest, and that he played upon Bossuet, who believed he had converted a clergyman, when he had only given a little fortune to a philosopher.

SAUSSURE, Horace Benedict de, a celebrated naturalist, was a native of Geneva, and born in the year 1740. His father was an intelligent farmer, who lived at Conches, about half a league from Geneva, which no doubt contributed, in addition to his active education, to increase the physical strength of young Saussure, so requisite for a naturalist who intends to travel. He went daily to town for public instruction; and as he lived at the foot of a mountain, he frequently amused himself in ascending its steep and rugged sides. Thus environed by the phenomena of nature, and assisted by study, it was to be expected that he would soon conceive a predilection for natural history. Botany was his most early and favourite study, a taste which was powerfully encouraged by his local situation, and was the means of introducing him to the acquaintance of the great Haller, to whom he paid a visit in 1764, and who was astonished at his intimate acquaintance with every branch of the natural sciences.

His attachment to the study of the vegetable kingdom was also increased by his connection with Bonnet, who had married his aunt, and who put a proper estimate on the talents of his nephew. He was at that time engaged in the examination of the leaves of plants, to which Saussure was also induced to turn his attention, and published the result of his researches under the title of Observations on the Bark of Leaves. About this time the philosophical chair at Geneva became vacant, and was given to Saussure at the age of twenty-one. Rewards conferred so early have been thought to extinguish in some a zeal for the increase of knowledge; but this was not the case with De Saussure, who taught physics and logic alternately with equal success. For physics, however, he had the greatest taste, as affording the means of prosecuting the study of chemistry, mineralogy, and other kindred sciences.

He now began his travels through the mountains, not for the purpose of studying, as formerly, their flowery decorations, but their constituent parts, and the disposition of their masses. During the first fifteen years of his professorship, he was alternately engaged in discharging the duties of his office, and in traversing the mountains in the vicinity of Geneva; and in this period his talents as a great philosopher were fully displayed. He extended his researches on one side to the banks of the Rhine, and on the other to the country of Piedmont. He travelled to Auvergne to examine the extinguished volcanoes, going afterwards to Paris, England, Holland, Italy, and Sicily. It is proper to remark, that these were not mere journeys, but were undertaken purely with the view of studying nature; and in all his journeys he was surrounded with such instruments as would be of service to him, together with plans previously arranged of his whole procedure.

Saussure.

The first volume of his travels through the Alps, which was published in 1779, contains a circumstantial description of the environs of Geneva, and an excursion as far as Chamouni, a village at the foot of Mont Blanc. It contains a description of his *magnetometer*. In proportion as he examined the mountains, the more was he persuaded of the importance of mineralogy; and that he might study it with advantage, he acquired a knowledge of the German language. In the last volumes of his travels, the reader will perceive how much new mineralogical knowledge he had acquired.

During the troubles which agitated Geneva in 1782, he made his beautiful and interesting experiments on hygrometry, which he published in 1783. This has been pronounced the best work that ever came from his pen, and completely established his reputation as a philosopher. De Saussure resigned his chair to his pupil and fellow-labourer, Pictet, who discharged the duties of his office with reputation, although rendered difficult to him by succeeding so great a man. He projected a plan of reform in the education of Geneva, the design of which was to make young people acquainted with the natural sciences and mathematics at an early period; and wished that their physical education should not be neglected, for which purpose he proposed gymnastic exercises. This plan found admirers in the city, but the poverty of its funds was an obstacle in the way of any important innovation. It was dreaded, too, that if established forms were changed, they might be altered for the worse.

The attention of De Saussure was not wholly confined to public education, for he superintended the education of his own two sons and a daughter, who have since proved themselves worthy of such a father and preceptor. In 1786, he published his second volume of travels, containing a description of the Alps around Mont Blanc, the whole having been examined with the eye of a mineralogist, geologist, and philosopher. It contains some valuable experiments on electricity, and a description of his own electrometer, said to be the most perfect we have. To him we are indebted for his *cyanometer*, for measuring the degree of blueness of the heavens, which is found to vary according to the height of the observer; his *diaphanometer*, for measuring the transparency of the atmosphere; and his *anemometer*, for ascertaining the force of the winds. He founded the Society of Arts, to the operations of which Geneva is indebted for the state of prosperity which it has reached within the last thirty years. Over that society he presided to the day of his death; and the preservation of it in prosperity constituted one of his fondest wishes.

In 1794, the health of this eminent man began rapidly to decline, and a severe stroke of the palsy almost deprived him of the use of his limbs. Such a condition was no doubt painful; but his intellects still preserved their original activity, and he prepared for the press the last two volumes of his travels, which appeared in 1796. They contain a great mass of new facts and observations, of the last importance to physical science. During his illness he published Observations on the Fusibility of Stones by means of the Blow-pipe. He was in general a Neptunian, ascribing the revolutions of our globe to water, and admitting the possibility of mountains having been thrown up by elastic fluids disengaged from the cavities of the earth. In the midst of his rapid decline he cherished the hopes of recovery; but his strength was exhausted. A languor succeeded the vigour which he had formerly enjoyed; his slow pronunciation did not correspond with the vivacity of his mind, and formed a melancholy contrast to the pleasantness which he had formerly exhibited. He tried in vain to procure the re-establishment of his health; for all the remedies prescribed by the ablest physicians were wholly ineffectual. His mind afterwards lost its activity; and on the 22d of March 1799, he finished his mortal career, in the fifty-ninth year of his age, lamented by a family to whom he was dear, by a country to which he had done great honour, and by Europe, the knowledge of which he had extended.

SAUTGUR, a town of the south of India, in the province of Barramahal, among the Eastern Ghauts, thirty miles west from Vellore. Long. 78. 54. E. Lat. 12. 58. N. The pass in the Ghaut beyond this place, approaching the Mysore, has been levelled and improved since the conquest of the country by the British.

SAUVEUR, Joseph, an eminent French mathematician, born at La Flèche in 1653. He was absolutely dumb until he was seven years of age; and even then his organs of speech were not evolved so fully as to permit him to speak without great deliberation. Mathematics were the only studies he had any relish for, and these he cultivated with extraordinary success; so that he commenced teacher at twenty years of age, and rose so rapidly into vogue, that he had Prince Eugene for his scholar. He became mathematical professor in the royal college in 1686; and ten years afterwards was admitted a member of the Academy of Sciences. He died in 1716; and his writings, which consist rather of detached papers than of connected treatises, are all inserted in the Memoirs of the Academy of Sciences. He was twice married; and by the last wife he had a son, who, like himself, was dumb for the first seven years of his life.

SAVA, a town of Persia, now in ruins, in the northern part of the province of Irak. It is still the capital of a district which yields excellent pasture, though strongly impregnated with salt. It is one hundred and eighty miles north-west from Ispahan.

SAVAGE is a word so well understood as scarcely to require explanation. When applied to inferior animals, it denotes that they are wild, untamed, and cruel; when applied to man, it is of much the same import with barbarian, and means a person that is untaught and uncivilized, or who is in the rudest state of uncultivated nature.

Savage *Island*, in the South Pacific Ocean, discovered by Captain Cook in 1774. It is about thirty-three miles in circumference. Long. 169. 37. W. Lat. 19. 1. S.

Savage, *Richard*, one of the most remarkable characters that is to be met with in all the records of biography, was, according to her own confession, the son of Anne countess of Macclesfield by the Earl of Rivers, and was born in 1698. This confession of adultery was made in order to procure a separation from her husband the Earl of Macclesfield; yet, having obtained this desired end, no sooner was her spurious offspring brought into the world, than, without the dread of shame or poverty to excuse her, she discovered the resolution of disowning him, and, as long as he lived, treated him with the most unnatural cruelty. She delivered him over to a poor woman to educate as her own; prevented the Earl of Rivers from leaving him a legacy of L.6000, by declaring him dead; and in effect deprived him of another legacy which his godmother Mrs Lloyd had left him, by concealing from him his birth, and thereby rendering it impossible for him to prosecute his claim. She endeavoured to send him secretly to the plantations; but this plan being either laid aside or frustrated, she placed him apprentice with a shoemaker. In this situation, however, he did not long continue; for his nurse having died, he went to take care of the effects of his supposed mother, and found in her boxes some letters which discovered to young Savage his birth, and the cause of its concealment.

From the moment of this discovery it was natural for him to become dissatisfied with his situation as a shoemaker. He now conceived that he had a right to share in the affluence of his real mother; and therefore he directly, and perhaps indiscreetly, applied to her, and made use of every art to awaken her tenderness and attract her regard. But in vain did he solicit this unnatural parent. She avoided him with the utmost precaution, and took measures to prevent his ever entering her house on any pretence whatever.

Savage was at this time so touched with the discovery of his birth, that he frequently made it his practice to walk before his mother's door in hopes of seeing her by accident; and often did he warmly solicit her to admit him to see her; but all to no purpose. He could neither soften her heart nor open her hand.

In the mean time, whilst he was assiduously endeavouring to rouse the affections of a mother in whom all natural affection was extinct, he was destitute of the means of support, and reduced to the miseries of want. We are not told by what means he got rid of his obligation to the shoemaker, or whether he ever was actually bound to him; but we now find him very differently employed in order to procure a subsistence. In short, the youth had parts, and a strong inclination towards literary pursuits, especially poetry. He wrote a poem, and afterwards two plays, Woman's a Riddle, and Love in a Veil; but the author was allowed no part of the profits from the first; and from the second he received no other advantage than the acquaintance of Sir Richard Steele and of Mr Wilkes, by whom he was pitied, caressed, and relieved. However, the kindness of his friends not affording him a constant supply, he wrote the tragedy of Sir Thomas Overbury, which not only procured him the esteem of many persons of wit, but brought him in L.200. The celebrated Aaron Hill was of great service to him in correcting and fitting this piece for the stage and the press; and he extended his patronage still further. But Savage was, like many other wits, a bad manager, and was ever in distress. As fast as his friends raised him out of one difficulty, he sunk into another; and, when he found himself greatly involved, he would ramble about like a vagabond, with scarcely a shirt to his back.

Mr Hill also earnestly promoted a subscription to a volume of Miscellanies by Savage, and likewise furnished part of the poems of which the volume was composed. To this miscellany Savage wrote a preface, in which he gives an account of his mother's cruelty in an uncommon strain of humour. The profits of his tragedy and his Miscellanies together had now, for a time, somewhat raised poor Savage both in circumstances and in credit; so that the world just began to behold him with a more favourable eye than formerly, when both his fame and his life were endangered by a most unhappy event. A drunken frolic in which he one night engaged, ended in a fray, and Savage unfortunately killed a man, for which he was condemned to be hanged. His friends earnestly solicited the mercy of the crown, whilst his mother as earnestly exerted herself to prevent his receiving it. The Countess of Hertford at length laid his whole case before Queen Caroline, and Savage obtained a pardon.

Savage had now lost that tenderness for his mother which the whole series of her cruelty had not been able wholly to repress; and considering her as an implacable enemy, whom nothing but his blood could satisfy, threatened to harass her with lampoons, and to publish a copious narrative of her conduct, unless she consented to allow him a pension. This expedient proved successful; and the Lord Tyrconnel, upon his promise of laying aside his design of exposing his mother's cruelty, took him into his family, treated him as an equal, and engaged to allow him a pension of L.200 a year. This was the golden part of Savage's life. He was courted by all who endeavoured to be thought men of genius, and caressed by all who valued themselves upon a refined taste. In this gay period of his life he published the Temple of Health and Mirth, on the recovery of Lady Tyrconnel from a languishing illness; and The Wanderer, a moral poem, which he dedicated to Lord Tyrconnel, in strains of the highest panegyric. But these praises he in a short time found himself inclined to retract, being discarded by the man on whom they were bestowed. Of this quarrel Lord Tyrconnel and Mr Savage assigned very different reasons. Our author's known character pleads too strongly against him; for his conduct was ever such as made all his friends, sooner or later, grow weary of him, and even forced most of them to become his enemies.

Being thus once more turned adrift upon the world, Savage, whose passions were very strong, and whose gratitude was very small, became extremely diligent in exposing the faults of Lord Tyrconnel. He, moreover, now thought himself at liberty to take revenge upon his mother, in a poem called The Bastard. This poem had an extraordinary sale; and its appearance happening when his mother was at Bath, many persons there took frequent opportunities of repeating passages from the Bastard in her hearing.

Some time after this, Savage formed the resolution of applying to the queen. With this view, he published a poem on her birth-day, which he entitled the Volunteer-Laureat; for which she was pleased to send him L.50, with an intimation that he might annually expect the same bounty. But this annual allowance was nothing to a man of his strange and singular extravagance. His usual custom was, as soon as he had received his pension, to disappear with it, and secrete himself from his most intimate friends, till every shilling of the L.50 was spent; which done, he appeared again, pennyless as before. But he would never inform any person where he had been, or in what manner his money had been dissipated. From the reports, however, of some, who found means to penetrate his haunts, it would seem that he expended both his time and his cash in the most sordid and despicable sensuality.

His wit and parts, however, still raised him new friends as fast as his behaviour lost him his old ones. Yet such was his conduct, that occasional relief only furnished the means of occasional excess; and he defeated all attempts made by his friends to fix him in a decent way. He was even reduced so low as to be destitute of a lodging, insomuch that he often passed his nights in those mean houses that are set open for casual wanderers; sometimes in cellars, amidst the riot and filth of the most profligate of the rabble; and not seldom would he walk the streets till he was weary, and then lie down in summer on a hulk, or in winter with his associates among the ashes of a glass-house.

Yet, amidst all this penury and wretchedness, had this man so much pride, and so high an opinion of his own merit, that he was always ready to repress, with scorn and contempt, the least appearance of any slight or indignity towards himself, in the behaviour of his acquaintance, among whom he looked upon none as his superior. This life, unhappy as it may be imagined, was yet rendered more so by the death of the queen in 1738, which stroke deprived him of all hopes from the court. His pension was discontinued, and the insolent manner in which he demanded of Sir Robert Walpole to have it restored, for ever cut off this considerable supply.

His distress became now so great and so notorious, that a scheme was at length concerted for procuring him a permanent relief. It was proposed that he should retire into Wales, with an allowance of L.50 per annum, on which he was to live privately in a cheap place, for ever quitting his town haunts, and resigning all further pretensions to fame. This offer he seemed gladly to accept; but his intentions were only to deceive his friends, by retiring for a while, to write another tragedy, and then to return with it to London in order to bring it upon the stage.

In 1739 he set out in the Bristol stage-coach for Swansey, and was furnished with fifteen guineas to bear the expense of his journey. But, on the fourteenth day after his departure, his friends and benefactors, the principal of whom was Mr Pope, who expected to hear of his arrival in Wales, were surprised with a letter from Savage, informing them that he was yet upon the road, and could not proceed for want of money. There was no other method than a remittance, which was sent him, and by the help of which he was enabled to reach Bristol, whence he was to proceed to Swansey by water. At Bristol, however, he found an embargo laid upon the shipping, so that he could not immediately obtain a passage. Here, therefore, being obliged to stay for some time, he, with his usual facility, so ingratiated himself with the principal inhabitants, that he was frequently invited to their houses, distinguished at their public entertainments, and treated with a regard that highly flattered his vanity, and therefore easily engaged his affections. At length, with great reluctance, he proceeded to Swansey, where he lived about a year, very much dissatisfied with the diminution of his salary; for he had, in his letters, treated his contributors so insolently, that most of them withdrew their subscriptions. Here he finished his tragedy, and resolved to return with it to London; which was strenuously opposed by his great and constant friend Mr Pope, who proposed that Savage should put this play into the hands of Mr Thomson and Mr Mallet, in order that they might fit it for the stage, that his friends should receive the profits it might bring in, and that the author should receive the produce by way of annuity. This kind and prudent scheme was rejected by Savage with the utmost contempt. He declared he would not submit his works to any one's correction; and that he should no longer be kept in leading-strings. He soon returned to Bristol in his way to London; and there meeting with a repetition of the same kind treatment he had before found, he was tempted to make a second stay in that opulent city. Here he was again not only caressed and treated, but the sum of L.30 was raised for him, with which it had been happy if he had immediately departed for London. But he never considered that a frequent repetition of such kindness was not to be expected, and that it was possible to tire out the generosity of his Bristol friends, as he had before tired his friends everywhere else. In short, he remained here till his company was no longer welcome. His visits in every family were too often repeated; his wit had lost its novelty, and his irregular behaviour grew troublesome. Necessity came upon him before he was aware. His money was spent, his clothes were worn out, his appearance was shabby, and his presence was disgustful at every table. He now began to find every man from home at whose house he called. Thus reduced, it would have been prudent in him to have withdrawn from the place; but prudence and Savage were never acquainted. He staid, in the midst of poverty, hunger, and contempt, till the mistress of a coffee-house, to whom he owed about eight pounds, arrested him for the debt. He remained for some time, at a great expense, in the house of the sheriff's officer, in hopes of procuring bail; which expense he was enabled to defray by a present of five guineas from Mr Nash. No bail, however, was to be found, so that poor Savage was at last lodged in Newgate, a prison so named in Bristol.

But it was the fortune of this extraordinary mortal always to find more friends than he deserved. The keeper of the prison took compassion on him, and greatly softened the rigours of his confinement by every kind of indulgence. He supported him at his own table, gave him a commodious room to himself, allowed him to stand at the door of the jail, and even frequently took him into the fields for the benefit of the air and exercise; so that, in reality, Savage endured fewer hardships in this place than he had usually suffered during the greater part of his life. Whilst he remained in this not intolerable prison, his ingratitude again broke out, in a bitter satire on the city of Bristol, to which he certainly owed great obligations, notwithstanding the circumstances of his arrest, which was but the act of an individual, and that attended with no circumstances of injustice or cruelty.

When Savage had remained about six months in this hospitable prison, he received a letter from Mr Pope, who still continued to allow him L.20 a year, containing a charge of very atrocious ingratitude. What were the particulars of this charge we are not informed; but, from the notorious character of the man, there is reason to fear that Savage was but too justly accused. He, however, solemnly protested his innocence; but he was very unusually affected on this occasion. In a few days afterwards he was seized with a disorder, which at first was not suspected to be dangerous; but growing daily more languid and dejected, at last a fever seized him, and he expired on the 1st of August 1743, in the forty-sixth year of his age.

SAVANNAH, formerly the capital of Georgia, in North America. This city is advantageously situated for a commercial town, being accessible to large vessels from the sea, and communicating with the interior by the noble river of the same name. It is built on a high bank rising about forty feet above the water; and its spacious and regular streets and handsome buildings, mingling with the groves of ornamental trees, have an imposing appearance. The site was formerly unhealthy, on account of the surrounding swamps; but this evil has been remedied by judicious drainings, and by the substitution of the dry for the wet cultivation of rice around the city. Savannah was founded by General Oglethorpe in 1733, on a spot then known as the Yamacrow Bluff. It was captured by the British in 1778, and unsuccessfully besieged and assaulted by the French and Americans in the following year. In 1820 it suffered so much from a terrible fire, that its prosperity received a temporary check, and the population, which in 1820 had been 7523, was only 7423 in 1830; but it has since recovered from this shock, and has been for a number of years one of the most flourishing towns in the southern states, its population having increased to about 11,000 in 1835. Although the railroad from Augusta to Charlestown, and the security of the inland passage from the Savannah to that city, have of late tended to divert much of the trade thither, yet Savannah is the chief commercial dépôt in the state, and much of the cotton and rice of Georgia, with large quantities of the other exported articles, are shipped from its wharfs. In 1835, the exports included 250,000 bales of cotton, and 24,000 casks of rice; and the whole value of exported articles in 1836 amounted to 15,469,000 dollars. Twenty steam-boats of a large class, and fifty steam tug-boats, are employed on the river; and the shipping of the port amounts to 8375 tons. The banking institutions in the city are five, with an aggregate capital of 1,682,525 dollars. Long. 81. 10. W. Lat. 32. 8. N.

SAVARY, James, an eminent French writer on the subject of trade, was born at Done, in Anjou, in 1622. Being bred to merchandise, he continued in trade until 1658, when he left off the practice, to cultivate the theory. He had married in 1650; and in 1660, when the king declared his purpose of assigning privileges and pensions to such of his subjects as had twelve children alive, Mr Savary was not too rich to put in his claim to the royal bounty. He was afterwards admitted of the council for the reformation of commerce, and the orders which passed in 1670 were drawn up by his instructions and advice. He wrote *Le Parfait Negociant*, 4to; and *Avis et Conseils sur les Importantes Matières du Commerce*, in 4to. He died in 1690; and out of seventeen children whom he had by one wife, he left eleven. Two of his sons, James and Philemon Louis, laboured jointly on a great work, *Dictionnaire Universelle du Commerce*, in two vols. folio. This work was begun by James, who was inspector-general of the manufactures at the custom-house, Paris, and who called in the assistance of his brother Philemon Louis, although a canon of the royal church of St Maur, and by his death left him to finish it. This work appeared in 1723, and Philemon afterwards added a third supplemental volume. Postlethwayte's English Dictionary of Trade and Commerce is a translation, with considerable improvements, from Savary.

SAVARY, *M.*, an eminent French traveller and writer, was born at Vitre, in Bretagne, about the year 1748. He studied with applause at Rennes, and in 1776 travelled into Egypt, where he remained nearly three years. During this period he was wholly engaged in the study of the Arabian language, in searching out ancient monuments, and in examining the national manners. After making himself acquainted with the knowledge and philosophy of Egypt, he visited the islands in the Archipelago, where he spent eighteen months. On his return to France in the year 1780, he published, 1. A Translation of the Koran, with a short Life of Mahommed, in 1783, two vols. 8vo; 2. The Morality of the Koran, or a Collection of the most excellent Maxims in the Koran; 3. Letters on Egypt, in three vols. 8vo, in 1785. In these the author makes his observations with accuracy, paints with vivacity, and renders interesting every thing he relates. His descriptions are in general faithful, but are perhaps in some instances too much ornamented. He has been justly censured for painting modern Egypt and its inhabitants in too high colours. He died on the 4th of February 1788.

SAVE, a river of Germany, which has its source in Upper Carniola, on the frontiers of Carinthia. It runs through Carniola from west to east, afterwards separates Sclavonia from Croatia, Bosnia, and part of Servia, and then falls into the Danube at Belgrade.

SAVENAY, an arrondissement of the department of the Lower Loire, in France, extending over 210,279 hectares, which, in English measure, is equal to 739¼ square miles. It is divided into eleven cantons, and these into fifty-one communes, with (in 1836) 114,256 inhabitants. The capital is a town of the same name, which, in 1836, contained 2079 inhabitants.

SAVENDROOG, a celebrated fortress of the south of India, in Mysore. It is strongly situated on the summit of an immense rock, half a mile in nearly perpendicular height, and surrounded by a thick wood. It was taken by the British in 1791, without the loss of a man. Long. 77. 29. E. Lat. 12. 56. N.

SAVERNE, an arrondissement of the department of the Lower Rhine, in France. Its extent is 297,104 acres, equal to 464 square miles; and is divided into seven cantons, and these into 165 communes, with a population, in the year 1836, of 112,260 persons. The capital, a city of the same name, stands on the river Zorn, at the foot of the Vosges Mountains, in one of the most luxuriant parts of ancient Alsace. It is antiquely built, and contains 5352 inhabitants, who generally speak the German language. Long. 7. 48. 21. E. Lat. 48. 44. 20. N.

SAVIGLIANO, a city of Italy, in the kingdom of Sardinia and province of Turin. It stands on a fine plain watered by the river Maira. It is well built, and has a fine market-place, magnificent palaces, several churches and monasteries, and 18,750 inhabitants, among whom are many of the nobility. It has some considerable manufactures of silk and linen goods, and considerable trade in cattle, wine, and corn, especially in maize. Long. 6. 33. E. Lat. 44. 30. N.

SAVIGNANO, a town of Italy, in the papal delegation

SAVINGS BANKS are institutions established by act of parliament, for the safe custody of small sums deposited by the industrious classes, and for the accumulation of such sums at compound interest. The origin of savings banks is comparatively recent. Attempts at instituting such banks were made, on a small scale, at various places in England towards the end of last century and the beginning of the present: attempts of a private and isolated nature, without the benevolent individuals by whom they were made entertaining any idea of the institution ever becoming general; and it was reserved for an individual yet living to have the honour of founding an institution which served as a model for such banks, and thus of conferring an unspeakable blessing on the operative classes. We refer to the Rev. Dr Duncan, minister of Ruthwell in Dumfriesshire. In 1810 he established "the Parish Bank Friendly Society of Ruthwell;" and during the same year published a pamphlet on the subject, entitled "An Essay on the Nature and Advantages of Parish Banks." This pamphlet, in which the nature and advantages of these institutions are ably developed, had so great an effect, and the success of the Ruthwell institution had been so remarkable, that "Parish Banks," as Dr Duncan called them, but which are now described as Savings Banks, speedily sprung up, not only in most of the principal towns and boroughs of Scotland, but in several remote parishes.

Savings banks in England and Ireland were first taken under the protection of government by the act of 57th Geo. III. cap. 62, passed in 1817; but the first act in support of these institutions in Scotland did not pass till two years afterwards. A savings bank in Scotland, established under the latter act, is an institution formed by any number of persons who may choose to unite for the purpose of receiving deposits of small sums, and who, upon enrolling their rules at the quarter-sessions, acquire the privilege of suing and being sued in the name of trustees. The money and effects of the institution are vested in the trustees, for behoof of the depositors. Receipts and other documents used by the bank are exempted from stamp-duties; and provision is made by the act for a summary mode of settling disputes that may arise between the trustees and depositors. These were all the advantages which the act conferred on savings banks in Scotland. Hence these institutions did not flourish; the aggregate sums deposited in them at the period (1835) when the privileges of the English system were extended to Scotland not being estimated higher than L.100,000.

Various acts were meanwhile passed for the support of these institutions in England and Ireland; but all these statutes were consolidated in the existing English Savings Bank Act of 9th Geo. IV. cap. 92, passed in 1828, which was amended in a few particulars by the act of 3d Will. IV. cap. 14. These acts, as previously stated, were extended to Scotland in 1835.

By this statute the whole deposits may be invested in the Bank of England on account with the Commissioners for the Reduction of the National Debt, at the rate of L.3. 16s. 0½d. per cent. of interest. The savings banks are thus enabled to give a comparatively high rate of interest, which is generally L.3. 6s. 8d., or 3⅓ per cent. Each individual is allowed to deposit any sum from one shilling up to L.30 in a year, and L.150 in all, exclusive of interest; and, including interest, L.200. The bank is obliged to allow compound interest; and this interest must be made up by law at the end of every year (20th November), and added to the amount belonging to each depositor, even though he does not appear to get his book balanced. The bank is also authorized to receive the funds of friendly societies without limitation, and of benevolent and charitable institutions to the amount of L.300 in all. By this statute the whole funds are required to be invested with the National Debt Commissioners, and nowhere else; and any part of these funds, when required, is repaid by the Bank of England, without regard to fluctuations in the value of the public stocks. It likewise requires security to be given by every person—the treasurer, the actuary, the cashier, the clerks, the office-keeper—intrusted with the receipt or custody of any sum of money belonging to a savings bank; while neither these functionaries, nor the managers or trustees, nor any person having a control or direction in the management, can become depositors in the bank, or derive, directly or indirectly, any benefit from the institution. Annual returns must be made to the National Debt Office, and likewise suspended in the office of the bank, and exhibited to depositors; the manager and trustees being thus directly responsible both to the government and to the public. In short, while the greatest facilities are afforded for the increase of the funds, every possible precaution has been taken to insure their safe custody, and the direct responsibility of the managers. Nay, so liberal is the system, that the annual general meeting is open by law to depositors of the amount of L.10; but, practically speaking, every depositor who chooses is allowed to attend. Besides, the rules and regulations of every savings bank require to be approved by the Commissioners of the National Debt, and certified by the barrister-at-law appointed for the purpose, and enrolled at the quarter-sessions of the justices of the peace for the county in which the bank is situated. It may here be mentioned, that, to prevent an abuse of the institution, no person is allowed by law to be a depositor in two savings banks at the same time; and on joining a savings bank, every person is required to sign a declaration to that effect.

The act 2d and 3d Will. IV. enables depositors in savings banks, and others, to purchase government annuities, for life or for a given number of years, and either immediate or deferred. At present these annuities are limited to L.20 a year. The money advanced is returned (but without interest), provided the contracting party does not live to the age at which the annuity is to become payable, or is unable to continue the monthly or annual instalments. The transactions under the act are to be carried on through the medium of savings banks, or by societies established for the purpose. But of this scheme, the classes for whose benefit it was intended have not availed themselves to any great extent.

Since their establishment in 1817, the increase of savings banks has been beyond all expectation. The total sum of money invested by these institutions in England, Wales, and Ireland, amounts at this moment (1841) to upwards of L.22,000,000 sterling; while in Scotland, since 1835, when the English law on the subject was extended to that part of the united kingdom, the progress has also been very considerable; savings banks having been established in most of the principal towns; while, in many places, such institutions still exist, and are flourishing, under the meagre and defective statute of 1819. The National Security Savings Bank of Edinburgh was founded in April 1836; and on the 20th November 1841, after the lapse of only five years and a half, it had accumulated L.221,816. 19s. 0d., including interest; while the aggregate number of depositors was no fewer than 19,130, of whom 16,149 had balances (including interest) in their favour not exceeding L.20 each. Of this bank, 107 charitable societies, whose united deposits amounted to L.5215. 1s. 2d., had availed themselves; and sixty-two friendly societies, whose gross deposits amounted to L.216,585. 13s. 5d.

The object and principle of this great national institution cannot be too highly commended. In London, and many other parts of England, public banks do not receive small deposits, and upon none do they pay any interest. And even in Scotland, where the public banks allow interest on deposits, they are not willing to open an account under L.10. But few poor persons are able to save so large a sum, except by a lengthened course of economy. The truth therefore is, that, until savings banks were established, the poor were everywhere without the means of securely and profitably investing those small sums which they are not unfrequently in a condition to save, and were consequently led, from the difficulty of disposing of them, to neglect opportunities of making savings, or, if they did make them, were tempted by the offer of high interest to lend them to persons of doubtful character and desperate fortune, by whom they were for the most part squandered. Under such circumstances, it is plain that nothing could be more important in the way of diffusing habits of forethought and economy among the labouring classes than the establishment of savings banks, where the smallest sums are placed in perfect safety, are accumulated at compound interest, and are paid, with their accumulations, the moment they are demanded by the depositors.

But, notwithstanding the soundness of these views, various objections have been stated against these institutions. To a few only of these objections can we at present allude.

It has, for example, been objected to savings banks that the money deposited in them being sent to London and invested in national stock, is withdrawn from the spot where it was saved, and that thereby that spot is impoverished in proportion to the amount of the sum thus transferred. This objection is more specious than solid. In the first place, nine tenths of the money invested in savings banks would not be saved at all, but spent as it is earned, if these institutions did not exist. The savings bank does not transmit to London money already saved. It causes money to be saved which otherwise would have been spent. It may be said to *create* money; and it is only the fund which it creates that it transmits to London and invests in national stock. But, in the second place, no man is obliged to put his money into a savings bank, and thus to send it to London; nor will he ever dream of doing so, if he can invest it more profitably at home. Profitable and safe investment is the sole object, and money is always sure to go where it can be most profitably employed. The circumstance of an individual putting his earnings into a savings bank, affords a proof that such a mode of investment is regarded by him as the most eligible. Besides, he will at once recall it from the savings bank, which he is entitled to do, if he find he can invest it elsewhere more profitably. The savings bank, therefore, is not merely the parent of saving, but its deposits embrace only those sums which cannot be otherwise so profitably employed. It withdraws no money from productive industry. It merely embraces funds which cannot otherwise be so favourably employed, or which might not have existed, or have been placed in improper hands, and lost to the individual.

But there is no objection, no general or national objection to money being sent to London. The money thus disposed of is invested by the National Debt Commissioners, as agents, in stock; which is the same thing as if it were directly invested in productive industry. These commissioners, for example, have bought stock with the twenty-two millions of money belonging to the savings banks throughout England, Wales, and Ireland; and when they so bought in, other parties must necessarily have sold out. For any given amount of buying there must be an equal amount of selling. Now the money thus sold out will not lie idle, because money in a free country never lies idle, but will be invested in productive industry; and it is evidently the same thing for the country as if the twenty-two millions of the savings banks, instead of being converted into stock, had been at once employed in productive industry, as the money in the stocks which it displaced is so invested.

The only other objection of which we shall take notice is the following; namely, that as the money of savings banks goes into the hands of government, the minister of the day may avail himself of it, and use it for public purposes; that the depositors have only government security; and that if a revolution should take place, the funds would all be lost.

These objections, however formidable in appearance, are in reality quite fanciful and untenable. It cannot, with any degree of truth, be said that the money of savings banks goes into the hands of government. The money is invested in the Bank of England, and the National Debt Commissioners are appointed by law to purchase national stock with it. Government does not touch a fraction of the funds. Such money no more goes into the hands of the minister of the day, than the funds of any corporate body or private individual who purchases stock. Parliament passed a law for the encouragement of savings banks, and for the safe custody and increase of their funds, which law, under certain conditions, provides that these funds may be sent through the Bank of England to the National Debt Commissioners; that these commissioners shall buy stock with them, or, in other words, invest them in government securities, and allow the depositors a certain rate of interest, or, at their option, to withdraw their funds in full, without reference to the existing state of the public securities. Now, these commissioners, when the money comes into their hands, *must* buy stock with it, and return proper vouchers to the savings banks. The commissioners have been exposed to much additional labour in consequence of the great spread of savings banks; but they cost these banks nothing; for though their duty is imperative, their services are gratuitous.

It is thus evident that the funds of savings banks neither go nor can go into the hands of government. The law provides the very reverse. As well might it be said that any funds invested in national stock has this destination. But though the government does not and dares not use one fraction of the funds of these institutions, it is undoubtedly security for the money. But can the world afford higher security than that of this intelligent, free, and wealthy nation? As to a revolution, the people of this country are too intelligent, and value too much the institutions under which they live, to render such an event at all probable; but even should a season of anarchy occur, the constitution has so much elasticity and solidity in it, that, under well-directed public intelligence, it would soon recover and right itself. Besides, in all civilized countries, as was recently proved in France and Belgium, a revolution generally respects private property. In this case, the funds of savings banks would certainly be as secure, indeed we should say a great deal more secure, than any other species of property whatever. Besides, the very circumstance of a large portion of the people, as the depositors in savings banks, having a deep interest in the stability of government, would make them constitutionally to resist, not wantonly to promote, civil commotion. "Every person," says Mr Tidd Pratt, "who has vested his savings in the public funds, has a stake in the security of the country, proportioned not merely to the sum total of those savings, but to the value of that sum to himself, and will be deterred from compassing the disturbance of his native land by a personal motive, added to the influence of duty. He will feel the importance of public peace and public credit with that strong conviction which individual interest never fails to inspire; and in answer to the objections of those who would be jealous of the support thus obtained to the ruling powers, it should be observed, that he who possesses property in a country is not interested in the stability of the administration for the time being, but in the perpetual stability of universal order and good government."—(Hist. of Savings Banks, p. 21, ed. 1830.)

(C. I.)

of Forli. It contains 5100 inhabitants, mostly very poor, who are chiefly occupied in winding silk.

SAVILE, Sir George, afterwards Marquis of Halifax, and one of the greatest statesmen of his time, was born about the year 1630; and some time after his return from his travels was created a peer, in consideration of his own and his father's merits. He was a strenuous opposer of the bill of exclusion, but proposed such limitations of the Duke of York's authority as should disable him from doing any harm either to church or state; as the taking out of his hands all power in ecclesiastical matters, the disposal of the public money, and the power of making peace and war, and lodging these in the two houses of parliament. After that bill was rejected in the House of Lords, he pressed them, though without success, to proceed to the limitation of the duke's power; and began with moving, that during the king's life he might be obliged to live five hundred miles out of England. In August 1682 he was created a marquis, and soon after made privy-seal. Upon King James's accession, he was made president of the council; but on his refusal to consent to the repeal of the test act, he was dismissed from all public employments. In that assembly of the Lords which met after King James's withdrawing himself the first time from Whitehall, the marquis was chosen their president; and upon the king's return from Feversham, he was sent, together with the Earl of Shrewsbury and Lord Delamere, from the Prince of Orange, to order his majesty to quit the palace at Whitehall. In the convention of parliament he was chosen speaker of the House of Lords, and strenuously supported the motion for the vacancy of the throne, and the conjunctive sovereignty of the prince and princess, upon whose accession he was again made privy-seal. Yet, in 1689, he quitted the court, and became a zealous opponent of the measures of government till his death, which happened in April 1695. Mr Grainger observes, that "he was a person of unsettled principles, and of a lively imagination, which sometimes got the better of his judgment. He would never lose his jest, though it spoiled his argument, or brought his sincerity or even his religion in question. He was deservedly celebrated for his parliamentary talents; and in the famous contest relating to the bill of exclusion was thought to be a match for his uncle Shaftesbury. The pieces he has left us show him to have been an ingenious, if not a masterly writer; and his Advice to a Daughter contains more good sense in fewer words than is, perhaps, to be found in any of his contemporary authors." His lordship also wrote, the Anatomy of an Equivalent; a Letter to a Dissenter; a Rough Draught of a New Model at Sea; and Maxims of State; all which were printed together in one volume 8vo. Since these there were also published under his name, the Character of King Charles II. 8vo; the Character of Bishop Burnet, and Historical Observations upon the Reigns of Edward I. Edward II. Edward III. and Richard II. with Remarks upon their faithful Counsellors and false Favourites.

SAVILLE, Sir Henry, a learned Englishman, was the second son of Henry Saville, and was born at Bradley, near Halifax, in Yorkshire, on the 30th of November 1549. He entered of Merton College, Oxford, in 1561, where he took the degrees in arts, and was chosen fellow. When he proceeded master of arts in 1570, he read for that degree in the Almagest of Ptolemy, which procured him the reputation of a man eminently skilled in the mathematics and the Greek language; in the former of which he voluntarily read a public lecture in the university for some time.

In 1578 he travelled into France and other countries, where, diligently improving himself in all useful learning, in languages, and in the knowledge of the world, he became a most accomplished gentleman. At his return he was made tutor in the Greek tongue to Queen Elizabeth, who had a great esteem for him.

Saville.

In 1585 he was made warden of Merton College, which he governed thirty-six years with great honour, and improved it by all the means in his power. In 1596 he was chosen provost of Eton College, which he filled with many learned men. James I. upon his accession to the crown of England, expressed a great regard for him, and would have preferred him either in church or state; but Saville declined it, and only accepted the ceremony of knighthood from the king, at Windsor, in 1604. His only son Henry dying about that time, he thenceforth devoted his fortune to the promoting of learning. Among other things, in 1619, he founded, in the university of Oxford, two lectures or professorships, one in geometry, and the other in astronomy, which he endowed with a salary of L.160 a year each, besides a legacy of L.600 to purchase more lands for the same use. He also furnished a library with mathematical books, near the mathematical school, for the use of his professors, and gave L.100 to the mathematical chest of his own appointing; adding afterwards a legacy of L.40 a year to the same chest, to the university, and to his professors jointly. He likewise gave L.120 towards the new building of the schools, besides several rare manuscripts and printed books to the Bodleian Library, and a good quantity of Greek types to the printing press at Oxford.

After a life thus spent in the encouragement and promotion of science and literature in general, he died at Eton College on the 19th of February 1622, in the seventy-third year of his age, and was buried in the chapel there. On this occasion, the university of Oxford paid him the greatest honours, by having a public speech and verses made in his praise; which were soon afterwards published in quarto, under the title of *Ultima Linea Savilii.*

The highest encomiums were bestowed on Saville by all the learned of his time; by Casaubon, Mercerus, Meibomius, Joseph Scaliger, and especially the learned Bishop Montague, who, in his *Diatribæ* upon Selden's History of Tythes, styles him, "that magazine of learning, whose memory shall be honourable amongst not only the learned, but the righteous, for ever." His works are, 1. Four Books of the Histories of Cornelius Tacitus, and the Life of Agricola, with Notes upon them, in folio, dedicated to Queen Elizabeth, 1581. 2. A View of certain Military Matters, or Commentaries concerning Roman Warfare, 1598. 3. Rerum Anglicarum Scriptores post Bedam, 1596, a collection of the best writers of our English history. 4. The Works of St Chrysostom, in Greek, in eight vols. folio, 1613. This is a very fine edition, and composed with great cost and labour. In the preface he says, "that having himself visited, about twelve years before, all the public and private libraries in Britain, and copied out thence whatever he thought useful to his design, he then sent some learned men into France, Germany, Italy, and the East, to transcribe such parts as he had not already, and to collate the others with the best manuscripts." The whole charge of this edition, including the several sums paid to learned men, at home and abroad, employed in finding out, transcribing, and collating the best manuscripts, is said to have amounted to no less than L.8000. 5. In 1618 he published a Latin work, written by Thomas Bradwardin, archbishop of Canterbury, against Pelagius, entitled De Causa Dei contra Pelagium, et de virtute Causarum, to which he prefixed the life of Bradwardin. 6. In 1621 he published a collection of his own Mathematical Lectures on Euclid's Elements, in 4to. 7. Oratio coram Elizabetha Regina Oxoniæ habita, anno 1592, printed at Oxford in 1658, in 4to. 8. He translated into Latin King James's Apology for the Oath of Allegiance. He also left several manuscripts, written by order of King James, all which are in the Bodleian Library. He wrote notes likewise upon the margin of many books in his library, particularly Eusebius's Ecclesiastical History; which were afterwards used by Valesius in his edition of that work in 1659.

Four of his letters to Camden are published by Smith, among Camden's Letters, 1691, 4to.

SAVIOUR, an appellation which is peculiarly given to Jesus Christ, as being the Messiah and Saviour of the world. See JESUS.

SAVONA, a city of Italy, in the kingdom of Sardinia, and the province, formerly the state, of Geno. It stands on the river Ponente, near the sea, where the Egabona falls into that stream. It has a small harbour, fit only for coasting vessels, but by which trade and the fisheries are carried on in it. It is the seat of a bishop, and, besides the cathedral, has twenty parish and monastic churches. It contains 10,660 inhabitants, who manufacture silk goods, earthenware, soap, vitriol, and fire-arms. Long. 9. 25. E. Lat. 44. 16. N.]

SAVONAROLA, JEROME, a famous Italian monk, was born at Ferrara in 1452, being descended of a noble family. At the age of twenty-two he assumed the habit of a Dominican friar, without the knowledge of his parents, and distinguished himself in that order by his piety and ability as a preacher. Florence was the theatre where he chose to appear, and where he preached, confessed, and wrote. He had address enough to place himself at the head of the faction which opposed the family of the Medici. He explained the Apocalypse, and there found a prophecy which foretold the destruction of his opponents. He predicted a renovation of the church, and declaimed with much severity against the clergy and the court of Rome. Alexander VI. excommunicated him, and prohibited him from preaching. He derided the anathemas of the pope; yet he forbore for some time from preaching, and then resumed his employment with more applause than before. The pope and the Medici family then thought of attacking him with his own weapons. Savonarola having posted up a thesis as a subject of disputation, a Franciscan, at their instigation, offered to prove it heretical. The Franciscan was seconded by his brother friars, and Savonarola by his; and thus the two orders were at open war with each other. To settle the dispute, and to convince their antagonists of the superior sanctity of Savonarola, one of the Dominicans offered to walk through a fire; and in order to prove his wickedness, a Franciscan agreed to the same experiment. The multitude, eager to witness so extraordinary a spectacle, urged both parties to come to a decision; and the magistrates were constrained to give their consent. Accordingly, Saturday the 7th of April 1498 was fixed for the trial. On that day the champions appeared; but when they saw one another in cold blood, and beheld the wood in flames, they were seized with fear, and very anxious to escape, by any subterfuge, the imminent danger into which they had rashly thrown themselves. The Dominican pretended he could not enter the flames without the host in his hand. This the magistrates obstinately refused to allow; and the Dominican's fortitude was not put to the test. The Franciscans incited the multitude against their opponents, who accordingly assaulted their monastery, broke open the gates, which were shut against them, and entered by force. Upon this, the magistrates thought it necessary to bring Savonarola to trial as an impostor. He was put to the torture and examined, and the answers which he gave fully evinced that he was both a cheat and a fanatic. He boasted of having frequent conversations with God, and he found his brother friars credulous enough to believe him. One of the Dominicans who had shared in his sufferings, affirmed that he saw the Holy Ghost in the shape of a dove, with feathers of gold and silver, twice in one day alight on the shoulder of Savonarola and peck his ear; and he pretended also that he had violent combats with demons. John Francis Picus, count of Mirandola, who wrote his life, assures us that the devils which infested the convent of the Dominicans trembled at the sight of Friar Jerome, and that out of vexation they always suppressed some letters of his name in pronouncing it. He expelled them from all the cells of the monastery. When he went round the convent sprinkling holy water to defend the friars from the insults of the demons, it is said that the evil spirits spread thick clouds before him to prevent his passage. At length, the Pope Alexander VI. sent the chief of the Dominicans, with Bishop Romolino, to degrade him from holy orders, and to deliver him up to the secular judges with his two fanatical associates. They were condemned to be hanged and burned on the 23d of May 1498. Savonarola submitted to the execution of the sentence with great firmness and devotion, and without uttering a word respecting his guilt or his innocence. He was in the forty-sixth year of his age. His works have been published at Leyden in six vols. 12mo.

SAVOY. See SARDINIA.

SAVU, an island in the Eastern Seas, about twenty miles in length, low at the sea-coast, but towards the middle rising into considerable hills. According to Captain Cook and other navigators, it presents a delightful prospect from the sea. The inhabitants have made some approaches to civilization, and the island is divided into five principalities. Long. 122. 30. E. Lat. 10. 35. S.

SAW, an instrument which serves to cut into pieces several solid matters, as wood, stone, ivory, and the like.

The best saws are of tempered steel ground bright and smooth; those of iron are only hammer-hardened. Hence the first, besides their being stiffer, are likewise found smoother than the last. They are known to be well hammered by the stiff bending of the blade; and to be well and evenly ground, by their bending equally in a bow.

The lapidaries, too, have their saw, as well as the workmen in mosaic; but of all mechanics, none have so many saws as the joiners, the chief of which are the following. The pit-saw, which is a large two-handed saw, employed for sawing timber in pits, and chiefly used by the sawers. The whip-saw, which has likewise two handles, used in sawing such large pieces as the hand-saw will not easily reach. The hand-saw is made to be used by an individual, of which there are different kinds, as the frame-saw, which is furnished with cheeks. By the twisted cords which pass from the upper parts of these cheeks, and the tongue in the middle of them, the upper ends are drawn close together, and the lower set farther asunder. The tenon-saw, which being very thin, has a back to keep it from bending. The compass-saw, which is very small, and its teeth usually not set. Its use is to cut a round, or any other compass-kerf, on which account the edge is made broad, and the back thin, that it may have a compass to turn in.

At an early period, the trunks of trees were split with wedges into as many and as thin pieces as possible; and if it were necessary to have them still thinner, they were hewn on both sides to the proper size. This simple and wasteful manner of making boards has been still continued in some places to the present day. Peter the Great of Russia endeavoured to put a stop to it, by forbidding hewn dales to be transported on the river Neva. The saw, however, though so convenient and beneficial, has not been able to banish entirely the practice of splitting timber used in building, or in making furniture and utensils; and indeed it must be allowed that this method is attended with peculiar advantages which that of sawing can never possess. The wood-splitters perform their work more expeditiously than sawers, and split timber is much stronger than that which has been sawn: for the fissure follows the grain of the wood, and leaves it whole; whereas the saw, which proceeds in the line chalked out for it, divides the fibres, and by these means lessens its cohesion and solidity. Split timber, indeed, turns out often crooked and warped; but for many purposes to which it is applied this is not injurious, and these faults may sometimes be amended. As the fibres, however, retain their natural length and direction, thin

Saw-Mills.

boards particularly can be bent much better. This is a great advantage in making pipe-staves, or sieve-frames, which require still more art, and in forming various implements of a similar kind.

Our common saw, which requires only to be guided by the hand, however simple it may be, was not known to the inhabitants of America when they were subdued by the Europeans. The inventor of this instrument has been inserted in their mythology by the Greeks, with a place, in which, amongst their gods, they honoured the greatest benefactors of the earliest ages. By some he is called Talus, and by others Perdix. None except Pliny make Dædalus the inventor; but Hardouin, in the passage where this occurs, reads Talus for Dædalus. Talus is the name of the inventor according to Diodorus Siculus, Apollodorus, and others. He was the son of Dædalus's sister, and was by his mother placed under the tuition of her brother, to be instructed in his art. Having found the jaw-bone of a snake, he employed it to cut through a small piece of wood, and by these means was induced to fabricate a similar instrument of iron, that is, to make a saw. This invention, by which labour is greatly facilitated, excited the envy of his master, and prompted him to put Talus privately to death. Being asked, when burying the body, what he was depositing in the earth, he replied, a serpent. This ambiguous answer discovered the murder; and thus a snake was the cause of the invention, of the murder, and of its being brought to light. By others the inventor is called Perdix, who is supposed to have been the son of a sister of Dædalus. Perdix did not employ the jaw-bone of a snake for a saw, but the back-bone of a fish, as is mentioned by Ovid.

The saws of the Grecian carpenters had the same form, and were made with equal ingenuity as the same instruments at present. This appears from a painting preserved among the antiquities of Herculanum. Two genii are represented at the end of a bench consisting of a long table resting on two four-footed stools, and the piece of wood to be sawn through is secured by cramps. The saw with which the genii are at work bears a striking resemblance to our frame-saw. It consists of a square frame, having a blade in the middle, the teeth of which are perpendicular to the plane of the frame. The piece of wood to be sawn extends beyond the end of the bench, and one of the workmen appears standing, and the other sitting on the ground. The arms in which the blade is fastened have the same form as that which is given to them at present. In the bench are seen holes, in which the cramps holding the timber are stuck. They are shaped like the figure 7; and the ends of them reach below the boards which form the top of it.

Saw-Mills. The most beneficial improvement of the operation of sawing was the invention of saw-mills, which are driven either by water or by wind. Mills of the first kind were erected in Germany, on the small river Ruer, as early as the fourth century. The art of cutting marble with a saw is very ancient. According to Pliny, it was invented in Caria. Stones of the soap-rock kind, which are softer than marble, were sawn at that period; but it appears that the harder kinds of stone were also then sawn; for we are informed of the discovery of a building which was encrusted with cut agate, carnelian, lapis lazuli, and amethysts. There is, however, no account in any of the Greek or Roman writers of a mill for sawing wood; and as modern authors speak of saw-mills as new and uncommon, it appears that the oldest construction of them has been forgotten, or that some interesting improvement has made them appear entirely new.

Becher says that saw-mills were invented in the seventeenth century, which is a mistake; for when the Infant Henry sent people to settle in the island of Madeira, discovered in 1420, he gave orders for saw-mills to be erected, for the purpose of sawing into deals the various species of excellent timber with which the island abounded, and which were afterwards exported to Portugal. There was a saw-mill in the city of Breslau about the year 1427, producing a yearly rent of three merks; and in 1490, the magistrates of Erfurt purchased a forest, in which they erected a saw-mill, besides renting another in the neighbourhood. The first saw-mill in Norway was erected about the year 1530. In the year 1552 there was a saw-mill erected at Joachimsthal, the property of a mathematician called Jacob Geusen. In 1555, the Bishop of Ely, ambassador from Queen Mary of England to the court of Rome, having seen a saw-mill in the vicinity of Lyons, the writer of his travels gave a particular description of it. The first saw-mill was erected in Holland at Saardam in 1596, the invention of which is ascribed to Cornelius Cornelissen. The first mill of this kind in Sweden was erected in the year 1653.

Saw-Mills.

In England, saw-mills had at first a similar effect with printing in Turkey, the ribbon-loom in the dominions of the church, and the crane at Strasburg. When attempts were made to introduce them, they were violently opposed, because it was apprehended that the sawers would thus be deprived of the means of procuring subsistence. An opulent merchant in 1767 or 1768, by desire of the Society of Arts, caused a saw-mill to be erected at Limehouse, driven by wind; but it was demolished by the mob, and the damage was sustained by the nation, while some of the rioters were punished. This, however, was not the only mill of the kind then in Great Britain; for at Leith there was one driven by wind some years before. Saw-mills are very common in America, where the moving power is generally water. Some have been constructed on a very extensive plan.

The mechanism of a sawing-mill may be reduced to three principal things. The first is, that the saw is drawn up and down as long as is necessary, by a motion communicated to the wheel by water. The second is, that the piece of timber to be cut into boards is advanced by an uniform motion to receive the strokes of the saw; for here the wood is to meet the saw, and not the saw to follow the wood, therefore the motion of the wood and that of the saw ought immediately to depend the one on the other. The third is, that where the saw has cut through the whole length of the piece, the whole machine stops of itself, and remains immoveable; lest having no obstacle to surmount, the moving power should turn the wheel with too great velocity, and break some part of the machine.

When a completely cylindrical pillar is to be cut out of one block of stone, the first thing will be to ascertain in the block the position of the axis of the cylinder, then lay the block so that such axis shall be parallel to the horizon, and let a cylindrical hole of from one to two inches diameter be bored entirely through it. Let an iron bar, whose diameter is rather less than that of this tube, be put through it, having just room to slide freely to and fro as occasion may require. Each end of this bar should terminate in a screw, on which a nut and frame may be fastened. The nut-frame should carry three flat pieces of wood or iron, each having a slit running along its middle from nearly one end to the other, and a screw and handle must be adapted to each slit. By these means the frame-work at each end of the bar may readily be so adjusted as to form equal isosceles or equilateral triangles; the iron-bar will connect two corresponding angles of these triangles, the saw to be used two other corresponding angles, and another bar of iron or of wood the two remaining angles, to give sufficient strength to the whole frame. By this construction the workmen are enabled to place the saw at any proposed distance from the hole drilled through the middle of the block; and then, by giving the alternating motion to the saw-frame, the cylinder may at length be cut from the block, as required.

If it were proposed to saw a conic frustum from such a block, then let two frames of wood or iron be fixed to those parallel ends of the block which are intended to coincide with the bases of the frustum, circular grooves being previously cut in these frames to correspond with the circumferences of the two ends of the proposed frustum; the saw being worked in these grooves will manifestly cut the conic surface from the block. This, we believe, is the contrivance of Sir George Wright.

The best method of drilling the hole through the middle of the proposed cylinder seems to be this. On a carriage running upon four low wheels let two vertical pieces, each having a hole just large enough to admit the borer to play freely, be fixed two or three feet asunder, and so contrived that the pieces and holes to receive the borer may, by screws, be raised or lowered at pleasure, while the borer is prevented from sliding to and fro by shoulders upon its bar, which are larger than the holes in the vertical pieces, and which, as the borer revolves, press against those pieces; let a part of the boring bar between the two vertical pieces be square, and a grooved wheel with a square hole of a suitable size be placed upon this part of the bar; then the rotatory motion may be given to the bar by an endless band which shall pass over this grooved wheel and a wheel of a much larger diameter in the same plane, the latter wheel being turned by a winch-handle in the usual way.

Circular saws, acting by a rotatory motion, have been long known in Holland, where they are used for cutting wood used in veneering. They were introduced into this country, we believe, by General Bentham, and are now used in the dock-yard at Portsmouth, and in a few other places; but they are not as yet so generally adopted as might be wished, considering how well they are calculated to abridge labour, and to accomplish with expedition and accuracy what is very tedious and irksome to perform in the usual way. Circular saws may be made to turn either in horizontal, vertical, or inclined planes, and the timber to be cut may be laid upon a plane inclined in any direction; so that it may be sawn by lines making any angle whatever, or at any proposed distance from each other. When the saw is fixed at a certain angle, and at a certain distance from the edge of the frame, all the pieces will be cut of the same size, without marking upon them by a chalked line, merely by causing them to be moved along, and keeping one side in contact with the side of the frame; for then, as they are brought one by one to touch the saw revolving on its axle, and are pressed upon it, they are soon cut through.

SAWARDIN, a Kalmuck melody, sung while dancing.

SAWBRIDGEWORTH, a town of the hundred of Braughin, in the county of Hertford, twenty-six miles from London. It had once a market, but it has totally declined. The population amounted in 1801 to 1687, in 1811 to 1827, in 1821 to 2071, and in 1831 to 2231.

SAXE, MAURICE, COUNT OF, was born on the 13th of October 1696. He was the natural son of Frederick Augustus II. elector of Saxony and king of Poland, and of the Countess of Konigsmarc, a Swedish lady, celebrated both for her wit and her beauty. He was educated along with Frederick Augustus, the electoral prince, afterwards king of Poland. His infancy announced the future warrior. Nothing could prevail on him to apply to his studies but the promise of being allowed, after he had finished his task, to mount on horseback, or exercise himself in arms.

He served his first campaign in the army commanded by Prince Eugene and the Duke of Marlborough, when only twelve years old. He signalized himself at the sieges of Tournay and Mons, and particularly at the battle of Malplaquet. In the evening of that memorable day, he was heard to say, "I'm content with my day's work." During the campaign of 1710, Prince Eugene and the Duke of Marlborough made many public encomiums on his merit. Next year the young count accompanied the king of Poland to the siege of Stralsund, the strongest place in Pomerania, and displayed the greatest intrepidity, swimming across the river in sight of the enemy, with a pistol in his hand. His valour shone no less conspicuously on the bloody day of Gaedelbusck, where he commanded a regiment of cavalry. He had a horse killed under him, after he had three times rallied his regiment, and led them to the charge.

Soon after that campaign, his mother prevailed on him to marry the Countess of Lubin, a lady both rich and beautiful. This union lasted but a short time. In 1721, the count procured a dissolution of the marriage; a step of which he afterwards repented. The countess left him with regret; but this did not prevent her from marrying soon afterwards. The Count of Saxe was too fond of variety to submit to the duties which marriage imposes. In the midst, however, of the pleasures in which he sometimes indulged, he never lost sight of his profession. He carried along with him wherever he went a library of military books; and even when he seemed most occupied with his pleasures, he never failed to spend an hour or two in private study.

In 1717 he went to Hungary, where the emperor had an army of 15,000 men commanded by Prince Eugene. Count Saxe was present at the siege of Belgrade, and at a battle which the prince gained over the Turks. On his return to Poland in 1718, he was made a knight of the Golden Eagle.

The wars in Europe being concluded by the treaties of Utrecht and Passarowitz, Count Saxe went to France. He had always professed a partiality for that country. French, indeed, was the only foreign language which during his infancy he was willing to learn. He spent his whole time during the peace in studying mathematics, fortification, and mechanics, sciences which exactly suited his genius. The mode of exercising troops had struck his attention when very young. At sixteen he invented a new exercise, which was taught in Saxony with the greatest success. Having obtained a regiment in France in 1722, he formed it himself according to his new plan. From that moment the Chevalier Folard, an excellent judge of military talents, predicted that he would be a great man.

In 1726 the states of Courland chose him for their sovereign, but both Poland and Russia rose in arms to oppose the election. The Czarina wished to bestow the duchy on Menzikoff, a happy adventurer, who from a pastry-cook's boy became a general and a prince. Menzikoff sent eight hundred Russians to Milan, where they besieged the newly-chosen duke in his palace. Count Saxe, who had only sixty men, defended himself with astonishing intrepidity. The siege was raised, and the Russians were obliged to retreat. Soon afterwards he retired to Usmaiz, and prepared to defend his people against the two hostile nations. Here he remained with only three hundred men, until the Russian general approached to force his retreat, at the head of four thousand. That general invited the count to a conference, during which he intended to surprise him, and take him prisoner. The count, informed of the plot, reproached him for his baseness, and broke up the conference. About this time he wrote to France for men and money. Mademoiselle le Couvreur, a celebrated actress, pawned her jewels and plate, and sent him the sum of forty thousand livres. This actress had formed his mind for the fine arts. She had made him read the greater part of the French poets, and given him a taste for the theatre, which he retained even in the camp. The count, unable to defend himself against Russia and Poland, was obliged in the year 1729 to leave his new dominions, and retire into France. It is said that Anne Iwanowa, duchess dowager of Courland, and second daughter of the Czar Iwan Alexiowitz, had given him hopes of marriage, and abandoned him at that time because she despaired of fixing his wavering passion. This inconstancy lost him not only Courland, but the throne of Russia itself, which that princess afterwards filled.

Count Saxe, thus stripped of his territories, devoted himself for some time to the study of mathematics. He composed also, in thirteen nights, and during the intervals of an ague, his Reveries, which he afterwards corrected. This book is written in an incorrect but forcible style; it is full of remarks both new and profound, and is equally useful to the soldier and the general.

The death of the king of Poland, his father, in 1733, kindled a new war in Europe. His brother, the elector of Saxony, offered him the command of all his forces; but he preferred the French service, and repaired to Marshal Berwick's army, which was encamped on the Rhine. "Count," said that general, who was preparing to attack the enemy's intrenchments at Etlinghen, "I was going to send for three thousand men, but your arrival is of more value than theirs." When the attack began, the count, at the head of a regiment of grenadiers, forced the enemy's lines, and by his bravery decided the victory. He behaved with no less intrepidity at the siege of Philipsburg. For these services he was, in 1734, rewarded with the rank of lieutenant-general. Peace was concluded in 1736; but the death of Charles VI., the emperor of Germany, almost immediately kindled a new war.

Prague was besieged by the Count of Saxe in 1741, near the end of November, and was taken the same month by assault. The conquest of Egra followed that of Prague. It was taken a few days after the trenches were opened. This success gave so much joy to the Emperor Charles VII., that he wrote with his own hands a congratulatory letter to the conqueror.

In 1744 he was made marshal of France, and commanded a part of the French army in Flanders. During that campaign he displayed the greatest military conduct. Though the enemy was superior in number, he observed their motions so skilfully that they could do nothing. In January 1745, an alliance was concluded at Warsaw, between the queen of Hungary, the king of England, and the states of Holland. The ambassador of the states-general, meeting Marshal Saxe one day at Versailles, asked his opinion of that treaty. "I think," said he, "that if the king my master would give me an unlimited commission, I would read the original at the Hague before the end of the year." This answer was not a bravado; the marshal was capable of performing it.

He went soon afterwards, though exceedingly ill, to take the command of the French army in the Low Countries. A gentleman seeing the feeble condition in which he left Paris, asked him how he could in that situation undertake so great an enterprise. "The question," replied he, "is not about living, but setting out." Soon after the opening of the campaign, the battle of Fontenoy was fought. Marshal Saxe was at the point of death, yet he caused himself to be put into a litter, and carried round all the posts. During the action he mounted on horseback, though he was so very weak that his attendants dreaded every moment to see him expire. The victory of Fontenoy, which was owing entirely to his vigilance and capacity, was followed by the reduction of Tournay, Bruges, Ghent, Oudenard, Ostend, Ath, and Brussels. This last city was taken on the 28th of February 1746; and very soon afterwards the king sent to the marshal a letter of naturalization, conceived in the most flattering terms. The succeeding campaigns gained him additional honours. After the victory of Raucoux, which he gained on the 11th of October 1746, the king of France made him a present of six pieces of cannon. He was, on the 12th of January of the following year, created marshal of all the French armies, and, in 1748, commander-general of all those parts of the Netherlands which were lately conquered.

Holland now began to tremble for her safety. Maestricht and Bergen-op-Zoom had already fallen, and nothing but misfortunes seemed to attend the further prosecution of the war. The states-general, therefore, offered terms of peace, which were accepted, and a treaty concluded on the 18th of October 1748.

Saxe-Altenburg || Saxe-Coburg-Gotha.

Marshal Saxe retired to Chambord, a country-seat which the king of France had given him. Some time afterwards he went to Berlin, where the king of Prussia received him as Alexander would have received Cæsar. On his return to France, he spent his time among men of learning, artists, and philosophers. He died of a fever, on the 30th of November 1750, at the age of fifty-four.

The best edition of his Reveries was printed at Paris, 1757, in two volumes 4to. It was compared with the greatest attention with the original manuscript in the king's library. It is accompanied with many designs exactly engraved, and a life of the author written in the panegyrical style.

SAXE-ALTENBURG, a duchy in Germany, recently become an independent though a small sovereignty. It was united with Saxe-Gotha till the decease without issue of the Grand Duke of Saxe-Gotha Altenburg, when a dispute arose between the several branches of the family, which was terminated by a treaty in 1826, Gotha being transferred to the Duke of Saxe-Coburg, and Altenburg being created a sovereign state. It is 502 square miles in extent, but is not compact, and some parts are surrounded by the territories of other states. It contains ten cities and towns, and 458 villages, with (in 1836) 120,690 inhabitants, who, with the exception of 3900 Catholics, adhere to the Lutheran religion. The revenues of the state amount to L.68,250, consisting nearly one half of the rent of the domains, and the other half of direct taxes on consumption. The annual expenditure is somewhat less, and the surplus is applied to the discharge of the debt, which, in 1832, amounted to L.183,900. The force to form the contingent to the German confederation is fixed at 982 men. By a constitution fixed in April 1831, the assembly of the states is appointed to consist of nobles, burghers, and peasants, and, with the duke, to make or alter the laws. The district is hilly and woody, but more so on the western than on the eastern side. In the latter division the soil is generally fertile, producing abundant crops of corn, and containing much rich meadow-land, adapted to the fattening of cattle. The river Saale rises in this duchy, and receives many of the smaller streams which run to the Elbe. The chief manufacturing industry is spinning the flax of their own growth; but a few woollen goods are made, and some iron ware. The capital is the city of Altenburg, containing 13,800 inhabitants. Two other places contain more than 4000, viz. Ronnenburg 4640, and Eisenburg 4605.

SAXE-COBURG-GOTHA, a sovereign duchy in Germany. The Duke of Coburg, by a family arrangement, attained in 1826 the duchy of Gotha, and added it to his former dominions. The whole is a compact territory, except that a part of Saxe-Weimar projects itself into the south-eastern portion of it, and it extends over 1049 square miles. It comprehends twenty-one towns and cities, and 525 villages, with 156,639 inhabitants, of whom 127,000 are Lutherans, 11,500 are Catholics, 2900 Calvinists, and 1200 Jews, the remainder not being ascertained. The revenue amounts to L.120,000, and the expenditure to about one tenth less, the residue being applied to diminish the state debts, amounting to L.300,000. The military force to be furnished to the German Confederation is 1366 men. The northern part, or the duchy of Gotha, is on the Thuringian Mountains, some of whose elevations are near 3000 feet above the level of the sea, but decline towards the east into an undulating district, which is drained by streams running into the Elbe or the Weser. The climate, though cold, is healthy. The soil is of moderate fertility, and being well cultivated, produces good crops of corn, and a great abundance of fruits and culinary vegetables, as well as large quantities of flax. The duchy of Coburg, or southern part, is an extensive plain, except in the province of Lichtenburg, where there are some ranges

Saxe-Meiningen-Hildburghausen
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Saxe-Weimar-Eisenach.

of hills. Some of the streams run into the Elbe, some into the Weser, and others into the Rhine. The land is better calculated for pasture than for agriculture, and does not produce corn equal to the consumption, but receives supplies from Gotha. There are mines producing copper, others iron, and some coal. These afford some employment to the inhabitants; but the country is poor, and the means of obtaining subsistence are scanty. The villagers are generally occupied in spinning flax, or in making wood ware and potash from the forests. The cities are Gotha with 18,321, and Coburg with 9067 inhabitants.

Saxe-Meiningen-Hildburghausen, a sovereign duchy in Germany. It was two duchies, though now both united under one of the great branches of the Saxon Ernestine family. It extends over 896 square miles, and comprehends thirty-two cities or towns, and 381 villages, with 149,294 inhabitants, of whom 128,000 adhere to the Lutheran profession, and the remainder consists of Catholics and Calvinists, with some Jews. The income of the state amounts to L.110,000, and the expenditure to nearly the same; but in the latter is included the interest on the public debt, which is heavy when compared with that of the other Saxon duchies, being L.550,000. It is bound to furnish a force of 1150 men to the German Confederation. Meiningen is generally a mountainous country, though none of the hills are higher than 2700 feet, and few exceed 2000 feet. The valleys between these hills are tolerably fertile, and are drained by several small streams, all of which unite in the Werra in its progress to the ocean.

The agriculture is in a backward state, and, but for the great cultivation of potatoes, would not yield sufficient for the population. Flax is grown equal to the furnishing of employment for the females; but the chief product for sale beyond the limits of the duchy is timber, and there is also some trade in wool, which has been lately improved by the introduction of merino sheep. Some tobacco is raised; and a little inferior wine is made in the southernmost parts. The duchy of Hildburghausen is of nearly the same character, except that the soil is more sandy, and the forests of less extent. The meadows are better, and produce some well-fattened black cattle; and it has some manufactories of iron and glass ware. The only cities in these duchies are Meiningen with 4500 inhabitants, Saalfeld with 4500, and Hildburghausen and Posnect with 3500 each.

Saxe-Weimar-Eisenach, a sovereign state in Germany, distinguished as a grand duchy, or rather composed of two duchies, which are not contiguous, but are separated by a part of Saxe-Gotha and a part of the Prussian province of Saxony being interposed between them. Some portions also of this dominion are separated from both parts, and surrounded by the territories of other princes. The whole of the grand duchy is 1436 square miles in extent, the duchy of Weimar being 985, and that of Eisenach 451. The population of the whole, which in 1817 amounted to 197,712, had in 1835 increased to 241,046 persons, of whom about one quarter live in the cities and towns, and the remainder in villages and on detached farms. About 220,000 are Lutherans, 10,000 Catholics, 6600 Calvinists, and the remainder are either Jews, or some of the smaller protestant sects. The number of births in 1831 was 7559, and of deaths 5280. The marriages in the same year were 1707. The whole of the dominion is rather hilly, some of the elevations reaching to 1900, and one of them to 2460 feet. Between these hills the valleys are extensive, and of considerable fertility. The most flourishing are those vales through which run the rivers Saale, Werra, and Ilmenau. The climate, like that of all Thuringia, is raw and cold, and the snow lies late in the summer on the hills; but it is considered as healthy. As the business of husbandry is mostly in the hands of small peasants, and the land cultivated on the common field system, it is, with a few exceptions, imperfectly conducted; but it yields, in the duchy of Weimar, a surplus equal to the deficiency which is annually experienced in the duchy of Eisenach; and in good seasons is enabled to furnish rye to the mining districts in the kingdom of Saxony. The chief subsistence of the lower orders is potatoes, the extension of which has kept pace with the growth of the population. Flax, hemp, rape, poppies, and hops are grown; and the sides of the hills, on the red soil, are well planted with plum, cherry, apple, and pear trees, that yield abundant fruit. The extensive forests supply a sufficiency of fuel and timber, and afford employment to large numbers, who manufacture a variety of articles from the wood. The country is most abundantly stocked with game, which, to the annoyance of the peasantry, was most sedulously preserved by the last grand duke. It is said that more than 20,000 hares and 1400 deer have been taken in one year, besides great numbers of wild boars, and some thousands of pheasants. The rivers are also well stocked with fish. The domesticated animals are not numerous, and, except sheep, whose wool has been improved in fineness, deserve no particular mention.

The chief manufactures are carried on at Eisenach and in its vicinity. They consist of woollen, linen, and cotton cloths, carpets, hosiery, earthenware, glass, leather, and seed-oil. There are mills for spinning cotton, and flax is spun by the peasants in every cottage. In each of the cities there are breweries and distilleries. Much trade arises from the passage of the goods and passengers on the great road through the state from Frankfort to Leipsig, especially at the time of the great fairs at those cities. This grand duchy has a constitution formed by the late sovereign. The states, consisting of twenty-nine members, meet at Weimar for legislative purposes; but their proceedings attract very little attention. The annual revenue, derived mostly from domains, but partly from direct taxes, amounts to L.130,285; and the expenditure, including the interest of the state debt, is L.120,460. The amount of the debt at present is about L.450,000, but it is diminishing yearly. The military force consists of one regiment of infantry and a small corps of hussars. The contingent to be furnished to the German Confederation is 2010 men. Education is sedulously attended to. There is a university at Iena of considerable celebrity, with 590 students and many able professors. There are two gymnasia, sixty-nine burgher schools, and 543 village schools. The cities containing more than 5000 inhabitants were (in 1835) Weimar, 11,005; Eisenach, 9270; and Iena, 5792.

Saxmundham
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Saxo-Grammaticus.

SAXMUNDHAM, a town and parish of the hundred of Plomsgate, in the county of Suffolk, eighty-nine miles from London. It is situated on a hill, with good prospects around it, and is not well built, but has a large church. It has very little trade, but a market is held on Thursday. The population amounted in 1801 to 855, in 1811 to 957, in 1821 to 989, and in 1831 to 1048.

SAXO-GRAMMATICUS, descended from an illustrious Danish family, was born about the middle of the twelfth century. Stephens, in his edition of Saxo-Grammaticus, printed at Soroë, indubitably proves that he must have been alive in 1156; but he cannot ascertain the exact place and time of his birth. On account of his uncommon learning, Saxo was distinguished by the name of *Grammaticus*. He was provost of the cathedral church of Roskild, and warmly patronized by the learned and warlike Absalon, the celebrated archbishop of Lunden, at whose instigation he wrote the History of Denmark. His epitaph, which is a dry panegyric in bad Latin verses, gives no account of the era of his death, which happened, according to Stephens, in 1204. His history, consisting of sixteen books, begins from the earliest account of the Danish annals, and concludes with the year 1186. According to the opinion of an accurate writer, the first part, which relates to the origin of the Danes, and the reigns of the ancient kings, is full of fables; but the eight last books, and particularly those which regard the events of his own times, deserve the utmost credit. He wrote in Latin; and the style, if we consider the barbarous age in which he flourished, is in general extremely elegant, but rather too poetical for history. Mallet, in his *Histoire de Dannemarc* (vol. i. p. 182), says that "Sperling, a writer of great erudition, has proved, in contradiction to the assertions of Stephens and others, that Saxo-Grammaticus was secretary to Absalon, and that the Saxo, provost of Roskild, was another person, and lived earlier."

SAXONY, one of the provinces of the kingdom of Prussia. It has been formed out of several of the hereditary states of the monarchy, and also by the addition of the territory of some mediatized princes, and in a great measure by extensive parts of the kingdom of Saxony which were transferred to Prussia by the negotiations for the general peace of 1814. The parts then conveyed from Saxony were the duchy of that name and its province of Thuringia. The actual province now extends in north latitude from 50° 27′ to 53° 5′, and in east longitude from 9° 44′ to 13° 58′, being 9902 square miles. The division of the province is into three governments, assuming the names of the cities where the several administrative boards are established, viz. Magdeburg, Merseburg, and Erfurt. The population amounted in 1817 to 1,214,219, but had, like that of the other parts of Prussia, increased so as to amount in 1831, according to the census at the end of that year, to 1,449,587. Of these persons, two thirds adhere to the Lutheran church, and the other third are mostly Catholics, but with a small number of other protestant sects, and some Jews. The Catholics are chiefly found in the circles of Upper and Lower Reichsfeld, and in that of Erfurt.

The greater part of the province is a plain, with a few undulations; but on the western side, in the circles of Merseburg and Erfurt, are the Thuringian Hills, which are elevated but fertile, and include a part of the Hartz Forest, which is mountainous and woody. The whole is well watered by various small rivulets, which form the rivers Mulda, Saale, Ohre, Aland, Black-Alster, and Havel, all of which run through the Elbe to the German Ocean. There are three canals, viz. the Plauen, which unites the Havel with the Elbe, which is about twenty miles in length, and is used for navigation; the Shiffigraben, between Magdeburg and Brunswick, which is chiefly constructed for draining a rich tract of land; and the Flossgraben, in Merseburg, which connects the Elster and the Pegau, and is chiefly used for floating timber. The rivers, lakes, and ponds are very fully stocked with a variety of fishes.

No part of Germany is better cultivated than this province, and as the land is of a moderate quality, it yields abundant crops, and is considered as the granary of the Prussian dominions. The number of sheep is very great, and the wool of them, which has been much improved of late years, both supplies the home manufacturers, and also exports much to other countries. The inhabitants are industrious, cleanly, and temperate, like all the Saxons; and there is the appearance of ease in the villages and towns, where the manufacture of linens and woollens is the usual employment. There are mines, in that part which is within the Hartz, that produce silver, copper, iron, and coals; but the most productive of the mines are those of salt, which are found at a great depth in various parts of the province, and supply abundance of culinary salt when refined.

The country of Saxony is remarkable for being the cradle of the present English nation; but concerning the Saxons themselves previous to that period, we have very few particulars. The Saxons, says Mr Whitaker, have been derived by our historians from very different parts of the globe; India, the north of Asia, and the forests of Germany. Their appellation, too, has been equally referred to very different causes; the name of their Indian progenitor, the plundering disposition of their Asiatic fathers, and the short, hooked weapons of their warriors. But the real origin of the Saxons, and the genuine derivation of their name, seem to be different.

In the earlier period of the Gallic history, the Celtæ of Gaul crossed the Rhine in considerable numbers, and planted various colonies in the regions beyond it. Thus the Volcæ Tectosages settled on one side of the Hercynian Forest and about the banks of the Neckar; the Helvetii upon another and about the Rhine and Maine; the Boii beyond both; and the Senones in the heart of Germany. Thus also we see the Treviri, the Nervii, the Suevi, and the Marcomanni, the Quadi, the Venedi, and others in that country, all plainly indicated as Gallic nations, by the Gallic appellations which they bear, and all together possessing the greatest part of it. And, even as late as the conclusion of the first century, we find one nation on the eastern side of this great continent actually speaking the language of Gaul, and another upon the northern side using a dialect nearly related to the British. But as all the various tribes of the Germans are considered by Strabo as γενησιοι Γαλαται, or genuine Gauls in their origin, so those particularly that lived immediately beyond the Rhine, and are asserted by Tacitus to be indubitably native Germans, are expressly denominated Γαλαται, or Gauls, by Diodorus, and declared by Dio to have been from the earliest period distinguished by the equivalent appellation of *Celtæ*. And the broad line of nations which extended along the ocean, and reached to the borders of Scythia, was all known to the learned in the days of Diodorus by the same significant appellation of Γαλαται, Gauls.

Of these the most noted were the Sicambri and Cimbri, the former being situated near the channel of the Rhine, and the latter inhabiting the peninsula of Jutland. The denominations of both declare their original, showing them to have been derived from the common stock of the Celtæ, and to be of the same Celtic kindred with the Cimbri of our Somersetshire, and the Cymbri or Cambrians of our Wales. The Cimbri are accordingly denominated Celtæ by Strabo and Appian; and they are equally asserted to be Gauls by Diodorus, descendants of that nation which sacked the city of Rome, plundered the temple of Delphi, and subdued a great part of Europe and some of Asia.

Immediately to the south of these were the Saxons, extending from the isthmus of the Chersonesus to the current of the Elbe; and they were equally Celtic in their origin as their neighbours. They were denominated Ambrones as well as Saxons; and as such, they are included by Tacitus under the general appellation of *Cimbri*, and comprehended in Plutarch under the equal one of *Celto-Scythæ*. The name of Ambrones appears particularly to have been Gallic, being common to the Saxons beyond the Elbe, and the Ligurians in Cisalpine Gaul; as both found to their surprise, on the irruption of the former into Italy with the Cimbri. And, what is equally surprising, and has been equally unnoticed by the critics, the Welsh distinguish England by the name of *Loegr* or *Liguria*, even to the present moment. In that irruption these Saxons, Ambrones, or Ligurians, composed a body of more than thirty thousand men, and were principally concerned in cutting to pieces the large armies of Manlius and Cæpio. Nor is the appellation of Saxons less Celtic than the other. It was originally the same with the Belgic Suessones of Gaul; the capital of that tribe being now entitled Soisons by the French, and the name of the Saxons pronounced Saisen by the Welsh, Sason by the Scotch, and Sasenach by the Irish. And the Suessones or Saxones of Gaul derived their own appellation from the position of their metropolis on a river, the stream at Soisons being now denominated the Aisne, and formerly the Axon; Uesson or Axon importing only waters or a river, and S-uess-on or S-ax-on on the waters or the river. The

Suessones, therefore, are actually denominated the Uessones by Ptolemy, and the Saxones are actually entitled the Axones by Lucan.

These, with their brethren and allies the Cimbri, having been more formidable enemies to the Romans by land, than the Samnites, Carthaginians, Spaniards, Gauls, or Parthians, in the second century applied themselves to navigation, and became nearly as terrible by sea. They soon made themselves known to the inhabitants of the British isles by their piracies in the northern channels, and were denominated by them Lochlyn or Lochlynach; *lucd-lyn* signifying the people of the wave, and the *d* being quiescent in the pronunciation. They took possession of the Orkney Islands, which were then merely large shoals of sand, uncovered with wood, and overgrown with rushes; and they landed in the north of Ireland, where they ravaged the country. Before the middle of the third century they made a second descent upon the latter, disembarked a considerable body of men, and designed the absolute subjection of the island. Before the conclusion of it, they carried their naval operations to the south, infested the British channel with their little vessels, and made frequent descents upon the coasts. And in the fourth and fifth centuries, acting in conjunction with the Picts of Caledonia and the Scots of Ireland, they ravaged all the eastern and south-eastern shores of Britain, began the formal conquest of the country, and finally settled their victorious soldiery in Lancashire.

In the course of time these barbarous tribes were civilized, and settled in their lands, on which they began to exercise their industry in cultivation, and in various manufactures for their own convenience. Their possessions extended from beyond the north-western part of Germany to the southern extremity of the Erzgebirge, and were denominated the Duchy of Saxony, forming one of the most powerful German states, which was governed till the commencement of the tenth century by various Vandal houses, when Henry I. took from them the land lying between the Saale and the Elbe, and founded for its protection the margravate of Meissen, which was governed at first by various houses, but latterly became hereditary in the Askanian family. When the duchy of Saxony was taken from Henry the Lion, in the twelfth century, it was split into so many parts, that Bernhard of Askania, who succeeded to this duchy, being unable to procure any thing but the mere title, transferred the name of Saxony to the lands which he already possessed, and which still constitute a principal part of the present kingdom. After the death of Bernhard, and the extinction of his family, Frederick, landgrave of Thuringia, succeeded in the year 1423 to his titles and property. In 1485, however, his family divided itself into two distinct lines; the elder, or Ernestine, which possessed Thuringia and the electorship, and the younger, or Albertine, which possessed Meissen and the title of duke.

In the year 1547, Frederick the Magnanimous was made prisoner, and forced to resign a great part of his territory and his electorship to his cousin Maurice, of the Albertinian line; and thus the kings of Saxony are descended from the younger of the Thuringian family. In 1697, the royal family went over to the Catholic church, in the reign of Augustus I. and thereby procured for a season the crown of Poland.

During the early stages of the French revolution, Saxony took little or no part in the struggle, and only as a member of the Germanic empire furnished the contingent of troops required by that relation, which were withdrawn when Prussia formed a combination of the northern states of Germany to counteract the confederation which France had formed in the southern states. To this extent Saxony was in alliance with Prussia when France, in 1806, began the war with that power. At the decisive battle of Iena, in October of that year, a body of twenty thousand Saxons were joined to the Prussian army. The complete victory of Napoleon induced the Duke of Saxony to conclude a peace with him, and to become a member of the Rhenish confederation, of which the French emperor was acknowledged the protector.

In July 1807, the peace of Tilsit, between Russia, France, and Prussia, was concluded. In conformity with its conditions, the whole of the dominions of Prussia on the left bank of the Elbe, including the strong fortresses which commanded the passages over that river, were ceded to Saxony, and the duke was acknowledged as king. A part also of Poland, which at the last division of that country had been shared by Prussia, was, with the capital, erected into a grand duchy, called by the name of Warsaw, and the sovereignty of it was conferred on the king of Saxony. After the peace between Austria and France, which followed the battle of Wagram, the newly-created grand duchy of Warsaw was extended by additions from Austria of West Gallicia and the city of Cracow, with the vast salt mines of Wielicsla, whilst to the Saxon crown there were conveyed some portions of the kingdom of Bohemia.

When Napoleon declared war with Russia in 1812, the Saxon capital was the spot on which the several monarchs of Europe were assembled to pay homage to him whose dependents they had become. In the grand army that invaded Russia, the troops of the king of Saxony formed a part of the right wing, and advanced into Russia. They had little opportunity of distinguishing themselves, and after the burning of Moscow retired to their own country.

When in the following year the French army advanced into Germany to oppose the Russians and Prussians, the king of Saxony treated with Austria, with the pretext that it was only for the purpose of obtaining a peace. He declared his own neutrality, and gave orders to his general, Thielman, to refuse admission to the troops of any of the belligerent parties into his fortress of Torgau on the Elbe. While these negotiations with Austria were proceeding, the king left Dresden, and repaired first to Ratisbon, and from thence to Prague, whilst the French general Davoust entered his capital. About five weeks afterwards (2d May), Napoleon had gained a battle at Lutzen, over the united army of Russia and Prussia. Upon this the French emperor, who by the victory was master of Leipsig, and the whole of the king's dominions, peremptorily demanded by a special messenger to Prague, "Je veux que le roi se déclare; je saurai alors ce que j'aurai â faire; mais s'il est contre moi, il perdra tout ce qu'il a." This determined the conduct of the king. He returned to Dresden. His forces joined the French army, and the troops of that nation occupied Torgau and the other fortresses. His troops joined those of Napoleon in the successful resistance of the attack by the Russians and Prussians on Dresden, when the French general Moreau was killed; and at length, after an armistice, proceeded to Leipsig with the French. At the fatal battle before that city on the 19th of October, when the French retreated, the king was left in that city, where he was made a prisoner by the confederate armies of Austria, Russia, Prussia, and Sweden, and was removed to Berlin. The king remained under restraint from October 1813 till June 1815; whilst the allied powers were fully occupied, first, in annihilating the government of Napoleon, then in quelling his attempts to resume that power, and, finally, in settling the arrangements which the state of Europe demanded. At the congress of Vienna, the first intention seems to have been to depose the king of Saxony, and allot to other powers the whole of the territory; but gradually a more tender feeling prevailed. He was compelled to sign a treaty soon after Napoleon had arrived in Paris from Elba, by which he consented to the partition of his dominions, and joined his forces to those of the allies then advancing towards France.

By the partition Prussia received from Saxony more in extent than one half of its territory, and somewhat less than half as regarded the number of inhabitants. The loss most lamented was that of the province of Saxony, the cradle of the reigning dynasty, which was 5700 square miles in extent, and contained 875,000 inhabitants. Among the subjects of regret, the greatest was the loss of those portions of the kingdom which chiefly supplied the corn, the wood, and the salt.

Amidst the calamities that had been endured, not a complaint was made by the subjects against their monarch. They were universally satisfied, that in all the changes, he had acted more out of regard to the happiness of his people than his own aggrandisement; and when he returned from his captivity to Dresden, he was received with the affectionate feeling which would be displayed in a domestic circle, when the virtuous head of a family returned home among scenes of distress and common suffering. The country was at that time, from having been so long occupied by numerous armies of various nations, in a most dreadful state of poverty, disease, and moral depravity; but the return of peace, the restoration of the monarch, and the confidence reposed in his goodness and wisdom, produced in a very short time a wonderful effect. Order and credit in the finances were first established, and the fruitful soil, by the application of the skill and industry for which the natives are distinguished, soon produced abundance of the necessaries of life; by breeding fine-woolled sheep, the means of restoring that manufacture was effected; and the surplus wool being exported, brought in return much real wealth. The fabrics of linen, cotton, iron, and other goods, were much extended, whilst the great fairs at Leipsig became two central points yearly for beneficial commerce with foreign countries. As the tranquillity gradually produced prosperity, judicious improvements were made in the establishments for the education of the common people, as well as for the training of the medical students, of the civil and military engineers, and of the higher branches of knowledge. The king lived to a great age, the last twelve years of which were attended with improvements in every public department, and exhibited among all classes, whether agricultural, commercial, mining, or manufacturing, an advance which excited surprise in all who attentively watched its steps, and inspired that mutual confidence between the king and the people, which was retained till his death in 1827. The progress was continued under the successor of the king till the year 1831. At that time the revolution in France, which expelled the elder branch of the Bourbons, was felt in every part of Germany, and excited popular tumults. Dresden had its share, and a mob destroyed one or two of the inferior public buildings. It was, however, soon suppressed, by the discharge of a good but unpopular minister, by the division of the states into two chambers, and other trifling alterations. From that period peace has continued and prosperity has advanced.

The kingdom of Saxony, in its present state, is a compact and connected territory. It extends from 28° 5′ to 31° 13′ east longitude, and from 50° 10′ to 51° 31′ north latitude. It is bounded on the north and north-east by Prussia, on the south-east and south by Austria, on the south-west by Bavaria, on the west by the principality of Reus and the duchy of Saxe-Gotha, and on the north-west by Prussia. By a recent arrangement it has been divided into four circles, and these again are subdivided into amts or bailiwicks in the following manner:

Circles.	Amts.	Cities.	Villages.	Extent in English Acres.	Inhabitants.
Dresden ..	5	32	998	1,098,240	411,864
Leipsig....	3	38	1001	887,040	361,251
Zwickau..	5	58	873	1,182,720	549,811
Bautzen...	2	13	629	633,600	257,444
	15	141	3501	3,801,600	1,580,370

By a subsequent addition of the births, and a deduction of the deaths, the population at the end of the year 1836 was found to be 1,618,495. In the year 1818 the population was found to be 1,282,082, having thus increased in eighteen years 336,413, being at the rate of about twenty-five per cent.

The cities whose inhabitants amount to more than 5000, with their present population, are,

Dresden (besides the garrison)	66,133	Glauchau	6229
Leipsig	44,802	Zwickau	6127
Chemnitz	21,137	Grossenhain	5582
Freyburg	11,545	Dobeln	5559
Plauen	8,570	Mittweide	5506
Bautzen	8,467	Frankenberg	5415
Zittau	8,195	Reichenbach	5412
Meissen	7,525	Zschopau	5384
Schneeberg	6,769	Oschatz	5243
Annaberg	6,377	Perna	5214

The northern part of the kingdom of Saxony is for the most part a level or an undulating country; but on the south it is very mountainous. The mountains rise in three successive ridges, denominated the Vorgeberg, Mithelgeberg, and Hochgeberge; the southernmost of these, bordering on Bohemia, is the loftiest. The highest points of these mountains are those of the Fichtelberg, 3730 feet; Auersberg, 2931 feet; the Lausche, 2400 feet; and Hochwald, 2299 feet.

A part of this mountainous district, between Dresden and Bohemia, usually denominated Saxon Switzerland, has peculiar charms for the lovers of picturesque scenery. It is about twenty-eight miles in length and twenty-three in breadth, displaying deep chasms bordered by perpendicular rocks, some naked, and others clothed with every variety of trees. Rapid streams pour from declivities, forming cascades in some parts, and in others, in deep vales, meandering through verdant meadows, without their issue or their egress being discoverable by the observer from the precipices which enclose such recesses, and whence he can see no path by which the vales can be reached. Through this mass of mountains the river Elbe has worn itself a passage, by a most tortuous course, and washes the bases of rocks, in some parts of near a thousand feet in perpendicular height, from the summit of which that stream appears to the beholder as an insignificant rivulet. From the surface of this mountain plain rise pinnacles of rocks, on which castles in the feudal times were erected, some of the ruins of which add to the romantic grandeur of the prospect; whilst others, such as Königstein and Litherstein, have had applied to them all the arts of modern fortification, and are the most impregnable fortresses in the Saxon dominions. Königstein especially, though, from its great height, it appears to terminate in a point, has on its apex strong walls, surrounding buildings in which the treasures of the crown are secured in times of danger, with ground to yield potatoes enough to feed the garrison, as that vegetable grows there to perfection, though, from being fourteen hundred feet in height, the rigid cold of winter is most severely felt. This fortress, and that of Lillienstein on the opposite side of the Elbe, are considered as the keys to Bohemia. Few spots in Europe create greater interest in the geologist, the botanist, or the lover of picturesque scenery, than this portion of the country so appropriately denominated Saxon Switzerland.

The principal river of Saxony, and that to which almost all the others contribute their streams, though not till it has left this kingdom, is the Elbe. It enters from Bohemia, and is navigable for barges through the whole of its Saxon course. The other rivers are the Black Elster, which rises in Lusatia, and soon enters the Prussian territory; and the Sprec, which comes out of Bohemia, divides itself into two branches near Bautzen, and then passes into Prussia. These rivers fall into the Elbe on its right bank. On the left bank it receives the Moldau, which has two sources in Bohemia, and in Saxony unites with the Zwichau, and runs parallel to the Elbe till it joins that stream at Dessau. The White Elster rises in Voightland, with many curvatures reaches the suburbs of the city of Leipsig, and, receiving there the small river Pleisse, falls into the Saale, and is ultimately lost in the Elbe above Magdeburg. The only river that does not run to the Elbe is the Neisse, which rises in the eastern corner of the kingdom, and, passing into Silesia, is at length emptied into the Oder. There are no lakes in Saxony, nor any canals, except such as are used in the mining districts for conveying the ore to the mills.

As compared with most parts of Germany, the agriculture of Saxony is much advanced. Wherever the soil is capable of cultivation, it is worked with diligence; and the more hilly and poorer soils have a good herbage, and yield pasture to numerous flocks and herds. The sides of the mountains towards the Elbe, from Pirna to Meissen, are covered with vines which yield both red and white wine; the former from the vicinity of Pilnitz and Loschwitz, and the latter from that of Hoflasnitz, are the most valued; but the great portion of the Saxon wines is of a very indifferent quality. The best of them are produced from the vineyards belonging to the king; and though they are sold at the highest prices, it is very doubtful if the expenses of cultivation, and the rent which might be obtained for the land, do not exceed what is produced by the sale of the wines.

The whole of Saxony is highly productive of fruit, and the care and skill exercised in its cultivation is amply rewarded. Great destruction to the fruit-trees took place during the tremendous military conflicts of which the country was the theatre; but still the orchards and gardens are very extensive, and new trees, planted since the wasting warfare of 1813, are beginning to yield their products. The calamities which proved injurious to the fruit-trees have lessened the number of cattle of every description; in the year 1817, in many districts of the circle of Meissen, not a single head of cattle was to be found. The bee-hives were destroyed by the same events; but the traces of these calamities have now disappeared, and the remembrance of them is scarcely adverted to by the rising generation. The sheep were preserved by being driven to the mountains, and since the war have vastly multiplied; and the fineness of the wool, for the sake of which they are chiefly kept, has been most wonderfully increased, and excels the finest wools of Spain.

The arable land is chiefly cultivated on a three-course system, consisting of a fallow, winter sown grain, and spring sown grain. In some cases there is a fallow crop of flax, hemp, or potatoes. The winter corn that succeeds is generally rye, and sometimes, though less extensively, wheat; the summer corn which follows is chiefly oats, and sometimes barley. The greater part of the arable land is in common fields, held under a feudal tenure, over which the lord of the manor has the right of depasturing his flocks between the harvest and the next seed time. The farming occupations are generally very small, and the increase of grain throughout the whole kingdom is said not to average more than five to one. The culture of potatoes has been very much extended of late years, and forms almost exclusively the food of the labouring classes in the mountainous districts. Tobacco, hemp, flax, wood, hops, and chiccory, are grown in some parts of the kingdom, but neither of them to the extent which the consumption of the country requires. The woods of the kingdom, since the separation of its best portions, are insufficient to furnish the inhabitants with the necessary fuel; and though abundance of coal is found near Dresden, it is of so sulphureous a nature as to be deemed unwholesome, and is used only by those who are unable to pay the high price for wood which its scarcity has created.

Saxony abounds in minerals, and though the veins in general are far from being of great thickness, the ore is tolerably rich; which, added to superior skill and economy in working the mines and separating the metals, makes them very beneficial to the crown, to whom the greater portion of them belong. The mineralogical school of Freyberg has had a wonderful influence, not only in Saxony, but in all parts of the world, in increasing the knowledge and in improving the practice of the operative labourers in the mining art. The annual produce of the silver-mines is about 400,000 ounces; and besides this, they yield copper, lead, tin, iron, sulphur, quicksilver, bismuth, arsenic, and coal. Gold is found in very small quantities.

In no part of the Continent has manufacturing industry been carried to so great an extent, or occupied so large a proportion of the population, as in Saxony. Before the separation from it of the most productive agricultural provinces, it was calculated that two fifths of the inhabitants were employed in manufactures; but since that unfortunate event, it is estimated that three fifths are occupied in commerce and manufactures, and only two fifths in agriculture. It is by the extent of its manufactures alone that the country can be furnished with the means of paying for those articles of the first necessity, of which a sufficiency is not now produced within it. The provinces which supplied corn, fuel, and salt, have been ceded to Prussia, and those articles must be paid for by the sales of the minerals and manufactures. During the continuance of Napoleon's continental system, the Saxon manufacturers enjoyed a most extensive trade, and the encouragement thus obtained gave an impulse which directed the efforts and the capital of the country towards their perfection; but the division of labour was not carried to such an extent, nor was the application of machinery so generally adopted, as to enable them to withstand the competition with British goods, which peace introduced into many of those markets that they had before almost exclusively supplied. It would include almost the whole catalogue of European manufactures to enumerate the respective kinds of goods made in Saxony. Woollens, linens, cottons, and silks for clothing; iron, brass, and copper wares; paper, leather, earthenware, hats, musical instruments, and turnery ware; various chemical and dyeing preparations; clocks, watches, swords, guns, and pistols, are all comprehended in the list of Saxon manufactures.

The commerce of a country whose inhabitants are chiefly occupied in manufactures, and produce an insufficiency of food for their own consumption, must necessarily be extensive. The trade of Saxony chiefly centres in the city of Leipsig, whence, at the time of the two annual fairs, the greater part of the manufactures are disposed of, and contracts are made for such foreign commodities as the supply of the country demands. As the fairs of Frankfort-on-the-Maine precede, and those of Frankfort-on-the-Oder follow, the fairs of Leipsig, some portion of the trade is carried on by those channels. The roads leading to Leipsig are generally good, and trains of waggons loaded with goods are at all times to be seen proceeding to and from that place; many of which come from Flanders, Holland, Hamburg, and Brunswick, on one side, and from Russia, Poland, and even Turkey, on the other. At the fairs of Leipsig the new books printed in most parts of Germany are brought for publication. There the publishers meet and exchange the works of one part of the country, where the German language is spoken, with those of another. So extensive is this trade, that it is said the commissions on it to the brokers and merchants of Leipsig amount to more than 40,000 rix-thalers a year. The whole sales at the fairs in that city are estimated, including the exports and imports, at about 20,000,000 rix-thalers, or more than L.3,000,000 sterling. Saxony disposes, in this way, of sheep's wool, fine woollen goods, linen and thread lace, yarn and worsted, ironmongery, cutlery, and braziery, and also books. It receives in return corn, wine, salt, wood, and colonial wares. Although the river Elbe is navigable from the ocean to the interior of Saxony, it is only used for the conveyance of the heaviest goods, and for them but partially. It is found that the tolls on that river, with the risk of damage and of robbery, make it more advantageous to convey commodities by land than by water.

The government is a monarchy hereditary in the Saxon Albertine line, and in failure of that, in the Ernestine or Saxe-Weimar branch of the family. The monarchy may be called limited; but the limitations are of such a nature that the liberties of the people have been more secured by the mildness of the reigning family than by any restrictions that the states have or could exercise. The king enjoys the whole executive power, confirms pardons, bestows commissions, nominates the supreme judges, and enjoys the power of making peace and war, and of concluding all treaties. In making new laws, and in imposing new taxes, the states have the right to be consulted. According to the ancient constitution, which is still adhered to, the states are constituted of various elements; and, in fact, are an amalgamation of various corporations, each of which thinks only of its own peculiar interests, and contrives to cast the weight of all public burdens from the cities and the nobles, who are represented, to the country people, who have no voices. The assembly consists, first, of members chosen by the provincial representatives of the nobility; secondly, of the representatives of the prelates, who, before the Reformation, had seats, but who have since been chosen by the higher class of nobles in right of their possessing certain estates of which the prelates were deprived; and, thirdly, the university of Leipsig. These states represent only the circles of Meissen, Leipsig, Erzgebirge, and Voightland; for that of Lausatia has its own peculiar assembly of states, which differs but little from those of the other four, except that the members from the land possessors must have at least sixteen quarterings in their coats of arms. When the king pleases, these states are convoked; but as it has not been found necessary to impose new taxes, or to make alterations in the laws, they have seldom been assembled, and their session has usually been very short. The administration is conducted by a cabinet council, under which, through the medium of the privy council, orders are communicated to the departments of finance, war, domains, police, and foreign affairs.

The financial affairs of the kingdom and the credit of the government have rapidly improved. According to the budget of 1837, the income, a great part of which is derived from the estates of the crown, amounted to 5,194,873 rix-thalers, valued at about three shillings each. The expenditure amounted to the same sum, but in that was included 145,424 thalers appropriated to a reserve fund to meet unforeseen contingencies, 321,545 thalers to pay the interest of the debt, and 171,806 thalers which forms a sinking fund to extinguish the debt, which, at the rate now proceeding, a few years will accomplish, as at the close of the war it was near L.4,000,000 sterling, and is, according to the budget, reduced to L.1,177,740 sterling.

The armed force is no more than the contingent required from the kingdom by the German Confederation. It is composed of the following arms:—

The guards	370
Infantry of the line	7,080
Cavalry	2,066
Artillery	1,032
Sharp-shooters	1,454
Engineers	191
	12,193

Although the royal family profess the Catholic religion, and are zealous in discharging its injunctions, the established faith is the Lutheran, and, until the year 1811, no person of any other sect was eligible to seats in the several corporations in the provincial or general assembly of the states. At that period all sects were placed on the same footing. The whole number of Catholics is about 28,000, some of whom are attached to the royal household; but most of them are found among the inhabitants of the province of Lausatia. The number of Protestants dissenting from the established church, including Moravians and Calvinists, is not supposed to exceed two thousand. The Lutheran church is governed by four consistories or assemblies of divines, differing in the number of superintendents, but comprising together twenty-five of that order. The Catholics in Lausatia are governed by the abbot of Bautzen, on whom the pope generally bestows the title of bishop *in partibus infidelium.*

Education is well conducted in the university of Leipsig, and in the endowed classical schools of Meissen, Wurzen, and Grimma, as well as in several gymnasia. The popular education is not so well managed as in the other Protestant German states; but some steps have been taken, and others are in contemplation, which may soon make the Saxon system as effective as that of Prussia. The fine arts have been cultivated with considerable success, and both statuary and painting receive valuable assistance from the fine productions which are contained in the collections of Dresden.

SAYANSKIE, a chain of mountains in Siberia, forming a prolongation of the Altai chain, and, like them, separating Siberia from Chinese Tartary. They extend between the river Yenisei and Lake Baikal, and consist of naked rocks of red granite.

SAYMBRUMBACUM, a small town of India, in the province of the Carnatic. Near it is a remarkably fine reservoir of water, eight miles in length by three in average breadth, which in the dry season is rendered subservient to the purposes of cultivation, and being let out in small streams, serves to irrigate the lands of thirty-two villages. Long. 80. 5. E. Lat. 13. 2. N.

SAYPAN, one of the Ladrone Isles, in the Eastern Seas, about twenty miles in circumference. It was once the best peopled island of the Ladrones, but is now uninhabited; and very opposite accounts are given of its productiveness by different voyagers. Anson mentions that it presents as pleasant an aspect as Tinian; and on the west side of the island lies a safe and commodious port. Long. 145. 55. E. Lat. 15. 13. N.

SCALDS, in the history of literature, a name given by the ancient inhabitants of the northern countries to their poets, in whose writings their history is recorded.

SCALE, a mathematical instrument, consisting of several lines drawn on wood, brass, or silver, and variously divided, according to the purposes it is intended to serve; whence it acquires various denominations, as the *plain scale*, *diagonal scale*, *plotting scale*, and the like.

Scale, in *Music*, see Music. The name is derived from *scala*, a ladder, or flight of stairs, and has reference to the disposition of the notes that ascend or descend upon the written or printed musical stave.

Scale, in *Architecture* and *Geography*, a line divided into equal parts, and placed at the bottom of a map or draught, to serve as a common measure to all the parts of the building, or all the distances and places of the map.

SCALENE, or Scalenous Triangle, *scalenum*, in *Geometry*, a triangle the sides and angles of which are unequal.

SCALIGER, Julius Cæsar, a learned critic, poet, physician, and philosopher, was born at the castle of Ripa, in the territories of Verona, in 1484; and is said to have been descended from the ancient princes of Verona, though this is not mentioned in the letters of naturalization which he obtained in France in 1528. He learned the first rudiments of the Latin tongue in his own country; and in his twelfth year was presented to the Emperor Maximilian, who made him one of his pages. He served that emperor seventeen years, and gave signal proofs of his valour and conduct in several expeditions. He was present at the battle of Ravenna in April 1512, in which he had the misfortune to lose his father Benedict Scaliger, and his brother Titus, on which his mother died with grief; when, being reduced to necessitous circumstances, he entered into the order of the Franciscans, and applied himself to study at Bologna. But soon afterwards, changing his mind with respect to his becoming a monk, he took arms again, and served in Piedmont; at which time a physician persuaded him to study physic, which he did at his leisure hours, and also learned Greek; and at last the gout determined him, at forty years of age, to abandon a military life. He soon afterwards settled at Agen, where he married, and began to apply himself seriously to his studies. He learned first the French tongue, which he spoke perfectly in three months; and then made himself master of the Gascon, Italian, Spanish, German, Hungarian, and Sclavonian; but the chief object of his studies was polite literature. Meanwhile, he supported his family by the practice of physic. He did not publish any of his works till he was forty-seven years of age, when he soon gained a great name in the republic of letters. He had a graceful person, and so strong a memory, even in his old age, that he dictated to his son two hundred verses which he had composed the day before, and retained without writing them down. He was so charitable, that his house was as it were an hospital for the poor and sick; and he had such an aversion to lying, that he would have no correspondence with those who were given to that vice; but, on the other hand, he had much vanity, and possessed a satirical spirit, which created him many enemies. He died of a retention of urine in 1558. He wrote in Latin, 1. A treatise on the Art of Poetry, and, 2. Exercitations against Cardan, which works are much esteemed; 3. Commentaries on Aristotle's History of Animals, and on Theophrastus on Plants; 4. Some treatises on Physic; 5. Letters, Orations, Poems, and other works, in Latin.

SCALIGER, *Joseph Justus*, one of the most learned critics and writers of his time. He was the son of the former, and was born at Agen, in France, in 1540. He studied in the college of Bordeaux; after which his father took him under his own care, and employed him in transcribing his poems. By this means he obtained such a taste for poetry, that before he was seventeen years old he wrote a tragedy upon the subject of Œdipus, in which he introduced all the poetical ornaments of style and sentiment. His father having died in 1558, he went to Paris the year following, with a desire to apply himself to the Greek tongue. For this purpose he for two months attended the lectures of Turnebus; but finding that in the usual course he should be a long time in gaining his point, he shut himself up in his closet, and by constant application for two years gained a perfect knowledge of that language. After this he applied to the Hebrew, which he learned by himself with great facility. He made no less progress in the sciences; and his writings procured him the reputation of one of the greatest men of that or of any other age. He embraced the reformed religion at twenty-two years of age. In 1563, he attached himself to Louis Casteignier de la Roche Pozay, whom he attended in several journeys; and, in 1593, he was invited to accept of the place of honorary professor of the university of Leyden, which he complied with. He died of a dropsy in that city in 1609. He was a man of great temperance, was never married, and was so close a student that he often spent whole days in his study without eating; and though his circumstances were always very narrow, he constantly refused the presents that were offered him. He published many works, the principal of which are, 1. Notes on Seneca's Tragedies, on Varro, Ausonius, Pompeius Festus, &c.; 2. His Latin Poems; 3. A treatise de Emendatione Temporum; 4. Eusebius's Chronicle, with Notes; 5. Canones Isagogici; and many other works. The collections entitled *Scaligeriana* were collected from his conversations by one of his friends; and being ranged into alphabetical order, were published by Isaac Vossius.

SCALPING, in military history, a barbarous custom, in practice among the Indian warriors, of taking off the tops of the scalps of the enemies' skulls with their hair on. They preserve them as trophies of their victories, and are rewarded by their chiefs according to the number of scalps which they bring in.

SCANDARIEH, a village of Irak Arabi, situated on a canal which forms a communication between the Tigris and Euphrates, 120 miles north-west of Bassorah.

SCANDERBEG, the surname of George Castriot, king of Albania, a province of Turkey in Europe, dependent upon the Ottoman empire. He was delivered up with his three elder brothers as hostages, by their father, to Amurath II. sultan of the Turks, who poisoned his brothers, but spared him on account of his youth, being likewise pleased with his juvenile wit and amiable person. In a short time he became one of the most renowned generals of the age; and revolting from Amurath, he joined Hunniade Corvin, a most formidable enemy of the Ottoman power. He defeated the sultan's army, took Amurath's secretary prisoner, and obliged him to sign and seal an order to the governor of Croia, the capital of Albania, to deliver up the citadel and city to the bearer of that order, in the name of the sultan. With this forged order he repaired to Croia, and thus recovered the throne of his ancestors; and maintained the independency of his country against the numerous armies of Amurath and his successor Mahommed II. who was obliged to make peace with this hero in 1461. He then proceeded to the assistance of Ferdinand of Aragon, at the request of Pope Pius II., and by his assistance Ferdinand gained a complete victory over his enemy the Count of Anjou. Scanderbeg died in 1467.

SCANDEROON, a seaport of Syria, on a bay in the south-eastern part of the Mediterranean. About half a mile south is an octagonal castle, well built of hewn stone, called the Castle of Scanderberg, or Alexander. It is surrounded by walls, which are now low; but each side is defended by a tower. To the north is an old square tower, which is inaccessible on account of the morass. It is now reduced to a village of 185 houses, which owes all its importance to its road, the only one in Syria affording good anchorage, but still subject to sudden squalls. The village is extremely unhealthy, as is indicated by the sallow looks of the inhabitants. It is never exempt from a pestilential fever, which is occasioned by putrid exhalations from the neighbouring marshes during the heats of summer. It is thirty miles north of Antioch, and seventy north-west of Aleppo. Long. 36. 15. E. Lat. 36. 36. N.

SCANDINAVIA, a general name for the countries of Norway, Sweden, and Denmark, anciently under the dominion of one prince. The inhabitants of these countries, in former times, were excessively addicted to war. From their earliest years they applied themselves to the military art, and accustomed themselves to cold, fatigue, and hunger. Even the very sports of youth and childhood were dangerous. They consisted in taking frightful leaps, climbing up the steepest rocks, fighting naked with offensive weapons, and wrestling with the utmost fury; so that it was usual to see them grown up to be robust men, and terrible in the combat, at the age of fifteen. At this early age the young men became their own masters, which they did by receiving a sword, a buckler, and a lance. The ceremony was performed at some public meeting. One of the principal men of the assembly named the youth in public; after which he was obliged to provide for his own subsistence, and was either now to live by hunting, or by joining in some incursion against the enemy. Great care was taken to prevent the young men from too early connexions with the female sex; and indeed they could have no hope to gain the affection of the fair, but in proportion to the courage and address they had shown in their military exercises. Accordingly, in an ancient song, we find Bartholin, king of Norway, extremely surprised that his mistress should prove unkind, as he could perform eight different exercises. The children were generally born in camps; and being inured from their infancy to behold nothing but arms, effusion of blood, and slaughter, they imbibed the cruel disposition of their fathers, and when they broke forth upon other nations, behaved rather like furies than like human creatures.

The laws of this people, in some measure, resembled those of the ancient Lacedæmonians. They knew no virtue but bravery, and no vice but cowardice. The greatest penalties were inflicted on such as fled from battle. The laws of the ancient Danes declared such persons infamous, and excluded them from society. Among the Germans, cowards were sometimes suffocated in mud; after which they were covered over with hurdles, to show, says Tacitus, that though the punishment of crimes should be public, there are certain degrees of cowardice and infamy which ought to be buried in oblivion. Frotho king of Denmark enacted by law, that whoever solicited an eminent post ought upon all occasions to attack one enemy, to face two, to retire only one step back from three, and never to make an actual retreat till assaulted by four. The rules of justice were themselves adapted and warped to these prejudices. War was looked upon as a real act of justice, and force was thought to be an incontestable title over the weak, a visible mark that God had intended them to be subject to the strong. They had no doubt but that the intentions of the Deity had been to establish the same dependence among men that takes place among inferior creatures; and, setting out from this principle of the natural inequality among men, they had from thence inferred that the weak had no right to what they could not defend. This maxim was adopted with such rigour, that the name of divine judgment was given not only to the judicial combat, but to conflicts and battles of all sorts; victory being, in their opinion, the only certain mark by which Providence enables us to distinguish those whom it has appointed to command others.

Lastly, their religion, by annexing eternal happiness to the military virtues, gave the utmost possible degree of vigour to that propensity which these people had for war, and to their contempt of death, of which we shall now give some instances. We are informed that Harold, surnamed Blaatand, or Blue-tooth, a king of Denmark, who lived in the beginning of the ninth century, had founded on the coast of Pomerania a city named Julin or Jomsburg. To this place he sent a colony of young Danes, bestowing the government on a celebrated warrior called Palnatoko. In this colony it was forbidden to mention the word fear, even in the most imminent dangers. No citizen of Jomsburg was to yield to any number of enemies, however great. The sight of inevitable death was not to be taken as an excuse for showing the smallest apprehension. And this legislator really appears to have eradicated from the minds of most of the youths bred up under him all traces of that sentiment so natural and so universal, which makes men think on their destruction with horror. Nothing can show this better than a single fact in their history, which deserves to have a place here for its singularity. Some of them having made an irruption into the territories of a powerful Norwegian lord, named Haquin, were overcome in spite of the obstinacy of their resistance, and the most distinguished among them being made prisoners, were, according to the custom of those times, condemned to death. The news of this, far from afflicting them, was on the contrary received with joy. The first who was led to punishment was content to say, without changing countenance, and without expressing the least sign of fear, "Why should not the same happen to me as did to my father? He died, and so must I." A warrior named Thorchill, who was to cut off the head of the second, having asked him what he felt at the sight of death, he answered, "that he remembered too well the laws of Jomsburg, to utter any words that denoted fear." The third, in reply to the same question, said, "he rejoiced to die with glory, and that he preferred such a death to an infamous life like that of Thorchill's." The fourth made an answer much longer and more extraordinary. "I suffer with a good heart, and the present hour is to me very agreeable. I only beg of you," added he, addressing himself to Thorchill, "to be very quick in cutting off my head; for it is a question often debated by us at Jomsburg, whether one retains any sense after being beheaded. I will therefore grasp this knife in my hand; if, after my head is cut off, I strike it towards you, it will show I have not lost all sense; if I let it drop, it will be a proof of the contrary. Make haste, therefore, and decide the dispute." Thorchill, adds the historian, cut off his head in a most expeditious manner; but the knife, as might be expected, dropt from his hand. The fifth showed the same tranquillity, and died rallying and jeering his enemies. The sixth begged of Thorchill that he might not be led to punishment like a sheep: "Strike the blow in my face," said he; "I will sit still without shrinking; and take notice whether I once wink my eyes, or betray one sign of fear in my countenance; for we inhabitants of Jomsburg are used to exercise ourselves in trials of this sort, so as to meet the stroke of death without once moving." He kept his promise before all the spectators, and received the blow without betraying the least sign of fear, or so much as winking with his eyes. The seventh, says the historian, was a very beautiful young man, in the flower of his age. His long hair, as fine as silk, floated in curls and in ringlets on his shoulders. Thorchill asked him what he thought of death. "I receive it willingly," said he, "since I have fulfilled the greatest duty of life, and have seen all those put to death whom I would not survive. I only beg of you one favour, not to let my hair be touched by a slave, or stained with my blood."

Neither was this intrepidity peculiar to the inhabitants of Jomsburg. It was the general character of all the Scandinavians, of which we shall only give this further instance. A warrior, having been thrown upon his back in wrestling with his enemy, and the latter finding himself without his arms, the vanquished person promised to wait, without changing his posture, till his antagonist fetched a sword to kill him; and he faithfully kept his word. To die with arms in his hand was the ardent wish of every free man; and the pleasing idea which they had of this kind of death led them to dread such as proceeded from old age and disease. The history of ancient Scandinavia is full of instances of this way of thinking. The warriors who found themselves lingering in disease often availed themselves of their few remaining moments to shake off life, by a way that they supposed to be more glorious. Some of them would be carried into a field of battle, that they might die in the engagement. Others slew themselves. Many got this melancholy service performed by their friends, who considered it as a most sacred duty. "There is, on a mountain of Iceland," says the author of an old Iceland romance, "a rock so high that no animal can fall from the top of it and live. Here men betake themselves when they are afflicted and unhappy. From this place all our ancestors, even without waiting for sickness, have departed into Eden. It is useless, therefore, to give ourselves up to groans and complaints, or to put our relations to needless expenses, since we can easily follow the example of our fathers, who have all gone by the way of this rock." When all these methods failed, and at last when Christianity had banished such barbarous practices, the disconsolate heroes consoled themselves by putting on complete armour as soon as they found their end approaching.

SCANNING, in *Poetry*, the measuring of verse by feet, in order to see whether or not the quantities be duly observed. The term is chiefly used in Greek and in Latin verses. Thus an hexameter verse is scanned by resolving it into six feet; a pentameter, by resolving it into five feet; and so of the rest.

SCANTLING, a measure, size, or standard, by which the dimensions of things are to be determined. The term is particularly applied to the dimensions of any piece of timber, with regard to its breadth and thickness.

SCAPE-GOAT, in Jewish antiquities, the goat which was set at liberty on the day of solemn expiation. Some say that a piece of scarlet cloth, in form of a tongue, was tied upon the forehead of the scape-goat. (Hoffmann, *Lex. Univ.* in voc. *Lingua.*) Many have been the disputes among the interpreters concerning the meaning of the word scape-goat, or rather of *Azazel*, for which scape-goat is put in our version of the Bible. Spenser is of opinion that Azazel is a proper name, signifying the devil or evil dæmon. Among other things, he observes that the ancient Jews used to substitute the name *Samaël* for Azazel; and many of them have ventured to affirm, that at the feast of expiation they were obliged to offer a gift to Samaël to obtain his favour. Thus also the goat sent into the wilderness to Azazel, was understood to be a gift or oblation. Some Christians have been of the same opinion. But Spenser thinks that the genuine reasons of the ceremony were, that the goat loaded with the sins of the people, and sent to Azazel, might be a symbolical representation of the miserable condition of sinners; that God sent the goat thus loaded to the evil dæmons, to show that they were impure, thereby to deter the people from any conversation or familiarity with them; and that the goat sent to Azazel, sufficiently expiating all evils, the Israelites might the more willingly abstain from the expiatory sacrifices of the Gentiles.

SCAPEMENT, in clock-work, a general term for the manner of communicating the impulse of the wheels to the pendulum. See Clock and Watch Work.

SCAPULA, John, the reputed author of a Greek lexicon, studied at Lausanne. His name is recorded in the annals of literature, neither on account of his talents, nor learning, nor virtuous industry, but for a gross act of disingenuity and fraud which he committed against an eminent literary character of the sixteenth century. Being employed by Henry Stephens as a corrector of his press while he was publishing his *Thesaurus Linguæ Græcæ*, Scapula extracted those words and explications which he reckoned most useful, comprised them in one volume, and published them as an original work, with his own name.

The compilation and printing of the Thesaurus had cost Stephens immense labour and expense; but it was so much admired by those learned men to whom he had shown it, and seemed to be of such essential importance to the acquisition of the Greek language, that he reasonably hoped his labour would be crowned with honour, and that the money he had expended would be repaid by a rapid and extensive sale. But before his work came abroad, Scapula's abridgment appeared, which, from its size and price, was quickly purchased, while the Thesaurus itself lay neglected in the author's hands. The consequence was a bankruptcy on the part of Stephens, while he who had occasioned it was enjoying the fruits of his treachery. Scapula's Lexicon was first printed in the year 1570, in 4to. It was afterwards enlarged, and published in folio; and it has gone through several editions, while the valuable work of Stephens has never been reprinted. Its success is, however, not owing to its superior merit, but to its moderate price and commodious size. Stephens charges the author with omitting a great many important articles. He accuses him of misunderstanding and perverting his meaning, and of tracing out absurd and trifling etymologies, which he himself had been careful to avoid. Dr Busby, so much celebrated for his knowledge of the Greek language, and his success in teaching it, would never permit his scholars at Westminster school to make use of Scapula.

SCAPULAR, or Scapulary, a part of the habit of several religious orders in the Church of Rome, worn over the gown as a badge of peculiar veneration for the blessed Virgin. It consists of two narrow slips or breadths of cloth covering the back and the breast, and hanging down to the feet. The devotees of the scapulary celebrate its festival on the 10th of July.

SCARBOROUGH, a town on the shore of the German Ocean, in the lathe of Pickering, in the north riding of the county of York, and 216 miles from London. This town is distant about five leagues north-west from Flamborough Head. It has a harbour, which is dry at low water, and of late has been so improved as to afford shelter, in all gales of wind upon the coast, to vessels capable of bearing the ground. The ancient pier has been extended, and formed into a new harbour, which may be resorted to when the old harbour is crowded, and where are placed dolphins and mooring rings. A lighthouse has been erected upon the pier, which is kept burning from half flood to half ebb, as a direction to vessels entering in the night.

Though the harbour of Scarborough is thus useful as a protection for the smaller class of vessels, the trade of the port is not extensive. The chief exports consist of bacon hams, butter, and corn; and the chief imports are coals, timber, flax, and iron, with wine, gin, brandy, and rum, from the places of their growth, and groceries from London. The only manufactories are those connected with shipping, such as cordage and sail-cloth. The building of ships forms some occupation, but it is a fluctuating and precarious employment.

The chief importance of Scarborough arises from its being a most agreeable bathing-place, to which strangers repair in the summer. Besides the inducement to sea-bathing, many resort to it on account of its mineral springs, called the Spa.

The situation and view of Scarborough, either from the land or the sea, is striking and picturesque. The castle, on an extensive site, now in ruins, stands on a promontory running into the sea, and rising to the height of more than 300 feet above it. It was built in the reign of King Stephen, in 1136, and must have been then a place of unassailable strength, extending over an area of nineteen acres, the walls of which can be still traced, and having within it a copious well of water. The keep is at present in tolerable preservation. It is a square Norman building, ninety feet in height, and had formerly an embattled parapet. The walls are about twelve feet in thickness, cased with squared stones; and the mortar having been, according to ancient custom, in a fluid state, has become more durable than even the stone of the building.

The town confers the title of earl upon the family of Lumley. It returns two members to the House of Commons, as heretofore. By the municipal reform law it is now divided into two wards, in which are chosen six aldermen and eighteen councillors. The population (taken in May, when no visiters are in the town) amounted in 1801 to 6409, in 1811 to 6710, in 1821 to 8188, and in 1831 to 8760.

rdona ‖ arpa.

SCARDONA, a seaport town of Dalmatia, situated on the eastern bank of the river Cherca. It has been taken and retaken several times by the Turks and Venetians, the latter of whom ruined the fortifications and its principal buildings in 1537.

SCARIFICATION, in *Surgery*, the operation of making several incisions in the skin by means of lances or other instruments, particularly the cupping instrument.

SCARP, in *Fortification*, is the interior talus or slope of the ditch next the place, at the foot of the rampart.

SCARP, in *Heraldry*, the scarf which military commanders wear for ornament. It is borne somewhat like a battoon sinister, but is broader and continued out to the edges of the field, whereas the battoon is cut off at each end.

SCARPA, ANTONIO, was born in Lombardy between the years 1746 and 1750. He early distinguished himself as an anatomist and surgeon, and his works, in both these branches of science, have spread his reputation throughout all Europe. For many years he occupied the chairs of clinical and operative surgery in the school of Pavia; and when he became emeritus professor, he was really the director of the faculty of medicine in the university which he so greatly contributed to render celebrated. Scarpa was an exact as well as a laborious observer, and did more than most men of his time to advance the progress of surgery. Surgical anatomy, which has given a particular direction to the researches of surgeons, owes its first development to the labours of Scarpa, and forms, in some sort, the distinctive character of his productions.

His works are not altogether free from faults. They recommend themselves more by the beauty than by the precision of their style; but the excellence of the precepts which his writings convey, and the judicious and original observations on which they are based, have placed several of them in the rank of classical books, and have led to their translation into most of the languages of Europe.

Scarpa commenced his career as an anatomist, but afterwards directed his attention principally to the practice of surgery; and if he sometimes maintains opinions that are paradoxical, if his theories and his precepts are at times hardly defensible, we still recognise, even in his errors, the views of a great master, and thoughts which direct the reader to useful reflection.

Uniting to the love of science an exquisite taste for the fine arts, the author has illustrated his writings with engravings, which are models of exactness, elegance, and purity. The plates which represent the nerves of the heart, and those which accompany the treatises on hernia and aneurism, are among the most perfect productions of this kind.

Scarpa is author of a number of writings, many of them inserted in the journals of Italy, and on local subjects which are little known. His principal works are, 1. Anatomicæ Disquisitiones de Auditu et Olfactu, Pavia, 1789, in folio; 2. Tabulæ Neurologicæ ad illustrandam Historiam Cardiacorum Nervorum, Pavia, 1794, in folio; 3. Commentarius de Penitiori Ossium Structura, Leips. 1799, in 4to; 4. Sull' Ernie, Memorie Anatomico-chirurgiche, Milan, 1810, in folio; 5. Riflessioni ed Osservazioni Anatomico-chirurgiche sull' Aneurisma, Pavia, 1804, in folio; 6. Saggio di Osservazioni ed Esperienze sulle principali Malattie degli occhi, Pavia, 1801, in 4to; 7. Sul taglio Ipogastrico per l'Estrazione della pietra dalla Vesica Orinaria, Milan, 1820, in 4to; 8. Sullo Scirro e sul Cancro, Milan, 1821, in 4to; 9. Memoria sulla Ligatura delle principale Arterie; 10. Lettera sulla Ligatura temporaria delle grosse Arterie degli arti, Milan, 1823, in 8vo; 11. Saggio di Osservazioni sul taglio Retto-vesicale per l'Estrazione della pietra dalla Vesica Orinaria, Pavia, 1823, in 8vo; 12. Esame della terza Memoria del Professore Vacca sul taglio Retto-vesicale, Milan, 1824, in 8vo; 13. Memoria sull Idrocele del Cordone Spermatico, Pavia, 1823, in 4to.

Scarron.

SCARRON, PAUL, a famous burlesque writer, was the son of a counsellor in parliament, and born at Paris about the end of the year 1610, or in the beginning of the succeeding year. His father having married a second time, he was compelled to assume the ecclesiastical profession. At the age of twenty-four he visited Italy, where he freely indulged in licentious pleasures. After his return to Paris, he persisted in a life of dissipation, till a long and painful disease convinced him that his constitution was almost worn out. At length, when engaged in a party of pleasure at the age of twenty-seven, he lost "the use of those legs which danced so gracefully, and of those hands which could paint and play on the lute with so much elegance." In the year 1638 he was attending the carnival at Mons, of which he was a canon. Having dressed himself one day as a savage, his singular appearance excited the curiosity of the children of the town. They followed him in multitudes, and he was obliged to take shelter in a marsh. This wet and cold situation produced a numbness which totally deprived him of the use of his limbs; but notwithstanding this misfortune he continued gay and cheerful. He took up his residence at Paris, and by his pleasant humour soon attracted to his house all the men of wit about the city. The loss of his health was followed by the loss of his fortune. On the death of his father he entered into a process with his mother-in-law. He pleaded the cause in a ludicrous manner, though his whole fortune depended on the decision, and accordingly lost the cause. Mademoiselle de Hautefort, compassionating his misfortunes, procured for him an audience of the queen. The poet requested to have the title of valetudinarian to her majesty. The queen smiled, and Scarron considered the smile as the commission to his new office. He therefore assumed the title of "Scarron, by the grace of God unworthy valetudinarian to the queen."

Cardinal Mazarin gave him a pension of five hundred crowns; but that minister having received disdainfully the dedication of his Typhon, the poet immediately wrote a *Mazarinade*, and the pension was withdrawn. He then attached himself to the Prince of Conde, and celebrated his victories. He at length formed the extraordinary resolution of marrying, and was accordingly, in 1651, married to Mademoiselle d'Aubigné, afterwards Madame de Maintenon, who was then only sixteen years of age. "At that time," says Voltaire, "it was considered as a great acquisition for her to gain for a husband a man who was disfigured by nature, impotent, and very little enriched by fortune." When Scarron was questioned about the contract of marriage, he said he acknowledged to the bride two large invincible eyes, a very beautiful shape, two fine hands, and a large portion of wit. The notary demanded what dowry he would give her. Scarron immediately replied, "The names of the wives of kings die with them, but the name of Scarron's wife shall live for ever." She restrained by her modesty his indecent buffooneries, and the good company which had formerly resorted to his house were not less frequent in their visits. Scarron now became a new man. He grew more decent in his manners and conversation; and his gaiety, when tempered with moderation, was still more agreeable. But, in the mean time, he lived with so little economy, that his income was soon reduced to a small annuity and his marquisate of Quinet. By the marquisate of Quinet, he meant the revenue he derived from his publications, which were printed by one Quinet. He was accustomed to talk to his superiors with great freedom in his jocular style. In the dedication to his *Don Japhet d'Armenie*, he thus addresses the king: "I shall endeavour to persuade your majesty that you would do yourself no injury were you to do me a small favour; for in that case I should become more gay. If I should become more gay, I should write sprightly comedies; and if I should write sprightly comedies, your majesty would be amused, and thus your money would not be lost. All this appears so evident, that I should certainly be convinced of it if I were as great a king as I am now a poor unfortunate man."

Although Scarron wrote comedies, he had neither time nor patience to study the rules and models of dramatic poetry. Aristotle and Horace, Plautus and Terence, would have frightened him; and perhaps he did not know that there was ever such a person as Aristophanes. He saw an open path before him, and he followed it. It was the fashion of the times to pillage the Spanish writers. Scarron was acquainted with that language, and he found it easier to use the materials which were already prepared, than to rack his brain in inventing a subject; a restraint to which a genius like his could not easily submit. As he borrowed liberally from the Spanish writers, a dramatic piece did not cost him much labour. His labour consisted not in making his comic characters talk humorously, but in keeping up serious characters; for the serious was a foreign language to him. The great success of his *Jodelet Maître* was a vast allurement to him. The comedians who acted it eagerly requested more of his productions. They were written without much toil, and they procured him large sums. They served to amuse him. When the office of historiographer became vacant, he solicited for it without success. At length Fouquet gave him a pension of sixteen hundred livres. Christina queen of Sweden having come to Paris, was anxious to see Scarron. "I permit you," said she to Scarron, "to fall in love with me. The queen of France has made you her valetudinarian, and I create you my Roland." But Scarron did not long enjoy that title. He was seized with so violent a hiccough, that every person thought he would have expired. "If I recover," he said, "I will make a fine satire on the hiccough." His gaiety did not forsake him to the last. Within a few minutes of his death, when his domestics were shedding tears about him, "My goods friends," said he, "I shall never make you weep so much for me as I have made you laugh." Just before expiring, he said, "I could never believe before that it is so easy to laugh at death." He died on the 14th of October 1660, in the fifty-first year of his age.

His works have been collected and published by Bruzen de la Martiniere, in ten volumes 12mo, 1737. There are, 1. The Æneid travestied, in eight books. It was afterwards continued by Moreau de Brasey. 2. Typhon, or the Gigantomachia. 3. Many comedies, as Jodelet, or the Master Valet, Jodelet Cuffed, Don Japhet d'Armenie, the Ridiculous Heir, Every Man his own Guardian, the Foolish Marquis, the Scholar of Salamanca, the False Appearance, and the Prince Corsaire, a tragi-comedy. Besides these, he wrote other pieces in verse. 4. His Comic Romance, in prose, which is the only one of his works that deserves attention. It is written with much purity and gaiety, and has contributed not a little to the improvement of the French language. Scarron had great pleasure in reading his works to his friends as he composed them, which he called trying his works. Segrais and another of his friends coming to him one day, "Take a chair," said Scarron to them, "and sit down, that I may examine my Comic Romance." When he observed the company laugh, "Very well," said he, "my book will be well received, since it makes persons of such delicate taste laugh." Nor was he deceived. His romance had a prodigious run. It was the only one of his works that Boileau could submit to read. 5. Spanish novels translated into French. 6. A volume of Letters. 7. Poems, consisting of songs, epistles, stanzas, odes, and epigrams. The whole collection abounds with sprightliness and gaiety.

SCEAUX, an arrondissement of the department of the Seine, in France, to the south of Paris. It extends over 23,909 hectares, equal to 53,796 acres, or eighty-four square miles, and is divided into four cantons, and these into forty-three communes, which, in 1836, contained 87,708 inhabitants. The chief town, which is of the same name, had formerly a fine palace and park; but the orangery only now remains. It has considerable manufactories of china, and contains 1670 inhabitants.

SCENE, in its primary sense, denotes a theatre, or the place where dramatic pieces and other public shows are exhibited. It does not appear that the ancient poets were at all acquainted with the modern way of changing the scenes in the different parts of the play, in order to raise the idea of the persons represented by the actors being in different places.

The original scene for the acting of plays was as simple as the representations themselves. It consisted only of a plain plot of ground proper for the occasion, which was in some degree shaded by the neighbouring trees, the branches of which were made to meet together, and their vacancies supplied with boards, sticks, and the like; and to complete the shelter, these were sometimes covered with skins, and sometimes with only the branches of other trees newly cut down, and full of leaves. Afterwards more artificial scenes, or scenical representations, were introduced, and paintings used instead of the objects themselves. Scenes were then of three sorts; tragic, comic, and satiric. The tragic scene represented stately magnificent edifices, with decorations of pillars, statues, and other things suitable to the palaces of kings. The comic exhibited private houses with balconies and windows, in imitation of common buildings. And the satiric was the representation of groves, mountains, dens, and other rural appearances; and these decorations either turned on pivots, or slid along grooves as those in our theatres.

SCENE is also a part or division of a dramatic poem. Thus plays are divided into acts, and acts are again subdivided into scenes; in which sense the scene is properly the persons present at or concerned in the action on the stage at such a time. Whenever, therefore, a new actor appears, or an old one disappears, the action is changed into other hands; and therefore a new scene then commences.

It is one of the laws of the stage, that the scenes be well connected; in other words, that one succeed another in such a manner as that the stage be never quite empty till the end of the act.

SCENOGRAPHY, from the Greek σκηνη, *scene*, and γραφη, *description*, in perspective, is a representation of a body on a perspective plane; or a description of it in all its dimensions, such as it appears to the eye.

SCEPTIC, σκηπτικος, from σκεπτομαι, *I consider, look about*, or *deliberate*, properly signifies considerative and inquisitive, or one who is always weighing reasons on one side and the other, without ever deciding between them. It is chiefly applied to an ancient sect of philosophers founded by Pyrrho, who, according to Laertius, had various other denominations. From their master they were called Pyrrhonians; from the distinguishing tenets or characteristic of their philosophy they derived the name of *Aporctici*, from ἀπορειν, *to doubt*; from their suspension and hesitation they were called *ephectici*, from ἐπεχειν, *to stay* or *keep back*; and, lastly, they were called *zetetici*, or seekers, from their never getting beyond the search of truth.

That the sceptical philosophy is absurd, can admit of no dispute in the present age; and that many of the followers of Pyrrho carried it to the most ridiculous height, is not less true. But we cannot believe that he himself was so extravagantly sceptical as has sometimes been asserted, when we reflect on the particulars of his life, which are still preserved, and the respectful manner in which we find him mentioned by his contemporaries and writers of the first name who flourished soon after him. The truth, as far as at this distance of time it can be discovered, seems to be, that he learned from Democritus to deny the real existence of all

Sceptic.

qualities in bodies, except those which are essential to primary atoms; and that he referred every thing else to the perceptions of the mind produced by external objects, in other words, to appearance and opinion. All knowledge of course appeared to him to depend on the fallacious report of the senses, and consequently to be uncertain; and in this notion he was confirmed by the general spirit of the Eleatic School, in which he was educated. He was further confirmed in his scepticism by the subtilties of the Dialectic school, in which he had been instructed by the son of Stilpo; choosing to overturn the cavils of sophistry by recurring to the doctrine of universal uncertainty, and thus breaking the knot which he could not unloose. For being naturally and habitually inclined to consider immoveable tranquillity as the great end of all philosophy, he was easily led to despise the dissensions of the dogmatists, and to infer from their endless disputes, the uncertainty of the questions on which they debated; controversy, as it has often happened to others, becoming also with respect to him the parent of scepticism.

Pyrrho's doctrines, however new and extraordinary, were not totally disregarded. He was attended by several scholars, and succeeded by several followers, who preserved the memory of his notions. The most eminent of his followers was Timon, in whom the public succession of professors in the Pyrrhonic school terminated. In the time of Cicero it was almost extinct, having suffered much from the jealousy of the dogmatists, and from a natural aversion in the human mind to acknowledge total ignorance, or to be left in absolute darkness. The disciples of Timon, however, still continued to profess scepticism, and their notions were embraced, privately at least, by many others. The school itself was afterwards revived by Ptolemæus a Cyrenian, and was continued by Ænesidemus a contemporary of Cicero, who wrote a treatise on the principles of the Pyrrhonic philosophy, the heads of which are preserved by Photius. From this time it was continued through a series of preceptors of little note to Sextus Empiricus, who also gave a summary of the sceptical doctrine.

A system of philosophy thus founded on doubt, and clouded with uncertainty, could neither teach tenets of any importance, nor prescribe a certain rule of conduct; and accordingly we find that the followers of scepticism were guided entirely by chance. As they could form no certain judgment respecting good and evil, they accidentally learned the folly of eagerly pursuing any apparent good, or of avoiding any apparent evil; and their minds of course settled into a state of undisturbed tranquillity, the grand postulatum of their system.

In the schools of the sceptics we find ten distinct topics of argument urged in support of the doctrine of uncertainty; with this precaution, however, that nothing could be positively asserted either concerning their number or their force. These arguments chiefly respect objects of sense. They place all knowledge in appearance; and as the same things appear very different to different people, it is impossible to say which appearance most truly expresses their real nature. They likewise say that our judgment is liable to uncertainty from the circumstance of frequent or rare occurrence, and that mankind are continually led into different conceptions concerning the same thing, by means of custom, law, fabulous tales, and established opinions. On all these accounts, they think every human judgment is liable to uncertainty; and concerning any thing, they can only assert that it seems to be, not that it is what it seems.

This doubtful reasoning, if reasoning it may be called, the sceptics extended to all the sciences, in which they discovered nothing true, or which could be absolutely asserted. In all nature, in physics, morals, and theology, they found contradictory opinions, and inexplicable or incomprehensible phenomena. In physics, the appearances, they thought, might be deceitful; and respecting the nature of God and the duties of morality, men were, in their opinion, equally ignorant and uncertain. To overturn the sophistical arguments of these sceptical reasoners, would be no difficult matter, if their reasoning were worthy of confutation. Indeed, the great principle is sufficiently, though shortly, refuted by Plato, in these words. "When you say all things are incomprehensible," says he, "do you comprehend or conceive that they are thus incomprehensible, or do you not? If you do, then something is comprehensible; if you do not, there is no reason we should believe you, since you do not comprehend your own assertion."

Sceptre || Schaffhausen.

But scepticism has not been confined entirely to the ancients and to the followers of Pyrrho. Numerous sceptics have arisen also in modern times, varying in their principles, manners, and character, as chance, prejudice, vanity, weakness, or indolence, prompted them. The great object, however, which they seem to have in view is to overturn, or at least to weaken, the evidence of analogy, experience, and testimony; though some of them have even attempted to show, that the axioms of geometry are uncertain, and its demonstrations inconclusive. This last attempt has not indeed been often made; but the chief aim of Mr Hume's philosophical writings is to introduce doubts into every branch of physics, metaphysics, history, ethics, and theology. It is needless to give a specimen of his reasonings in support of modern scepticism. The most important of them have been noticed in the articles MIRACLE, METAPHYSICS, and PHILOSOPHY; and such of our readers as have any relish for speculations of that nature can be no strangers to his Essays, or to the able confutations of them by Reid, Campbell, Gregory, Beattie, and Stewart, who have likewise exposed the weakness of the sceptical reasonings of Descartes, Malebranche, and other philosphers of great fame in the same school.

SCEPTRE, a kind of royal staff, borne on solemn occasions by kings, as a badge of their command and authority. Nicod derives the word from the Greek σκηπτρον, which, he says, originally signified a javelin, which the ancient kings usually bore as a badge of their authority, that instrument being in very great veneration among the heathens. But σκηπτρον does not properly signify a javelin; it means a staff to rest upon, from σκηπτω, *innitor*, I lean upon. Accordingly, in the simplicity of the earlier ages of the world, the sceptres of kings were no other than long walking staves; and Ovid, in speaking of Jupiter, describes him as resting on his sceptre. The sceptre is an ensign of royalty of greater antiquity than the crown. The Greek tragic and other poets put sceptres in the hands of the most ancient kings they introduce. Justin observes, that the sceptre, in its original, was a *hasta*, or spear. He adds, that, in the most remote antiquity, men adored the *hastæ* or sceptres as immortal gods; and that it was upon this account that, even in his time, they still furnished the gods with sceptres. Neptune's sceptre is his trident. Tarquin the Elder was the first who assumed the sceptre among the Romans. Legendre tells us, that, in the first race of the French kings, the sceptre was a golden rod, almost always of the same height with the king who bore it, and crooked at one end like a crozier. Frequently, instead of a sceptre, kings are seen on medals with a palm in their hand.

SCHAFFHAUSEN, one of the cantons of Switzerland. It is bounded on the north, east, and west, by the grand duchy of Baden; and on the south by the Rhine, which divides it from the cantons of Thurgau and Zurich. It is only 120 square miles in extent, in which are comprehended three cities, four market-towns, and thirty-five villages. It contains 28,050 inhabitants, who, except about 200 Roman Catholics, adhere to the reformed church. The force to be contributed to the general confederation is fixed at 466 men, and the payment in money at 9320 francs. The chief article of cultivation is wine, which, though not of the best quality, finds a ready sale in the other cantons, and hence the hills are mostly covered with vineyards. Corn is raised about equal in amount to the consumption, and the meadows feed many cows, which produce much good butter. The river Rhine receives all the streams of the canton. The capital is the city of the same name, about one mile above the natural cascade of the Rhine. It is an antique-looking town, with a narrow street and large houses; it is also walled, and has a citadel. There are three churches, a council-house, and several hospitals; and it contains 7000 inhabitants, who carry on cotton-weaving, calico-printing, and make caps, hats, and hosiery. Long. 8. 32. E. Lat. 47. 42. N.

SCHAMACHI, the capital of the province of Shirvan, in Persia, once large, populous, and commercial, but now ruined, and its remains entirely covered with thick brushwood. The modern city is called New Schamachi, and is situated in a plain on the river Aksisi, about thirty miles from the Kur, and nearly the same distance from the Caspian. It is built in a square form, each side of which is eight hundred paces long; and the walls are in tolerable repair, built of unburned brick, and surrounded with a very broad and deep ditch. It is supposed to have contained 6000 inhabitants previous to its capture during the late war by Aga Mahommed. It was desolated by this tyrant, and has not recovered from its fallen state. Long. 48. 45. E. Lat. 40. 27. N.

SCHANCK, Cape, a rocky point, with three rocky islets lying off it, on the south coast of New Holland. It is the west point of the principal entrance into Western Port. Long. 144. 53. E. Lat. 38. 30. S.

SCHANTARSKIJA, three islands off the eastern coast of Asiatic Russia, in the Sea of Okhotzk. Long. 138. to 139. E. Lat. 55. 15. to 55. 30. N.

SCHAREDSJE, or Zaka, an island in the Persian Gulf, near the coast of Arabia, about thirty miles in circumference. Long. 54. 15. E. Lat. 25. N.

SCHASBURG, a city in the Austrian duchy of Sievenburgen, the capital of a circle of its own name. It is situated on a hill near the river Kokel, consisting of two towns, one of which is surrounded with walls, and the other a kind of suburb. It contains four Lutheran churches, with a Catholic and a Greek one, 1230 houses, and 7100 inhabitants, chiefly of the Saxon race. There is a Lutheran college, and considerable manufacturing industry employed in making cotton and linen goods. Long. 23. 43. E. Lat. 46. 10. 9. N.

SCHAUENBURG, a province of the principality of Hesse-Casel, in Germany, adjoining to Hanover, Lippe-Detmold, and Lippe-Schauenburg. It is 193 square miles in extent, a poor sandy district, except on such parts as are near the river Weser, which are of moderate fertility. It comprehends five towns and 130 villages and hamlets, with 28,600 inhabitants, whose chief occupation, besides that of agriculture, is the spinning of flax. It produces some good coal, and abundance of wood. It is divided into three bailiwicks, and the capital is the city of Rentelen, on the Weser, containing 2850 inhabitants.

Schauenburg-Lippe, a small independent principality in the north of Germany, between Hanover on the north and north-east, Hesse-Casel on the east and south-east, and the Prussian Westphalian province on the south-west and the west. It extends over 210 square miles, and comprehends two small cities, three market-towns, and 108 villages, with a population of 23,128 persons, who all adhere to the Lutheran church, except 3600 Calvinists and about 100 Roman Catholics. The revenues of the prince amount to about L.21,500, wholly drawn from his domains, no taxes of any kind being demanded; and as the reigning prince was in his minority during the time of the greatest suffering in this part of Germany, his guardian managed so prudently as to leave him without any debt. The principality is bound to provide a force of 240 men to the German confederation. The face of the country is undulating, but there are no hills of great height, and all are capable of cultivation. It rises gradually from the right bank of the Weser, into which run all the streams of the principality. It has one large lake, the Steinhuder, nearly fifty miles in compass, on which is a strong fortress used as an arsenal, and it is most abundantly stocked with fish. It has some valuable mineral springs; one near Stadthagen is resorted to for curative purposes. There are some valuable coal-mines worked, which belong to the prince, and are said to form one quarter of his revenue. There are many flocks of sheep, some yielding fine wool from the native races having been crossed by merinos. The soil produces more corn than is consumed; and it, with wool, flax, wood, and coal, are the chief objects of trade. The capital is Buckeberg, a city of 4220 inhabitants, on a gradual ascent from the Weser, and six miles from Minden.

SCHAZK, a city of Russia, the capital of a circle of the same name, within the province of Tambov. It is 737 miles from St Petersburg, on the river Schazk. It is old and ill built, and contains eight churches, only three of stone, 1011 houses, with 6800 inhabitants, chiefly making hempen goods, and cultivating that plant. Long. 41. 49. E. Lat. 54. 26. N.

SCHECHE SURE, or Surde, a small island in the Persian Gulf, with a village on the southern coast, where water and provisions may be obtained. Long. 54. 30. E. Lat. 26. 8. N.

SCHEDUAN, an immense naked rock in the Red Sea, eight miles long and five broad, at nearly an equal distance from the coasts of Asia and Africa. Lat. 27. 35. N.

SCHEDULE, a scroll of paper or parchment, annexed to a will, lease, or other deed, containing an inventory of goods, or some other matter omitted in the body of the deed. The word is a diminutive of the Latin *scheda*, or Greek σχέδη, a leaf or piece of paper.

SCHEELE, Charles William, was born on the 19th of December 1742, at Stralsund, where his father had kept a shop. When he was very young, he received the usual instructions of a private school; and was afterwards advanced to an academy. At a very early age he showed a strong desire to follow the profession of an apothecary, and his father suffered him to gratify his inclinations. With Mr Bauch, an apothecary at Gottenburg, he served his apprenticeship, which was completed in six years. He remained, however, some time longer at that place, and it was there that he so excellently laid the foundations of his knowledge. Among the various books which he read that treated of chemical subjects, Kunckell's Laboratory seems to have been his favourite. He used to repeat many of the experiments contained in that work privately in the night, when the rest of the family had retired to rest. A friend of Scheele's had remarked the progress which he had made in chemistry, and had asked him by what inducements he had at first been led to study a science in which he had gained such knowledge. Scheele replied, "The first cause, my friend, arose from yourself. Nearly at the beginning of my apprenticeship you advised me to read Neuman's Chemistry, from the perusal of which I became eager to make experiments myself; and I remember very well how I mixed together, in a conserve-glass, oil of cloves and fuming acid of nitre, which immediately took fire. I see also still before my eyes an unlucky experiment which I made with pyrophorus. Circumstances of this kind did but the more inflame my desire to repeat experiments." After Scheele's departure from Gottenburg in the year 1765, he obtained a place with Kalstrom, an apothecary at Malmo. Two years afterwards he went from thence to Stockholm, and managed the shop of Mr Scharenberg. In 1773, he changed this appointment for another at Upsal, under Mr

Loock. Here he was fortunately situated, as, from his acquaintance with learned men, and from having free access to the university laboratory, he had opportunities of increasing his knowledge. At this place also he happily commenced the friendship which subsisted between him and Bergman. During his residence at this place, Prince Henry of Prussia, accompanied by the Duke of Sudermania, visited Upsal, and chose this opportunity to see the academical laboratory. Scheele was accordingly appointed by the university to exhibit to them some chemical experiments. This office he undertook, and showed some of the most curious processes in chemistry. The two princes asked him many questions, and expressed their approbation of the answers which he returned to them. The duke asked him of what country he was, and seemed to be much pleased when Scheele informed him that he was born at Stralsund. At their departure they told the professor, who was present, that they should esteem it a favour if he would permit the young man to have free access to the laboratory as often as he chose to make experiments.

In the year 1777 Scheele was appointed by the Medical College to be apothecary at Koping. It was at that place that he soon showed the world how great a man he was, and that no place or situation could confine his abilities. When he was at Stockholm he showed his acuteness as a chemist, as he discovered there the new and wonderful acid contained in the fluor spar. It has been confidently asserted that Scheele was the first who discovered the nature of the aerial acid, and that whilst he was at Upsal he made many experiments to prove its properties. This circumstance might probably have furnished Bergman with the means of treating this subject more fully. At the same place he began the series of excellent experiments on that remarkable mineral substance manganese; from which investigation he was led to make the very valuable and interesting discovery of oxymuriatic acid. At the same time he examined the properties of ponderous earth.

At Koping he finished his Dissertation on Air and Fire; a work which the celebrated Bergman most warmly recommended in the friendly preface which he wrote for it. The theory which Scheele endeavours to prove in this treatise is, that fire consists of pure air and phlogiston. According to more recent opinions, if inflammable air be phlogiston, water is composed of these two principles. Of these opinions we may say, in the words of Cicero, "Opiniones tam variæ sunt tamque inter se dissidentes ut alterum profecto fieri potest ut earum nulla, alterum certe non potest ut plus una vera sit." The author's merit in this work, exclusive of the encomiums of Bergman, was sufficient to obtain the approbation of the public; as the ingenuity displayed in treating so delicate a subject, and the many new and valuable observations which are dispersed through the treatise, justly entitled the author to that fame which his book procured him. It was spread abroad throughout every country, became soon out of print, and was reprinted, and translated into many languages. The English translation is enriched with the notes of that accurate and truly philosophical genius Mr Richard Kirwan.

Scheele now diligently employed himself in contributing to the Transactions of the Academy at Stockholm. He first pointed out a new way to prepare the salt of benzoin. In the same year he discovered that arsenic, freed in a particular manner from phlogiston, partakes of all the properties of an acid, and has its peculiar affinities to other substances.

In a Dissertation on Flint, Clay, and Alum, he clearly overturned Beaumé's opinion of the identity of the siliceous and argillaceous earths. He published an Analysis of the Human Calculus. He showed also a mode of preparing *mercurius dulcis* in the humid way, and improved the process of making the powder of algaroth. He analysed the mineral substance called molybdena, or flexible black lead. He discovered a beautiful green pigment. He showed us how to decompose the air of the atmosphere. He discovered that some neutral salts are decomposed by lime and by iron. He decomposed plumbago, or the common black lead. He observed, with peculiar ingenuity, an acid in milk, which decomposes acetated alkali; and in his experiments on the sugar of milk, he discovered another acid, different in some respects from the above-mentioned acids and the common acid of sugar. He accomplished the decomposition of tungsten, the component parts of which were before unknown, and found in it a peculiar metallic acid united to lime. He published an excellent dissertation on the different sorts of ether. He found out an easy way to preserve vinegar for many years. His investigation of the colouring matter in Prussian blue, the means he employed to separate it, and his discovery that alkali, sal ammoniac, and charcoal, mixed together, will produce it, are strong marks of his penetration and genius. He found out a peculiar sweet matter in expressed oils after they have been boiled with litharge and water. He showed how the acid of lemons may be obtained in crystals. He found the white powder in rhubarb, which Model thought to be selenite, and which amounts to one seventh of the weight of the root, to be calcareous earth united to the acid of sorrel. This suggested to him the examination of the acid of sorrel. He precipitated acetate of lead with it, and decomposed the precipitate thus obtained by the vitriolic acid, and by this process he obtained the common acid of sugar; and by slowly dropping a solution of fixed alkali into a solution of the acid of sugar, he regenerated the acid of sorrel. From his examination of the acids contained in fruits and berries, he found not one species of acid alone, viz. the acid of lemon, but also another, which he denominated the malaceous or malic acid, from its being found in the greatest quantity in apples.

By the decomposition of Bergman's new metal, siderite, he showed the truth of Meyer's and Klaproth's conjecture concerning it. He boiled the calx of siderite with alkali of tartar, and precipitated nitrate of mercury by the middle salt which he obtained by this operation. The calx of mercury which was precipitated was found to be united to the acid of phosphorus, so that he demonstrates that this calx was phosphoretted iron. He found also that the native Prussian blue contained the same acid. He discovered, by the same means, that the perlate acid, as it was called, was not an acid *sui generis*, but the phosphoric united to a small quantity of the mineral alkali. He suggested an improvement in the process for obtaining magnesia from Epsom salt; and he advises the adding of an equal weight of common salt to the Epsom salt, so that an equal weight of Glauber's salt may be obtained; but this will not succeed unless during the cold of winter. These are the valuable discoveries of this great philosopher, which are to be found in the Transactions of the Royal Society at Stockholm. Most of his essays have been published in French by Madame Picardet and M. Morveau of Dijon. Dr Beddoes also has made a very valuable present to his countrymen of an English translation of a great part of Scheele's dissertations, to which he has added some useful and ingenious notes.

Viewing Scheele as a philosopher, we must judge of him from his many and important discoveries. What concerns him as a man we are informed of by his friends, who affirm that his moral character was irreproachable. It was matter of remark, that his chemical apparatus was neither neat nor convenient; his laboratory was small and confined; nor was he particular in regard to the vessels which he employed in his experiments, so that we may justly wonder how such discoveries and such experiments could have been made. He understood none of the modern languages except the German and Swedish; and he had not the advantage of being benefited by the early intelligence of discoveries made by foreigners, but was forced to wait till the intelligence was conveyed to him in the slow and uncertain channel of translation.

It was often wished that he would quit his retirement at Koping, and move in a larger sphere. It was suggested to him that a place might be procured in England, which might afford him a good income and more leisure; and indeed latterly an offer was made to him of an annuity of L.300 if he would settle in this country. But death put an end to this project. For half a year before this melancholy event his health had been declining, and he himself was sensible that he would not recover. On the 19th of May 1786 he was confined to his bed; on the 21st he bequeathed all of which he was possessed to his wife, who was the widow of his predecessor at Koping, and whom he had lately married; and on the same day he departed this life. Thus, in less than two years, the world lost Bergman and Scheele, of whom Sweden may justly boast, as philosophers who were beloved and lamented by all their contemporaries, and whose memory posterity will never cease to revere.

SCHEINER, Christopher, a German mathematician and astronomer, eminent for being the first who discovered spots on the sun, was born at Schwaben, in the territory of Middleheim, in 1575. He first discovered spots on the sun's disk in 1611, and made observations on these phenomena at Rome, until at length reducing them to order, he published them in one volume folio in 1630. He wrote also some smaller things relating to mathematics and philosophy, and died in 1660.

SCHELDT, a river which rises on the confines of Picardy, and runs north-east by Cambray, Valenciennes, Tournay, and Oudenarde, and receiving the Lis at Ghent, runs east by Dendermond, and then north to Antwerp. Below this city it divides into two branches, one called the Wester Scheldt, which separates Flanders from Zealand, and discharges itself into the sea near Flushing; and the other called the Oster-Scheldt, which runs by Bergen-op-Zoom, and afterwards between the islands Beveland and Schowen, and a little below falls into the sea.

SCHELESTADT, an arrondissement of the department of the Lower Rhine, in France, extending over 257,945 acres, equal to 403 square miles. It is divided into eight cantons, and these into 114 communes, with a population, in 1836, of 134,887 persons. The capital is the city of the same name, situated on a canal connected with the river Ill. It is well built and strongly fortified, and contained in the same year 9700 inhabitants, who make hats, hosiery, clocks, wax-lights, and much potash. Long. 7. 26. E. Lat. 48. 17. N.

SCHEME, a draught or representation of any geometrical or astronomical figure or problem, by lines sensible to the eye, or of the celestial bodies in their proper places for any moment. It is otherwise called a diagram.

SCHEMNITZ, a city of the kingdom of Hungary, in the province of the Hither Danube, and the capital of a circle to which it gives the name. It stands on a lofty situation, 2170 feet above the level of the sea, in a district abounding in mines, and at the source of the river Schemnitz. It is wildly built, some of the streets being separated from others by rocks, woods, and gardens, especially in the extensive suburbs, the population of which equals that within the walls. It contains one Lutheran and four Roman Catholic churches, 1720 houses, with 20,450 inhabitants. It has establishments for education, of both religions; and also a mining academy, with five professors and 150 students. It is the great seat of the operations of mining; and gold, silver, copper, iron, arsenic, and sulphur are procured and prepared for sale, the value of which is said to exceed L.200,000 annually. Long. 18. 48. 45. E. Lat. 48. 47. 45. N.

SCHERZO, a short musical composition, generally in $\frac{3}{4}$ time, of a light and playful style. In more modern symphonies, quartets, trios, sonatas, &c. the scherzo takes the place of the older minuet, but is of a much more rapid movement. Some excellent examples of the scherzo are to be found in Beethoven's works; among others, one in his second Symphony, op. 36, in D major.

SCHIECHS, or Scheichs, is a name which is applied by the Arabs to their nobles. "Among the Bedouins," says Niebuhr, "it belongs to every noble, whether of the highest or the lowest order. Their nobles are very numerous, and compose in a manner the whole nation; the plebeians are invariably actuated and guided by the schiechs, who superintend and direct in every transaction. The schiechs and their subjects are born to the life of shepherds and soldiers. The greater tribes rear many camels, which they either sell to their neighbours, or employ them in the carriage of goods, or in military expeditions. The petty tribes keep flocks of sheep. Among those tribes which apply to agriculture, the schiechs live always in tents, and leave the culture of their grounds to their subjects, whose dwellings are wretched huts. Schiechs always ride on horses or dromedaries, inspecting the conduct of their subjects, visiting their friends, or hunting. Traversing the desert, where the horizon is wide as on the ocean, they perceive travellers at a distance. As travellers are seldom to be met with on those wild tracts, they easily discover such as pass that way, and are tempted to pillage them when they find their own party the strongest."

SCHIEDAM, a city of the Netherlands, in the province of South Holland. It stands on the river Schie, near to its junction with the Maas; is well built, and contains five churches, a good exchange and town-house, and 1520 dwellings, with (in 1832) 11,588 inhabitants. The chief trade is distillation. It has 200 distilleries employed in making gin, in which are consumed annually 300,000 quarters of corn. A great number of pigs are fattened, and their flesh converted into bacon. Long. 4. 18. E. Lat. 51. 55. N.

SCHILLER, John Christopher Frederick von, was born at Marbach, a small town in the duchy of Würtemberg, on the 10th day of November 1759. It will aid the reader in synchronizing the periods of this great man's life with the corresponding events throughout Christendom, if we direct his attention to the fact, that Schiller's birth nearly coincided in point of time with that of Robert Burns, and that it preceded that of Napoleon by about ten years.

The position of Schiller is remarkable. In the land of his birth, by those who undervalue him the most, he is ranked as the second name in German literature; everywhere else he is ranked as the first. For us, who are aliens to Germany, Schiller is the representative of the German intellect in its highest form; and to him, at all events, whether first or second, it is certainly due, that the German intellect has become a known power, and a power of growing magnitude, for the great commonwealth of Christendom. Luther and Kepler, potent intellects as they were, did not make themselves known as Germans: the revolutionary vigour of the one, the starry lustre of the other, blended with the convulsions of reformation, or with the aurora of ascending science, in too kindly and genial a tone to call off the attention from the work which they performed, from the service which they promoted, to the circumstances of their personal position. Their country, their birth, their abode, even their separate existence, was merged in the mighty cause to which they lent their co-operation. And thus at the beginning of the sixteenth century, thus at the beginning of the seventeenth, did the Titan sons of Germany defeat their own private pretensions by the very grandeur of their merits. Their interest as patriots was lost and confounded in their paramount interest as cosmopolites. What they did for man and for human dignity eclipsed what they had designed for Germany. After them there was a long interlunar period of darkness for the land of the Rhine and the Danube. The German energy, too spasmodically excited, suffered a collapse. Throughout the whole of the seventeenth century, but one vigorous mind arose for permanent effects in literature. This was Opitz, a poet who deserves even yet to be read with attention, but who is no more worthy to be classed as the Dryden whom his too partial countrymen have styled him, than the Germany of the Thirty Years' War of taking rank by the side of civilized and cultured England during the Cromwellian era, or Klopstock of sitting on the same throne with Milton. Leibnitz was the one sole potentate in the fields of intellect whom the Germany of this century produced; and he, like Luther and Kepler, impresses us rather as a European than as a German mind, partly perhaps from his having pursued his self-development in foreign lands, partly from his large circle of foreign connections, but most of all from his having written chiefly in French or in Latin. Passing onwards to the eighteenth century, we find, through its earlier half, an absolute wilderness, unreclaimed and without promise of natural vegetation, as the barren arena on which the few insipid writers of Germany paraded. The torpor of academic dulness domineered over the length and breadth of the land. And as these academic bodies were universally found harnessed in the equipage of petty courts, it followed that the lethargies of pedantic dulness were uniformly deepened by the lethargies of aulic and ceremonial dulness; so that, if the reader represents to himself the very abstract of birthday odes, sycophantish dedications, and court sermons, he will have some adequate idea of the sterility and the mechanical formality which at that era spread the sleep of death over German literature. Literature, the very word literature, points the laughter of scorn to what passed under that name during the period of Gottsched. That such a man indeed as this Gottsched, equal at the best to the composition of a Latin grammar or a school arithmetic, should for a moment have presided over the German muses, stands out as in itself a brief and significant memorial, too certain for contradiction, and yet almost too gross for belief, of the apoplectic sleep under which the mind of central Europe at that era lay oppressed. The rust of disuse had corroded the very principles of activity. And, as if the double night of academic dulness, combined with the dulness of court inanities, had not been sufficient for the stifling of all native energies, the feebleness of French models (and of these moreover naturalized through still feebler imitations) had become the law and standard for all attempts at original composition. The darkness of night, it is usually said, grows deeper as it approaches the dawn; and the very enormity of that prostration under which the German intellect at this time groaned, was the most certain pledge to any observing eye of that intense re-action soon to stir and kindle among the smouldering activities of this spell-bound people. This re-action, however, was not abrupt and theatrical: it moved through slow stages and by equable gradations: it might be said to commence from the middle of the eighteenth century, that is, about nine years before the birth of Schiller; but a progress of forty years had not carried it so far towards its meridian altitude, as that the sympathetic shock from the French Revolution was by one fraction more rude and shattering than the public torpor still demanded. There is a memorable correspondency throughout all members of Protestant Christendom in whatsoever relates to literature and intellectual advance. However imperfect the organization which binds them together, it was sufficient even in these elder times to transmit reciprocally from one to every other, so much of that illumination which could be gathered into books, that no Christian state could be much in advance of another, supposing that Popery opposed no barriers to free communication, unless only in those points which depended upon local gifts of nature, upon the genius of a particular people, or upon the excellence of its institutions. These advantages were incommunicable, let the freedom of intercourse have been what it might: England could not send off by posts or by heralds her iron and coals; she could not send the indomitable energy of her population; she could not send the absolute security of property; she could not send the good faith of her parliaments. These were gifts indigenous to herself, either through the temperament of her people, or through the original endowments of her soil. But her condition of moral sentiment, her high-toned civic elevation, her atmosphere of political feeling and popular boldness,—much of these she could and did transmit, by the radiation of the press, to the very extremities of the German empire. Not only were our books translated, but it is notorious to those acquainted with German novels, or other pictures of German society, that as early as the Seven Years' War (1756–1763), in fact, from the very era when Cave and Dr Johnson first made the parliamentary debates accessible to the English themselves, most of the German journals repeated, and sent forward as by telegraph, these senatorial displays to every village throughout Germany. From the polar latitudes to the Mediterranean, from the mouths of the Rhine to the Euxine, there was no other exhibition of free deliberative eloquence in any popular assembly. And the *Luise* of Voss alone, a metrical idyll not less valued for its truth of portraiture than our own Vicar of Wakefield, will show, that the most sequestered clergyman of a rural parish did not think his breakfast equipage complete without the latest report from the great senate that sat in London. Hence we need not be astonished that German and English literature were found by the French Revolution in pretty nearly the same condition of semi-vigilance and imperfect animation. That mighty event reached us both, reached us all, we may say (speaking of Protestant states), at the same moment, by the same tremendous galvanism. The snake, the intellectual snake, that lay in ambush among all nations, roused itself, sloughed itself, renewed its youth, in all of them at the same period. A new world opened upon us all; new revolutions of thought arose; new and nobler activities were born; "and other palms were won."

But by and through Schiller it was, as its main organ, that this great revolutionary impulse expressed itself. Already, as we have said, not less than forty years before the earthquake by which France exploded and projected the scoria of her huge crater over all Christian lands, a stirring had commenced among the dry bones of intellectual Germany; and symptoms arose that the breath of life would soon disturb, by nobler agitations than by petty personal quarrels, the death-like repose even of the German universities. Precisely in those bodies however it was, in those as connected with tyrannical governments, each academic body being shackled to its own petty centre of local despotism, that the old spells remained unlinked; and to them, equally remarkable as firm trustees of truth, and as obstinate depositories of darkness or of superannuated prejudice, we must ascribe the slowness of the German movement on the path of reascent. Meantime the earliest torch-bearer to the murky literature of this great land, this crystallisation of political states, was Bodmer. This man had no demoniac genius, such as the service required; but he had some taste, and, what was better, he had some sensibility. He lived among the Alps; and his reading lay among the alpine sublimities of Milton and Shakspeare. Through his very eyes he imbibed a daily scorn of Gottsched and his monstrous compound of German coarseness with French sensual levity. He could not look at his native Alps, but he saw in them, and their austere grandeurs or their dread realities, a spiritual reproach to the hollowness and falsehood of that dull imposture which Gottsched offered by way of substitute for nature. He was taught by the Alps to crave for something nobler and deeper. Bodmer, though far below such a function, rose by favour of circumstances into an apostle or missionary of truth for Germany. He translated passages of English literature. He inoculated with his own sympathies the more fervent mind of the youthful Klopstock, who visited him in Switzerland. And it soon became evident that Germany was not dead, but sleeping; and once again, legibly for any eye, the pulses of life began to play freely through the vast organization of central Europe.

Klopstock, however, though a fervid, a religious, and for that reason an anti-Gallican mind, was himself an abortion. Such at least is our own opinion of this poet. He was the child and creature of enthusiasm, but of enthusiasm not allied with a masculine intellect, or any organ for that capacious vision and meditative range which his subjects demanded. He was essentially thoughtless, betrays everywhere a most effeminate quality of sensibility, and is the sport of that pseudo-enthusiasm and baseless rapture which we see so often allied with the excitement of strong liquors. In taste, or the sense of proportions and congruences, or the harmonious adaptations, he is perhaps the most defective writer extant.

But if no patriarch of German literature, in the sense of having shaped the moulds in which it was to flow, in the sense of having disciplined its taste or excited its rivalship by classical models of excellence, or raised a finished standard of style, perhaps we must concede that, on a minor scale, Klopstock did something of that service in every one of these departments. His works were at least Miltonic in their choice of subjects, if ludicrously non-Miltonic in their treatment of those subjects. And, whether due to him or not, it is undeniable that in his time the mother-tongue of Germany revived from the most absolute degradation on record, to its ancient purity. In the time of Gottsched, the authors of Germany wrote a macaronic jargon, in which French and Latin made up a considerable proportion of every sentence: nay, it happened often that foreign words were inflected with German forms; and the whole result was such as to remind the reader of the medical examination in the *Malade Imaginaire* of Molière,

> Quid poetea est à faire?
> Saignare
> Baignare
> Ensuita purgare, &c.

Now is it reasonable to ascribe some share in the restoration of good to Klopstock, both because his own writings exhibit nothing of this most abject euphuism (a euphuism expressing itself not in fantastic refinements on the staple of the language, but altogether in rejecting it for foreign words and idioms), and because he wrote expressly on the subject of style and composition.

Wieland, meantime, if not enjoying so intense an acceptation as Klopstock, had a more extensive one; and it is in vain to deny him the praise of a festive, brilliant, and most versatile wit. The Schlegels showed the haughty malignity of their ungenerous natures, in depreciating Wieland, at a time when old age had laid a freezing hand upon the energy which he would once have put forth in defending himself. He was the Voltaire of Germany, and very much more than the Voltaire; for his romantic and legendary poems are above the level of Voltaire. But, on the other hand, he was a Voltaire in sensual impurity. To work, to carry on a plot, to affect his readers by voluptuous impressions,—these were the unworthy aims of Wieland; and though a good-natured critic would not refuse to make some allowance for a youthful poet's aberrations in this respect, yet the indulgence cannot extend itself to mature years. An old man corrupting his readers, attempting to corrupt them, or relying for his effect upon corruptions already effected, in the purity of their affections, is a hideous object; and that must be a precarious influence indeed which depends for its durability upon the licentiousness of men. Wieland, therefore, except in parts, will not last as a national idol; but such he was nevertheless for a time.

Bürger wrote too little of any expansive compass to give the measure of his powers, or to found national impression; Lichtenberg, though a very sagacious observer, never rose into what can be called a *power*—he did not modify his age; yet these were both men of extraordinary talent, and Bürger a man of undoubted genius. On the other hand, Lessing was merely a man of talent, but of talent in the highest degree adapted to popularity. His very defects, and the shallowness of his philosophy, promoted his popularity; and by comparison with the French critics on the dramatic or scenical proprieties he is ever profound. His plummet, if not suited to the soundless depths of Shakspeare, was able ten times over to fathom the little rivulets of Parisian philosophy. This he did effectually, and thus unconsciously levelled the paths for Shakspeare, and for that supreme dominion which he has since held over the German stage, by crushing with his sarcastic shrewdness the pretensions of all who stood in the way. At that time, and even yet, the functions of a literary man were very important in Germany: the popular mind and the popular instinct pointed one way, those of the little courts another. Multitudes of little German states (many of which were absorbed since 1816 by the process of *mediatizing*) made it their ambition to play at keeping mimic armies in their pay, and to ape the greater military sovereigns, by encouraging French literature only, and the French language at their courts. It was this latter propensity which had generated the anomalous macaronic dialect, of which we have already spoken as a characteristic circumstance in the social features of literary Germany during the first half of the eighteenth century. Nowhere else, within the records of human follies, do we find a corresponding case in which the government and the patrician orders in the state, taking for granted, and absolutely postulating the utter worthlessness for intellectual aims of those in and by whom they maintained their own grandeur and independence, undisguisedly and even professedly sought to ally themselves with a foreign literature, foreign literati, and a foreign language. In this unexampled display of scorn for native resources, and the consequent collision between the two principles of action, all depended upon the people themselves. For a time the wicked and most profligate contempt of the local governments for that native merit which it was their duty to evoke and to cherish, naturally enough produced its own justification. Like Jews or slaves, whom all the world have agreed to hold contemptible, the German literati found it hard to make head against so obstinate a prejudgment; and too often they became all that they were presumed to be. *Sint Mæcenates, non deerunt, Flacce, Marones.* And the converse too often holds good—that when all who should have smiled scowl upon a man, he turns out the abject thing they have predicted. Where Frenchified Fredericks sit upon German thrones, it should not surprise us to see a crop of Gottscheds arise as the best fruitage of the land. But when there is any latent nobility in the popular mind, such scorn, by its very extremity, will call forth its own counteraction. It was perhaps good for Germany that a prince so eminent in one aspect as *Fritz der einziger*,[1] should put on record so emphatically his intense conviction, that no good thing could arise out of Germany. This creed was expressed by the quality of the French minds which he attracted to his court. The very refuse and dregs of the Parisian coteries satisfied his hunger for French garbage; the very offal of their shambles met the demand of his palate; even a Maupertuis, so long as he could produce a French baptismal certificate, was good enough to manufacture into the president of a Berlin academy. Such scorn challenged a re-action: the contest lay between the thrones of Germany and the popular intellect, and the final result was inevitable. Once aware that they were insulted, once enlightened to the full consciousness of the scorn which trampled on them as intellectual and predestined Helots, even the mild-tempered Germans became fierce, and now began to aspire, not merely under the ordinary instincts of personal ambition, but with a vindictive feeling, and as conscious agents of retribution. It became a pleasure with the German author, that the very same works which elevated himself, wreaked his nation upon their princes, and poured retorted scorn upon their most ungenerous and unparental sovereigns. Already, in the reign of the martial Frederick, the men who put most weight of authority into his contempt of Germans,—Euler, the matchless Euler, Lambert, and Immanuel Kant,—had vindicated the pre-eminence of German mathematics. Already, in 1755, had the same Immanuel Kant, whilst yet a probationer for the chair of logic in a Prussian university, sketched the outline of that philosophy which has secured the admiration, though not the assent, of all men known and proved to have understood it, of all men able to state its doctrines in terms admissible by its disciples. Already, and even previously, had Haller, who wrote in German, placed himself at the head of the current physiology. And in the fields of science or of philosophy, the victory was already decided for the German intellect in competition with the French.

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[1] "*Freddy the unique;*" which is the name by which the Prussians expressed their admiration of their martial and indomitable, though somewhat fantastic, king.

But the fields of literature were still comparatively barren. Klopstock was at least an anomaly; Lessing did not present himself in the impassioned walks of literature; Herder was viewed too much in the exclusive and professional light of a clergyman; and, with the exception of John Paul Richter, a man of most original genius, but quite unfitted for general popularity, no commanding mind arose in Germany with powers for levying homage from foreign nations, until the appearance, as a great scenical poet, of Frederick Schiller.

The father of this great poet was Caspar Schiller, an officer in the military service of the Duke of Würtemberg. He had previously served as a surgeon in the Bavarian army; but on his final return to his native country of Würtemberg, and to the service of his native prince, he laid aside his medical character for ever, and obtained a commission as ensign and adjutant. In 1763, the peace of Paris threw him out of his military employment, with the nominal rank of captain. But, having conciliated the duke's favour, he was still borne on the books of the ducal establishment; and, as a planner of ornamental gardens, or in some other civil capacity, he continued to serve his serene highness for the rest of his life.

The parents of Schiller were both pious, upright persons, with that loyal fidelity to duty, and that humble simplicity of demeanour towards their superiors, which is so often found among the unpretending natives of Germany. It is probable, however, that Schiller owed to his mother exclusively the preternatural endowments of his intellect. She was of humble origin, the daughter of a baker, and not so fortunate as to have received much education. But she was apparently rich in gifts of the heart and the understanding. She read poetry with delight; and through the profound filial love with which she had inspired her son, she found it easy to communicate her own literary tastes. Her husband was not illiterate, and had in mature life so laudably applied himself to the improvement of his own defective knowledge, that at length he thought himself capable of appearing before the public as an author. His book related simply to the subjects of his professional experience as a horticulturist, and was entitled *Die Baumzucht im Grossen* (On the Management of Forests). Some merit we must suppose it to have had, since the public called for a second edition of it long after his own death, and even after that of his illustrious son. And although he was a plain man, of no pretensions, and possibly even of slow faculties, he has left behind him a prayer, in which there is one petition of sublime and pathetic piety, worthy to be remembered by the side of Agar's wise prayer against the almost equal temptations of poverty and riches. At the birth of his son, he had been reflecting with sorrowful anxiety, not unmingled with self-reproach, on his own many disqualifications for conducting the education of the child. But at length, reading in his own manifold imperfections but so many reiterations of the necessity that he should rely upon God's bounty, converting his very defects into so many arguments of hope and confidence in heaven, he prayed thus: "Oh God, that knowest my poverty in good gifts for my son's inheritance, graciously permit that, even as the want of bread became to thy Son's hunger-stricken flock in the wilderness the pledge of overflowing abundance, so likewise my darkness may, in its sad extremity, carry with it the measure of thy unfathomable light; and because I, thy worm, cannot give to my son the least of blessings, do thou give the greatest; because in my hands there is not any thing, do thou from thine pour out all things; and that temple of a new-born spirit, which I cannot adorn even with earthly ornaments of dust and ashes, do thou irradiate with the celestial adornment of thy presence, and finally with that peace that passeth all understanding."

Reared at the feet of parents so pious and affectionate, Schiller would doubtless pass a happy childhood; and probably to this utter tranquillity of his earlier years, to his seclusion from all that could create pain, or even anxiety, we must ascribe the unusual dearth of anecdotes from this period of his life; a dearth which has tempted some of his biographers into improving and embellishing some puerile stories, which a man of sense will inevitably reject as too trivial for his gravity or too fantastical for his faith. That nation is happy, according to a common adage, which furnishes little business to the historian; for such a vacuity in facts argues a condition of perfect peace and silent prosperity. That childhood is happy, or may generally be presumed such, which has furnished few records of external experience, little that has appeared in doing or in suffering to the eyes of companions; for the child who has been made happy by early thoughtfulness, and by infantine struggles with the great ideas of his origin and his destination (ideas which settle with a deep, dove-like brooding upon the mind of childhood, more than of mature life, vexed with inroads from the noisy world), will not manifest the workings of his spirit by much of external activity. The *fallentis semita vitæ*, that path of noiseless life, which eludes and deceives the conscious notice both of its subject and of all around him, opens equally to the man and to the child; and the happiest of all childhoods will have been that of which the happiness has survived and expressed itself, not in distinct records, but in deep affection, in abiding love, and the hauntings of meditative power.

Such a childhood, in the bosom of maternal tenderness, was probably passed by Schiller; and his first awaking to the world of strife and perplexity happened in his fourteenth year. Up to that period his life had been vagrant, agreeably to the shifting necessities of the ducal service; and his education desultory and domestic. But in the year 1773 he was solemnly entered as a member of a new academical institution, founded by the reigning duke, and recently translated to his little capital of Stuttgard. This change took place at the special request of the duke, who, under the mask of patronage, took upon himself the severe control of the whole simple family. The parents were probably both too humble and dutiful in spirit towards one whom they regarded in the double light of sovereign lord and of personal benefactor, ever to murmur at the ducal behests, far less to resist them. The duke was for them an earthly providence; and they resigned themselves, together with their child, to the disposal of him who dispensed their earthly blessings, not less meekly than of Him whose vicegerent they presumed him to be. In such a frame of mind, requests are but another name for commands; and thus it happened that a second change arose upon the first, even more determinately fatal to the young Schiller's happiness. Hitherto he had cherished a day-dream pointing to the pastoral office in some rural district, as that which would harmonize best with his intellectual purposes, with his love of quiet, and, by means of its preparatory requirements, best also with his own peculiar choice of studies. But this scheme he now found himself compelled to sacrifice; and the two evils which fell upon him concurrently in his new situation were, first, the formal military discipline and monotonous routine of duty; secondly, the uncongenial direction of the studies, which were shaped entirely to the attainment of legal knowledge, and the narrow service of the local tribunals. So illiberal and so exclusive a system of education was revolting to the expansive mind of Schiller; and the military bondage under which this system was enforced, shocked the aspiring nobility of his moral nature, not less than the technical narrowness of the studies shocked his understanding. In point of expense the whole establishment cost nothing at all to those parents who were privileged servants of the duke: in this number were the parents of Schiller, and that single consideration weighed too powerfully upon his filial piety to allow of his openly murmuring at his lot; while on *their* part the parents were equally shy of encouraging a disgust which too obviously tended to defeat the promises of ducal favour. This system of monotonous confinement was therefore carried to its completion, and the murmurs of the young Schiller were either dutifully suppressed, or found vent only in secret letters to a friend. In one point only Schiller was able to improve his condition; jointly with the juristic department, was another for training young aspirants to the medical profession. To this, as promising a more enlarged scheme of study, Schiller by permission transferred himself in 1775. But whatever relief he might find in the nature of his new studies, he found none at all in the system of personal discipline which prevailed.

Under the oppression of this detested system, and by puré re-action against its wearing persecutions, we learn from Schiller himself, that in his nineteenth year he undertook the earliest of his surviving plays, the Robbers, beyond doubt the most tempestuous, the most volcanic, we might say, of all juvenile creations anywhere recorded. He himself calls it " a monster," and a monster it is; but a monster which has never failed to convulse the heart of young readers with the temperament of intellectual enthusiasm and sensibility. True it is, and nobody was more aware of that fact than Schiller himself in after years, the characters of the three Moors, father and sons, are mere impossibilities; and some readers, in whom the judicious acquaintance with human life in its realities has outrun the sensibilities, are so much shocked by these hypernatural phenomena, that they are incapable of enjoying the terrific sublimities which on that basis of the visionary do really exist. A poet, perhaps Schiller might have alleged, is entitled to assume hypothetically so much in the previous positions or circumstances of his agents as is requisite to the basis from which he starts. It is undeniable that Shakspeare and others have availed themselves of this principle, and with memorable success. Shakspeare, for instance, *postulates* his witches, his Caliban, his Ariel: grant, he virtually says, such modes of spiritual existence or of spiritual relations as a possibility; do not expect me to demonstrate this, and upon that single concession I will rear a superstructure that shall be self-consistent; every thing shall be *internally* coherent and reconciled, whatever be its *external* relations as to our human experience. But this species of assumption, on the largest scale, is more within the limits of credibility and plausible verisimilitude when applied to modes of existence, which, after all, are in such total darkness to us (the limits of the possible being so undefined and shadowy as to what can or cannot exist), than the very slightest liberties taken with human character, or with those principles of action, motives, and feelings, upon which men would move under given circumstances, or with the modes of action which in common prudence they would be likely to adopt. The truth is, that, as a coherent work of art, the Robbers is indefensible; but, however monstrous it may be pronounced, it possesses a power to agitate and convulse, which will always obliterate its great faults to the young, and to all whose judgment is not too much developed. And the best apology for Schiller is found in his own words in recording the circumstances and causes under which this anomalous production arose. " To escape," says he, " from the formalities of a discipline which was odious to my heart, I sought a retreat in the world of ideas and shadowy possibilities, while as yet I knew nothing at all of that human world from which I was harshly secluded by iron bars. Of men, the actual men in this world below, I knew absolutely nothing at the time when I composed my Robbers. Four hundred human beings, it is true, were my fellow-prisoners in this abode; but they were mere tautologies and reiterations of the self-same mechanic creature, and like so many plaster casts from the same original statue. Thus situated, of necessity I failed. In making the attempt, my chisel brought out a monster, of which [and that was fortunate] the world had no type or resemblance to show."

Meantime this demoniac drama produced very opposite results to Schiller's reputation. Among the young men of Germany it was received with an enthusiasm absolutely unparalleled, though it is perfectly untrue that it excited some persons of rank and splendid expectations (as a current fable asserted) to imitate Charles Moor in becoming robbers. On the other hand, the play was of too powerful a cast not in any case to have alarmed his serenity the Duke of Würtemberg; for it argued a most revolutionary mind, and the utmost audacity of self-will. But besides this general ground of censure, there arose a special one, in a quarter so remote that this one fact may serve to evidence the extent as well as intensity of the impression made. The territory of the Grisons had been called by Spiegelberg, one of the robbers, " the Thief's Athens." Upon this the magistrates of that country presented a complaint to the duke; and his highness, having cited Schiller to his presence, and severely reprimanded him, issued a decree that this dangerous young student should henceforth confine himself to his medical studies.

The persecution which followed exhibits such extraordinary exertions of despotism, even for that land of irresponsible power, that we must presume the duke to have relied more upon the hold which he had upon Schiller through his affection for parents so absolutely dependent on his highness's power, than upon any laws, good or bad, which he could have pleaded as his warrant. Germany, however, thought otherwise of the new tragedy than the serene critic of Würtemberg: it was performed with vast applause at the neighbouring city of Mannheim; and thither, under a most excusable interest in his own play, the young poet clandestinely went. On his return he was placed under arrest. And soon afterwards, being now thoroughly disgusted, and, with some reason, alarmed by the tyranny of the duke, Schiller finally eloped to Mannheim, availing himself of the confusion created in Stuttgard by the visit of a foreign prince.

At Mannheim he lived in the house of Dalberg, a man of some rank and of sounding titles, but in Mannheim known chiefly as the literary manager (or what is called director) of the theatre. This connection aided in determining the subsequent direction of Schiller's talents; and his Fiesco, his Intrigue and Love, his Don Carlos, and his Maria Stuart, followed within a short period of years. None of these are so far free from the faults of the Robbers as to merit a separate notice; for with less power, they are almost equally licentious. Finally, however, he brought out his Wallenstein, an immortal drama, and, beyond all competition, the nearest in point of excellence to the dramas of Shakspeare. The position of the characters of Max. Piccolomini and the Princess Thekla is the finest instance of what, in a critical sense, is called *relief*, that literature offers. Young, innocent, unfortunate, among a camp of ambitious, guilty, and blood-stained men, they offer a depth and solemnity of impression which is equally required by way of contrast and of final repose.

From Mannheim, where he had a transient love affair with Laura Dalberg, the daughter of his friend the director, Schiller removed to Jena, the celebrated university in the territory of Weimar. The grand duke of that German Florence was at this time gathering around him the most eminent of the German intellects; and he was eager to enrol Schiller in the body of his professors. In 1799 Schiller received the chair of civil history; and not long after he married Miss Lengefeld, with whom he had been for some time acquainted. In 1803 he was ennobled; that is, he was raised to the rank of gentleman, and entitled to attach the prefix of *Von* to his name. His income was now sufficient for domestic comfort and respectable independence; while in the society of Goethe, Herder, and other eminent wits, he found even more relaxation for his intellect, than his intellect, so fervent and so self-sustained, could require.

Meantime the health of Schiller was gradually undermined: his lungs had been long subject to attacks of disease; and the warning indications which constantly arose of some deep-seated organic injuries in his pulmonary system ought to have put him on his guard for some years before his death. Of all men, however, it is remarkable that Schiller was the most criminally negligent of his health; remarkable, we say, because for a period of four years Schiller had applied himself seriously to the study of medicine. The strong coffee, and the wine, which he drank, may not have been so injurious as his biographers suppose; but his habit of sitting up through the night, and defrauding his wasted frame of all natural and restorative sleep, had something in it of that guilt which belongs to suicide. On the 9th of May 1805 his complaint reached its crisis. Early in the morning he became delirious; at noon his delirium abated; and at four in the afternoon he fell into a gentle unagitated sleep, from which he soon awoke. Conscious that he now stood on the very edge of the grave, he calmly and fervently took a last farewell of his friends. At six in the evening he fell again into sleep, from which, however, he again awoke once more to utter the memorable declaration, "that many things were growing plain and clear to his understanding." After this the cloud of sleep again settled upon him; a sleep which soon changed into the cloud of death.

This event produced a profound impression throughout Germany. The theatres were closed at Weimar, and the funeral was conducted with public honours. The position in point of time, and the peculiar services of Schiller to the German literature, we have already stated: it remains to add, that in person he was tall, and of a strong bony structure, but not muscular, and strikingly lean. His forehead was lofty, his nose aquiline, and his mouth almost of Grecian beauty. With other good points about his face, and with auburn hair, it may be presumed that his whole appearance was pleasing and impressive, while in later years the character of sadness and contemplative sensibility deepened the impression of his countenance. We have said enough of his intellectual merit, which places him in our judgment at the head of the Trans-Rhenish literature. But we add in concluding, that Frederick von Schiller was something more than a great author; he was also in an eminent sense a great man; and his works are not more worthy of being studied for their singular force and originality, than his moral character from its nobility and aspiring grandeur.

(W. W. W.)

SCHIO, a city of the delegation of Verona, in Austrian Lombardy. It stands on the river Timanchio, and carries on some large cloth manufactories, which produce excellent goods of various kinds. It contains 6950 inhabitants.

SCHIRAS, or Schirauz. See Shiraz.

SCHISM (from the Greek σχισμα, *a rent* or *fissure*), in its general acceptation signifies division or separation; but it is chiefly used in speaking of separations happening from diversity of opinions among people of the same religion and faith. Thus we say the schism of the ten tribes of Judah and Benjamin, the schism of the Persians from the Turks and other Mahommedans, &c. Among ecclesiastical authors, the great schism of the West is that which happened in the times of Clement VII. and Urban VI., which divided the church for forty or fifty years, and was at length ended by the election of Martin V. at the council of Constance. The Romanists number thirty-four schisms in their church, and bestow the name of English schism on the reformation of religion in this kingdom. Those of the church of England apply the term schism to the separation of the nonconformists, viz. the presbyterians, independents, and anabaptists, for a further reformation.

SCHISMA (σχισμα), a small theoretical interval in music, arising from the division of the monochord. Two σχισματα make up a δεισις, or a λεῖμμα.

SCHISTUS, a name given to several kinds of stones. See Mineralogy.

SCHITTUAR, or Shitwar, a small island in the Persian Gulf. Long. 53. 24. E. Lat. 26. 59. N.

SCHLEGEL, Frederick, an eminent German critic and philosophical writer, was born at Hanover in 1772, of a family which had already produced more than one writer of ability. He was the third son of the family, being three years younger than his distinguished brother, who is still alive, Augustus William. In his earlier years he is said to have displayed no remarkable genius. Though intended for the mercantile profession, he received an admirable classical education; and ultimately prevailed on his father to allow him to follow the bent of his own inclination, and to devote himself to literature. He then began to devote himself in earnest to study, which he pursued first at Göttingen and afterwards at Leipsig. From the age of seventeen, as he himself informs us, the writings of the Greek tragedians, and of Plato, combined with Winkelmann's enthusiastic criticisms on art, formed the intellectual world in which he lived. This admiration for the antique was increased by a visit which he was enabled to pay to Dresden in 1789, where he was for the first time enabled to contemplate, in their marble forms, those gods, heroes, and sages, who had been the companions of his thoughts. "These firm indelible impressions," he adds, "were in succeeding years the firm enduring groundwork for my study of classical antiquity."

As might be expected, his first literary effort, which appeared in 1794, took the direction of these his early studies.

It was a short Essay on the different Schools of Greek Poetry, which appeared in the *Berlinn Monatschrift*, displaying not only an erudition of considerable depth and extent, but an elegance of style and a clearness of classification less frequently to be found among his countrymen. Two little treatises followed, composed in 1795 and 1796; the Diotema, a view of the condition of the female sex in Greece; and a parallel between Cæsar and Alexander, which, however, was not published till twenty-six years afterwards. In this work we trace the first indications of that talent which was afterwards so conspicuously displayed in the field of philosophical and critical history.

A more important work, entitled the Greeks and Romans, appeared in 1797, which was highly praised by Heine. It was followed two or three years afterwards by a History of Greek Poetry, in which, taking Winkelmann's History of Art as his model, he has thrown into criticism an imaginative and poetical tone, which, combining as it did with profound learning and breadth of philosophical views, succeeded in bringing before the mind the true spirit of antiquity, with a freshness and distinctness of portraiture which mere erudition could not have effected. The work, however, is incomplete. In the portion which is finished, but which was afterwards considerably modified, and incorporated with another work, Frederick Schlegel reviews the Orpheic poetry, which he considers to be of the age of Hesiod; the Homeric poems, his criticism on which forms indeed the most important and the best executed part of the work; the Hesiodic epos; the middle epos, or the works of the Cydic poets; and, lastly, the productions of the Ionic, Æolic, and Doric schools of lyric poetry. The portion of the work which treats of the lyric poets is unfinished; nothing indeed but a few fragments, full of promise, affording an imperfect idea of the style in which it would have been executed. The strong hold, in fact, which the literary scepticism of Wolff had taken of the German mind, and the ardent application of his principles, not merely to the Homeric poems, but to all compositions claiming a remote antiquity, appear to have discouraged Schlegel from persevering, and the work accordingly was dropt.

In 1799 he published his Lucinde, a work, as Mrs Austin describes it, "of fancy, sentiment, and reflection," in which, however, the very anti-platonic character of his descriptions of love occasioned not a little scandal and censure. What the precise object of the author in this equivocal novel was, may admit of question, though, perhaps, it is not unaptly characterized by a German critic as a fantastic and dreamy attempt to exalt and sublimate sensual love. Certain it is, that the public in general conceived, and not without some reason, that, like Hemse's Ardinghello, it was an elaborate effort to invest sensuality with grace, and to lavish a poetical colouring on scenes and incidents of a very questionable character. Frederick Schlegel appears to have felt that the cold reception of this philosophical experiment was not without foundation; for though he threatened the public in the *Europa* with a continuation, the work remained a fragment. In the year 1800 he established himself as a private teacher in Jena, where he delivered a course of philosophical lectures with success. His first poetical compositions, which appeared in the Athenæum, seem to have been the productions of this period. In 1801 he published, in conjunction with his brother Augustus W. Schlegel, two volumes, entitled *Characteristiken und Critiken*, one of the most popular and pleasing of his works. The second volume includes his Hercules Musagetes, an elegiac poem of some length; and in 1802 he published a tragedy, Alarcos, in which he has tried, with no remarkable success, to impart the severe and gloomy simplicity of Æschylus to a legend of the middle ages. In fact, it is neither as a lyric nor as a dramatic poet that the name of Frederick Schlegel is likely to be remembered. Goethe, at least, always appeared to estimate the poetical talent of Schlegel at a low standard.[1] Still he may fairly be admitted to possess a chaste classical diction, great harmony and flexibility of diction, with considerable tenderness, while in the poetical compositions which he wrote on patriotic subjects there appears real feeling and enthusiasm. In boldness and originality of conception his poetry is unquestionably deficient; and, on the whole, it may be said that the philosophical element preponderates in the character of Frederick Schlegel, nearly as much as the poetical does in that of his brother.

But the study of the poetry and literature of the west was near about to be exchanged for that of the eastern nations. Following in the footsteps of Sir William Jones, and filled with the idea of the important additions which might be made to Europe by naturalizing in Germany the results of Indian research, and of the still greater benefits which he conceived might be derived from the pursuit of Indian literature, philosophy, and antiquities, in an enlarged, philosophical, and at the same time religious spirit, he resolved to devote himself to the study of Sanscrit. He probably overrated, on the whole, both the importance of the labour in which he was about to engage, and its probable interest to the public mind. With a view, however, to his intended investigations, he repaired to Paris in 1802, accompanied by his wife, the daughter of the celebrated Moses Mendelsohn, and, with the assistance afforded by the valuable stores of the National Library, and the hints derived from those distinguished orientalists, MM. de Langlès and Chézy, he is said to have made considerable progress in the study of Persian and Sanscrit poetry.

But he was by no means so entirely absorbed in his new task as not to find time for other studies, having contrived during his residence in France, which continued till 1805, to deliver a course of lectures on metaphysics, which appear to have met with but partial success; a result by no means surprising, when the lofty and Platonic character of Schlegel's philosophy is contrasted with the strong material tendencies which had long encumbered the metaphysical views of the French. During the same period he wrote a variety of articles on the early Italian, Spanish, Portuguese, and Provençal poetry; and published, in 1804, a collection of the romantic poems of the middle ages, and a series of letters on the different schools and epochs of Christian painting and Gothic architecture, a work for which the temporary concentration of the various treasures of modern art in the Parisian capital afforded ample materials. These letters, which he afterwards revised and enlarged, form one of the most pleasing of his compositions. He takes up the subject nearly where Winkelmann had left it, and performs, in the same spirit of love, the same service for the arts of the middle ages, which that critic had done for those of antiquity.

It was at this period of Frederick Schlegel's life (1805) that he took the step which occasioned so much surprise in some quarters, and such bitter hostility and censure in others, namely, his forsaking the tenets of the Protestant church, in which he had been brought up, and embracing Catholicism, as Count Stolberg had done a few years before. His conversion was ascribed by Voss, who, in addition to the rancour of religious opposition, was probably influenced by the jealousy of literary rivalry, to the most unworthy and interested motives, as resulting entirely from a time-serving spirit, and the prospect of honours and promotion in the service of Austria, which Protestant Germany was less likely to supply. Now that personal animosity is at an end, it seems to be conceded that there is little reason to question the sincerity of Frederick Schlegel's change of religious belief. To his poetical and enthusiastic mind, long occupied with the study of the religion, monuments, and literature of the middle ages, Catholicism presented many more attractive features than the rationalizing and semi-infidel spirit which too generally pervaded German Protestantism, in which, to use an expression of Hegel, the disciples of Luther and Calvin had "united on a basis of nullity." Of course the accession of such a convert was hailed with enthusiasm by the Catholic priesthood; and his example was shortly afterwards followed by several Protestants of rank or literary ability.

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[1] Characteristics of Goethe, vol. i. p. 120.

In 1808 appeared his work on the Language and Wisdom of the Indians. The first part of this work is occupied with a comparative examination of the etymology and grammatical structure of the Sanscrit, Persian, Greek, Roman, and German languages. The second traces the connection of the different religions and philosophical systems that prevailed in the ancient oriental world. The last consists of metrical versions from the sacred and didactic poems of the Hindus. It cannot be denied that this work, with all its learning and sagacity of conjecture, is yet a very imperfect one. The profounder learning of Jacob Grimm has demolished many of the ingenious theories of Schlegel as to the original monuments of the German language. Much, too, has of course been added to Indian learning since it appeared; many of its views have so completely passed into commonly-received opinions, that they have ceased to strike us as novelties; and other truths which are there only hinted at, have been elucidated and confirmed. But it had the merit of opening a comparatively new path in Germany, and perhaps in other countries of Europe. "Prior to the publication of this work, the Semitic languages of the East were alone, I believe, cultivated with much ardour in Germany; its appearance had the effect of directing the national energies towards an intellectual region, where they were destined to meet with the most brilliant success; and Germany may now boast with reason of her illustrious professors of Sanscrit. If France under the restoration made such progress in oriental literature; if England, roused from her inglorious apathy, has at last founded an Asiatic Society in London, and, more recently, the Boden professorship at Oxford; these events are in a great degree attributable to the enthusiasm which this little book excited."[1]

After Schlegel's return from France, he proceeded in 1808 to Vienna, with the view, it is said, of completing from historical documents an unfinished drama on the subject of Charles V. In the following year he was appointed imperial secretary at the Archduke Charles's head-quarters, and contributed much, by his spirited proclamations, towards rousing the patriotic ardour of the country in the contest against Napoleon. After the unfortunate issue of the war, he resumed his literary activity, and in 1810 delivered his course of lectures on modern history. By many these lectures were considered as his masterpiece. They embodied in a systematic form the various opinions and incidental views which he had thrown out in his earlier essays, and contained, in a more detailed form, the proofs of many of those positions which he afterwards stated in a more brief and general form in his Philosophy of History.

In 1812 Schlegel delivered, before a numerous and distinguished audience in Vienna, his celebrated Lectures on the History of Literature, the work by which he is best known beyond the limits of his own country. Of course a work which exhibits an outline of the literary history of the world, and traces the influence of its various literatures on one another, within the compass of two volumes, cannot descend to much minuteness of detail, or delineate, with that precision which would be desirable, the characteristics of individuals. Yet, in addition to the broad and striking views which the History of Literature exhibits, to the skill and sagacity with which it traces the divergence and reunion of the various streams of literature, as if the whole had been contemplated from some vast elevation in which their mutual relations were visible as on a map, and to the general spirit of candour and impartiality which pervades the work, it may be added, that some of Schlegel's brief sketches of the great ornaments of literature are among the happiest specimens of pregnant and characteristic delineation which are to be met with in any language. The style, too, of the work is elegant and enthusiastic without being extravagant. Yet some deductions must be made, both from the impartiality of the work, and from the soundness of its views. It is difficult to conceive on what grounds of sound criticism the Lusiad of Camoens can be exalted above the Jerusalem of Tasso; and still more how the "romantic witchery" of the drama of Calderon, rich and fantastical as it is, can ever be placed on the same level with the profound imagination which combines with this romantic beauty in the theatre of Shakspeare. English literature, with the exception of Shakspeare, can hardly be said to be appreciated at all. French literature, at least after the time of Corneille, is treated with great injustice; Pascal is passed over with a single word; Malebranche is not mentioned at all. And indeed the literature of the seventeenth and eighteenth centuries is discussed in a very perfunctory and unsatisfactory manner. Some of the faults of the work are undoubtedly owing to the strong religious bias of the author. For the Catholic literature of Spain and Italy he shows an undue preference, with a corresponding coldness and indifference towards that of Protestant nations. "Frederick Schlegel," says Heine, in his lively work on Germany, "has examined all literatures from a lofty point of view; but this high position of his is always on the belfry of the Catholic Church; and whatever Schlegel says, you can't help hearing the bells jingle about him, and now and then the croaking of the ravens that haunt the old weathercock." "Yet," he adds, "I know no better book of the kind; and indeed I know not where one can procure such a complete view of the literature of all nations, unless by putting together the multifarious lucubrations of Herder."

With the History of Literature the critical career of Frederick Schlegel may be said to have closed; for a flattering and somewhat exaggerated criticism on Lamartine's *Méditations Poétiques*, which appeared in the *Concordia*, scarcely deserves to be noticed as an exception. From 1812 he was much occupied with political and diplomatic employments. Having acquired the friendship and confidence of Prince Metternich, he was employed by him in various diplomatic missions; and for several years after the peace of 1814 he was one of the representatives of the court of Vienna at Francfort. A pension, with letters of nobility, and the title of aulic confessor, were conferred upon him by the emperor. These diplomatic functions, of course, occasioned a temporary interruption to his literary pursuits; but in 1818 he returned to Vienna, where they were resumed with ardour. The years 1819 and 1820 were marked by the simultaneous outbreak of revolutions in different countries in Europe; by a wild republican spirit among the youth of Germany, leading, as in the case of Kotzebue, to the assassination of those who were at the time considered as enemies of their country; by the formation of associations for disseminating pernicious and anti-social doctrines, often countenanced even from academical chairs; in short, by evident symptoms of a wide-spread conspiracy against the existing forms of government and society. It was to counteract this spirit, which preventive measures of force might control but could not eradicate, that Frederick Schlegel, in conjunction with his friend Adam Müller founded a religious and political journal, entitled *Concordia*, in which, while opposing the irreligious and dangerous notions which were abroad, he propounded not a few principles as to government, which excite surprise when coming from such a quarter, and addressed to the subjects of a government supposed to be so attached to absolutism, and so bent on maintaining the existing state of things, as the Austrian government.

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[1] Life of Frederick Schlegel, prefixed to his Philosophy of History, by J. Burton Robertson, p. 26.

In 1827 he delivered at Vienna another course of Lectures on the Philosophy of Life, of which, indeed, an outline had appeared in the *Concordia* for 1820. The work is of great, nay even of startling originality, and deep interest, embracing questions of the most solemn importance, which are discussed with a grave eloquence, and in a deeply religious strain of feeling, but strangely immethodical in its arrangement, and, whether from the imperfection of their expression, or the real obscurity of the ideas themselves, in some parts scarcely intelligible. This work was almost immediately followed by another course of Lectures on the Philosophy of History, which have lately been translated into English, and which appear not unworthy of the reputation of the author. Towards the close of the year 1828 Schlegel went to Dresden, where he delivered nine Lectures on the Philosophy of Language, in which he farther developed and expanded those philosophical views which he had already laid down in his Philosophy of Life. The course, however, was interrupted by death. "On Sunday the 11th of January 1829, he was, between ten and eleven o'clock at night, preparing a lecture which he was to deliver on the following Wednesday, and had begun a sentence with the remarkable words, 'But the consummate and perfect knowledge,' when sickness suddenly arrested his pen. From that illness he never recovered."

We have already briefly expressed our opinion of the nature of Schlegel's genius. It was philosophical and critical, rather than poetical; but he had that species of poetical imagination without which there can be no lofty or useful criticism, which enables the critic to rise above artificial and natural peculiarities, and to judge with truth and certainty upon broad and universal principles. Even when his criticism is imperfect or erroneous, it is often valuable; for it abounds in new and original views, excites the mind to independent speculation, and teaches the habit of viewing literature, the arts, and philosophy, not as isolated subjects of study, but as acting and re-acting with the most important influences upon each other. From his powerful and inventive mind many of the speculations of his brother appear to have been derived. In the study of the oriental languages and literature, the poetry of the Provençals, and that of Spain, Frederick Schlegel led the way; and in the History of Literature will be found the germs of many of those views which were developed at greater length by his brother in his Dramatic Course. (W. W. W. W.)

SCHMALKALDEN, one of the provinces into which the principality of Hesse Casel, in Germany, is divided. It extends over 116 square miles. It is a hilly district, including part of the Thuringian Forest, some of the points of which reach the height of 3100 feet. It is watered by several small streams, all of which lose themselves in the river Werra. The soil is mostly sandy and sterile, and rarely produces more corn than suffices for a quarter of the consumption. The mines yield rock-salt and iron, and the latter creates the chief employment of the inhabitants next to agriculture. The province contains one city, four market-towns, thirty-five villages, and twenty-four hamlets, with 24,500 inhabitants, mostly Protestants. The capital is the city of the same name, situated on the small river Schmalkalde. It is interesting in an historical view, as having been the place where the Protestant league was formed to secure religious liberty, at the commencement of the Thirty Years' War in Germany. It is surrounded with walls and ditches; but is dilapidated, and scarcely capable of defence. It has an ancient castle, three churches, several institutions for education, 1050 houses, and 5100 inhabitants, whose chief occupation is making ironmongery, cutlery, and weapons, especially swords and bayonets. The salt-mines produce about 12,000 quintals of refined salt. Long. 11. 1. E. Lat. 50. 44. 36. N.

SCHMIEDENBERG, a city of Prussian Silesia, in the government of Reichenbach and circle of Hirschberg. It stands on the river Yssel, at the foot of the Kahlenberg Mountains, but is 1400 feet above the level of the sea. It is an open place, of only two streets, more than two miles in length, and contains 550 houses, with 4830 inhabitants, who make some of the finest damask table-linens, and many other kinds of goods. The mountain behind it rises to 3300 feet.

SCHŒNOBATES (from the Greek, σχοινος, *a rope*, and βαινω, *I walk*), a name which the Greeks gave to their rope-dancers. By the Romans they were called *funambuli*. The *schœnobates* were slaves whose masters made money of them, by entertaining the people with their feats of activity. Mercurialis (*De Arte Gymnastica*, lib. iii.) gives us five figures of schœnobates, engraven after ancient stones.

SCHOLASTIC, something belonging to the school.

Scholastic Divinity is that part or species of divinity which clears and discusses questions by reason and arguments; in which sense it stands in some measure opposed to positive divinity, which is founded on the authority of fathers, councils, &c.

SCHOLIAST, or COMMENTATOR, a grammarian who writes *scholia*, that is, notes and glosses, upon ancient authors who have written in the learned languages.

SCHOLIUM, a note, annotation, or remark, occasionally made on some passage, proposition, or the like. This term is much used in geometry and other parts of mathematics, where, after demonstrating a proposition, it is customary to point out how it might be done some other way, or to give some advice or precaution in order to prevent mistakes, or add some particular use or application thereof.

SCHOMBERG, FREDERICK-ARMAND, DUKE OF, a distinguished officer, sprung from an illustrious family in Germany, and the son of Count Schomberg by an English lady, daughter of Lord Dudley, was born in 1608. He was initiated into the military life under Frederick-Henry prince of Orange, and afterwards served under his son William II. prince of Orange, who highly esteemed him. He then repaired to the court of France, where his reputation was so well known that he obtained the government of Gravelines, of Furnes, and the surrounding countries. He was reckoned inferior to no general in that kingdom, except Marshal Turenne and the Prince of Condé; men of such exalted eminence, that it was no disgrace to acknowledge their superiority. The French court thinking it necessary to diminish the power of Spain, sent Schomberg to the assistance of the Portuguese, who were engaged in a war with that country respecting the succession to their throne. Schomberg's military talents gave a turn to the war in favour of his allies. The court of Spain was obliged to solicit a peace in 1668, and to acknowledge the house of Braganza as the just heirs to the throne of Portugal. For his great services he was created Count Mentola in Portugal; and a pension of L.5000 was bestowed upon him, with the reversion to his heirs.

In 1673 he came over to England to command the army; but the English being at that time disgusted with the French nation, Schomberg was suspected of coming over with a design to corrupt the army, and bring it under French discipline. He therefore found it necessary to return to France, which he soon left, and went to the Netherlands.

In the month of June 1676, he forced the Prince of Orange to raise the siege of Maestricht; and it is said he was then raised to the rank of Marshal of France. But the French *Dictionnaire Historique*, whose information on a point of this nature ought to be authentic, says that he was invested with this honour the same year in which he took the fortress of Bellegarde from the Spaniards whilst serving in Portugal.

Upon the revocation of the edict of Nantes, when the persecution commenced against the Protestants, Schomberg, who was of that persuasion, requested leave to retire into his own country. This request was refused; but he was permitted to take refuge in Portugal, where he had reason to expect he would be kindly received on account of past services. But the religious zeal of the Portuguese, though it did not prevent them from accepting assistance from a heretic when their kingdom was threatened with subversion, could not permit them to give him shelter when he came for protection. The inquisition interfered, and obliged the king to send him away. He then went to Holland by the way of England. Having accepted an invitation from the Elector of Brandenburg, he was invested with the government of Ducal Prussia, and appointed commander-in-chief of the elector's forces. When the Prince of Orange sailed to England to take possession of the crown which his father-in-law James II. had abdicated, Schomberg obtained permission from the Elector of Brandenburg to accompany him. He is supposed to have been the author of an ingenious stratagem which the prince employed after his arrival in London, to discover the sentiments of the people respecting the revolution. The stratagem was, to spread an alarm over the country that the Irish were approaching with fire and sword. When the prince was established on the throne of England, Schomberg was appointed commander-in-chief of the forces, and master of the ordnance. In April 1689 he was made knight of the garter, and naturalized by act of parliament; and in May following he was created baron, earl, marquis, and duke of the kingdom of England, by the name and title of Baron Teys, Earl of Brentford, Marquis of Harwich, and Duke of Schomberg. The House of Commons voted to him L.100,000 as a reward for his services. Of this he only received a small part; but after his death a pension of L.5000 a year was bestowed upon his son.

In August 1689 he was sent to Ireland to reduce that kingdom to obedience. When he arrived, he found himself at the head of an army consisting only of twelve thousand foot and two thousand horse, while King James commanded an army three times more numerous. Schomberg thought it dangerous to engage so superior a force, and being disappointed in his promised supplies from England, he judged it prudent to remain on the defensive. He therefore posted himself at Dundalk, about five or six miles distance from James, who was encamped at Ardee. For six weeks he remained in this position, without attempting to give battle, while from the wetness of the season he lost nearly the half of his army. Schomberg was much blamed for not coming to action; but some excellent judges admired his conduct, as evincing great military talents. Had he risked an engagement, and been defeated, Ireland would have been lost. At the famous battle of the Boyne, fought on the 1st of July 1690, which decided the fate of James, Schomberg passed the river at the head of his cavalry, defeated eight squadrons of the enemy, and broke the Irish infantry. When the French Protestants had lost their commander, Schomberg went to rally and lead them on to charge. While thus engaged, a party of King James's guards, which had been separated from the rest, passed Schomberg, in attempting to rejoin their own army. They attacked him with great fury, and gave him two wounds in the head. As the wounds were not dangerous, he might soon have recovered from them; but the French Protestants, perhaps thinking their general was killed, immediately fired upon the guards, and shot him dead on the spot. He was buried in St Patrick's cathedral. Bishop Burnet says Schomberg was "a calm man, of great application and conduct, and thought much better than he spoke; of true judgment, of exact probity, and of a humble and obliging temper."

SCHOOL, a public place, in which the languages, the arts, or sciences, are taught. Thus we say, a grammar school, a writing school, and a school of natural philosophy. The word is formed from the Latin *schola*, which, according to Du Cange, signifies discipline and correction. He adds, that it was anciently used for all places where several persons met together, either to study, to converse, or do any other matter. See Education and Universities.

SCHOONER, in nautical language, a small vessel with two masts, whose main-sail and fore-sail are suspended from gaffs, reaching from the mast towards the stern, and stretched out below by booms, and whose foremost ends are hooked to an iron, which clasps the mast so as to turn therein as upon an axis, when the after-ends are swung from one side of the vessel to the other.

SCHOUTEN'S Island, on the eastern coast of Van Diemen's Land, consists of lofty mountains separated by deep valleys.

SCHREVELIUS, Cornelius, a laborious Dutch critic and writer, who has published some editions of the ancient classics, more distinguished for their elegance than accuracy. His Greek Lexicon is esteemed the best of all his works. He died in 1667.

SCHRYARI, an ancient wind-instrument of the bagpipe kind, long disused.

SCHULTENS, Albert, professor of Hebrew and of the oriental languages at Leyden, and one of the most learned men of the eighteenth century, was born at Groningen, where he studied till the year 1706, and thence continued his studies at Leyden and Utrecht. Schultens at length applied himself to the study of Arabic, both printed and in manuscript, in which he made great progress. A short time afterwards he became minister of Wassenar; and in two years professor of the eastern tongues at Franeker. At length he was invited to Leyden, where he taught Hebrew and the Oriental languages with extraordinary reputation till his death, which happened in the year 1750. He wrote many learned works, the principal of which are, 1. A Commentary on Job, in two vols. 4to; 2. A Commentary on the Proverbs; 3. Vetus regia Via Hebraizandi; 4. Animadversiones philologicæ et criticæ ad varia loca Veteris Testamenti; 5. An excellent Hebrew Grammar. Schultens discovered in all his works sound criticism and much learning. He maintained against Gousset and Driessen, that in order to have a perfect knowledge of Hebrew, it is necessary to join with it not only the Chaldaic and Syriac, but more particularly the Arabic.

SCHURMAN, Anna Maria, a most extraordinary German lady, was born at Cologne in 1607. Her natural genius discovered itself at six years of age, when she cut all sorts of figures in paper with her scissars without a pattern. At eight she learned in a few days to draw flowers in a very agreeable manner. At ten, she took only three hours to learn embroidery; and afterwards she was taught music vocal and instrumental, painting, sculpture, and engraving, in all of which she succeeded admirably. She excelled in miniature-painting, and in cutting portraits upon glass with a diamond. Hebrew, Greek, and Latin, were so familiar to her, that the most learned men were astonished at it. She spoke French, Italian, and English, fluently. Her handwriting, in almost all languages, was so inimitable, that the curious preserved specimens of it in their cabinets. But all this extent of learning and penetration could not protect her from falling into the errors of Labadie, the famous French enthusiast, who had been banished France for his extravagant tenets and conduct. To this man she entirely attached herself, and accompanied him wherever he went; nay even attended him in his last illness at Altena in Holstein. Her works, consisting of De Vitæ Humanæ termino, Dissertatio de Ingenii Muliebris ad doctrinam et meliores litteras aptitudine, and her Letters to her learned correspondents, were printed at Leyden in 1648, but enlarged in the edition of Utrecht, 1662, in 12mo, when they appeared under the following title: A. M. Schurman Opuscula Hebræa, Græca, Latina, Gallica, Prosaica, et Metrica. She likewise published at Altena, in Latin, a defence of her attachment to Labadie, whilst she was with him in 1673. She died in Friesland in 1678.

SCHWABACH, a city of the kingdom of Bavaria, in the circle of the Rezat, situated on a river of the same name. It is the seat of the provincial courts of law, and of the boards of administration. It contains one reformed and two Lutheran churches, two Catholic chapels, and a Jews' synagogue, with 650 houses, and 6960 inhabitants, who are employed in various manufactures, principally in spinning cotton and making hosiery, but also in producing cutlery, paper, and toys of wood and of ivory.

SCHWARTSBURG-SONDERHAUSEN, a small sovereign principality in Germany, taking its first name from an ancient castle, and the second from its capital. It is 360 square miles in extent, is divided into seven bailiwicks, which comprise twelve towns and cities, 83 villages, 8600 houses, and 51,767 inhabitants, all adhering to the Lutheran confession except 200, who are Catholics. The revenue of the prince, chiefly derived from domains, amounts to L.40,000, and the expenditure is nearly equal to it, including interest on the public debt, which does not exceed one year's income. The contingent fixed to the German confederation is a force of 450 men. By a decree issued in 1830, an assembly of the states is provided, which, with the prince, is in future to make or alter the laws, and to regulate the finances. It is generally a hilly and woody district. It produces, by the help of extensive cultivation of potatoes, a little more corn than it consumes, and the surplus of it, with the produce of the forests, form the chief articles of trade. Much flax is grown, and there are some inconsiderable mines of iron, and these two articles afford some employment. The capital is Sonderhausen, with 3600 inhabitants, and the city of Arastad has 4800; the others are small places.

SCHWARZBURG-RUDOLSTADT, a sovereign principality in Germany. It is 400 square miles in extent, and is divided into eleven bailiwicks, which comprise eight cities and towns, 155 villages, 10,281 houses, and 60,000 inhabitants, all professing Lutheranism, except 150 Catholics and about the same number of Jews. The income of the state is L.32,500, arising partly from domains, besides which the prince has estates in Holstein, which are his private property. The debt amounts to about two years' income, but by a sinking fund is gradually diminishing. The contingent of force to the German confederation is fixed at 539 men. The greater part of the territory is on the Thuringian Hills, but between them are valleys of considerable fertility, especially that through which the Saale passes, and in which the capital, Rudolstadt, stands; but much of the land is poor, and scantily rewards the labour of the husbandman. It does, however, with the aid of potatoes, which are extensively cultivated, yield sufficient bread-corn, chiefly rye, for the subsistence of the inhabitants. Flax is extensively grown; but the mines afford more employment, yielding iron and lead, and some earths well adapted for making pottery-ware, all of which, with the addition of glass manufactories, give subsistence to the labouring classes. There are two cities, viz. Rudolstadt with 4000, and Frankenhausen with 3900 inhabitants.

SCHWATZ, a town of the Austrian province of Tyrol, in the circle of Innspruck. It stands on the river Inn, and having been destroyed in the course of hostilities during the year 1809, has been since rebuilt. It has again become a seat of the cotton manufacture, and of the fabrication of iron and cutlery goods and copper ware, mines of the latter being near to it. The population in 1837 amounted to 7500, and has now grown to upwards of 10,000. Long. 12. 34. E. Lat. 47. 32. N.

SCHWEIDNITZ, a city of Prussian Silesia, in the government of Reichenbach, the capital of a circle of the same name, which extends over 203 square miles, and contains three other towns and seventy-one villages, with 41,300 inhabitants. It stands on the river Weistrig, at the foot of a lofty hill. It was the strongest fortification on the frontier, but having been taken by the French in 1807, has not since been restored. It contains two Catholic and two Lutheran churches, one of the former of which has the highest tower in Germany. It has a gymnasium, military storehouse, and barracks now unoccupied, and 700 houses, with 11,600 inhabitants, who carry on extensive manufactures of woollen, silk, and linen goods. Long. 16. 31. 25. E. Lat. 50. 47. 8. N.

SCHWEINFURT, a city of the kingdom of Bavaria, in the circle of the Upper Maine, the capital of an extensive bailiwick of the same name. It stands on the river Maine, which protects it on one side, and is defended by fortifications on the other parts. It is not well built, the streets being narrow and crooked. It contains a fine palace, eight churches, 780 houses, and 7100 inhabitants, who are occupied in various small branches of manufactures. Long. 9. 44. E. Lat. 50. 10. N.

SCHWERIN, a city, the capital of the grand duchy of Mecklenburg-Schwerin, in Germany. It is finely situated, part being on the side of the lake of Schwerin, and part on an island on that lake, the two parts being connected by bridges. It contains the palace of the grand duke, with gardens, which exhibit more taste than the residence. It is fortified, but very imperfectly. It contains one Catholic and three Lutheran churches, the various appendages of a capital for a small state, 1100 houses, and 12,880 inhabitants, who have various manufactures adequate to the domestic consumption. Long. 11. 26. E. Lat. 54. 43. N.

SCHWETZ, a town of West Prussia, in the government of Marienwerder, the capital of the circle of the same name, which extends over 537 square miles. It stands on the Vistula, at the spot where the Schwartzwasser falls into that stream, and contains an old castle, and 260 houses, with 2260 inhabitants. Long. 18. 22. 15. E. Lat. 53. 24. 10. N.

SCHWYZ, a canton of Switzerland, which gives its name to the whole confederation. It is bounded on the north by Zurich, on the north-east by St Gall, on the east by Glarus, on the south by Uri, and on the west by Lucerne and Zug. It extends over 344 square miles, and comprises six towns, twenty-seven communes, and 36,390 inhabitants, who all adhere to the Roman Catholic church. It furnishes a contingent of 602 men to the force of the confederation, and a contribution of 3010 francs yearly. The government is a pure democracy. The surface is intersected by a chain of mountains in the form of an arch, on both sides of which are some beautiful and moderately fertile valleys; and the mountains in summer afford excellent pasturage for cattle, which is the chief object of trade. It neither produces nor consumes much corn, and of what it does use, a part is obtained by the sale of cattle and of cheese. The most remarkable of the mountains is the Righi, 5680 feet, on whose summit is a tavern, where visiters are accommodated. The chief river is the Sihl, which conveys to the Limmat all the waters of the several brooks that are formed from the mountains. The capital of the canton has the same name. It stands between the Righi and Myten Mountains, and has a fine council-house, a church, and a monastery, and contains 4790 inhabitants, who have very little commerce of any kind except what is created by the visits of tourists. Long. 8. 33. E. Lat. 47. 1. N.

SCIAGRAPHY, or SCIOGRAPHY, the profile or vertical section of a building, used for showing the inside of it.

SCIAGRAPHY, in *Astronomy*, is a term made use of by some authors to signify the art of finding the hour of the day or night by the shadow of the sun, moon, or stars.

SCICLI, a city of the island of Sicily, in the province of Noto. It stands on a river of the same name, in a hollow way between two lofty rocks which terminate in the sea near the small harbour of Petershaven. It is in a humid atmosphere, but contains 10,500 inhabitants, who are industriously employed in various manufactures of cloth, pottery-ware, and leather.

SCIENCE, in *Philosophy*, denotes any body of doctrines deduced from self-evident principles.

SCIGLIANO, a city of Italy, in the Neapolitan province of Calabria Citeriore. It is situated in a valley on the great road, is defended by a castle, and contains 5620 inhabitants, who are employed in making mattresses and blankets.

SCILLY, a group of islands off the coast of Cornwall, from which they are distant about thirty miles. These islands are supposed by some to have been the Cassiterides or Ten Islands with which the Phœnicians traded; but that is a disputable point. There are six islands of this group that are inhabited, but they are all in one parish, that of St Mary, in which is the parish church. There are a few small islands, or rather bare rocks, with no inhabitants, among which is that which gives its name to the whole group. The island of St Mary contains more inhabitants than all the others, and the town on it is the only one. In 1831 it contained 1311 inhabitants. It has a harbour, a church, and strong fortifications. On the island of St Agnes is the important lighthouse, which is of the highest value to ships approaching the channel in wintry or foggy weather. There is likewise on it a small church. The cultivation of these islands is imperfect, and does not, in common years, produce more than a bare sufficiency of food for the population, which is consequently on the decline; appearing by the census of 1821 to have amounted to 2614, and by that of 1831 to 2465. In unfruitful seasons the greatest distress for food has been experienced, though in all seasons fish is the common aliment. These islands are dangerous to approach, and have been fatal to many ships, as well as to Admiral Shovel and a part of his fleet in the beginning of the last century. There are establishments of pilots ready to assist vessels, and they often conduct vessels into the harbour of St Mary, through intricate and hazardous passages. There are said to be several Druidical remains on these islands. The population in 1831 was, St Mary, 1311; Tresco, 470; St Agnes, 289; St Martins, 230; Bryher, 128; and Sampson Isle, 37.

SCINDAPSOS, σκινδαψος, a four-stringed musical instrument, according to Athenæus (lib. iv. c. 25).

SCIO, an island of the Mediterranean, not far from the coast of Smyrna, and one of those classed as the Sporades. It was known to the ancients by the name of Chios, and by the Turks is now called Sakez-Adassi. It is situated between the parallels of 38° 8′ and 38° 30′, and between the meridians 25° 50′ and 26° 11′, thus being in length twenty-two and in breadth twenty-one geographical miles. It is separated from the shore of Anatolia by a strait, called sometimes the Strait of Bianca, and sometimes that of Scio, which is seven leagues long, and has a depth of water of twenty fathoms. The road, or, as it is called, the Great Port, has depth for ships of the greatest draught of water; and near to it is the harbour of Fin or Delfyn. To the south of this last port, at about two leagues distance, is the capital of the island, the city of Scio, which, in spite of the dreadful disasters which it has endured, still exists. It was built by the Genoese when they possessed the island. It is wholly constructed of stone or brick, and was till recently much cleaner in its appearance than most towns in this part of the world. Mr Galt, who visited it in 1810, says, that "the houses are built in the Italian style, with lofty pyramidal roofs. Except in the particular of dress, and with the exception of the streets where the shops are situated, every thing about Scio has the appearance of a town in Christendom. The shops are well filled, many of them with those gorgeous stuffs of woven gold and silver which are but rarely to be seen even in London. This was one of the principal manufacturing seats of the Turkish empire; and silks, which rival in beauty and elegance the richest of France and Italy, are produced in the looms of Scio. In the town are about ninety places of worship belonging to the Greek and Roman persuasions. There is a cathedral, a respectable building, adorned with modern paintings. Almost the whole of the lower class are silk weavers and embroiderers. Many of the villas in the neighbourhood of the town are large buildings, with attached pleasure-grounds and beautiful gardens."

At a later period the city contained about 5000 houses, and the inhabitants were estimated at 25,000 persons. Besides the city, there were on the island seventy-six large villages, containing Armenians, Turks, and Greeks. The latter were calculated by none below eighty, but by some at a hundred thousand.

A traveller, Mr Laurent, who visited the island in 1818, says, "All the ideas which fancy can form of an earthly paradise seem realized here; the face of the country, itself most fruitful, is cultivated with the greatest assiduity, and every part presents rich vineyards intermingled with fruitful trees. The valleys are intersected with paths shaded by trees, spreading over the traveller's head their luxuriant branches, bending in the seasons under the weight of lemons, oranges, and pomegranates. The inhabitants seem willing to join their efforts to add to the charms of their island; by all the foreigner is welcomed, and the traveller hears the salute of the peasant, *kalé emera, kalé espera*, good day, or good evening, as he passes along."

Among the productions of the island, wine is one of much celebrity when drank on the spot; but, from the delicacy of its flavour, it suffers by removal. The corn produced is not equal to more than two months' consumption; the fruits, which are the chief means of subsistence, are the finest in the Levant; the figs are of an incredible size, and the lemons and oranges exported are said to have risen to the value of L.25,000. Mastic gum is an article of great importance, and the shrub from which it exudes was very extensively cultivated. The other articles of export were cotton wool, silk, terebinth, wrought silks, and tanned hides.

Literature was more cultivated in Scio than in any other of the Greek islands; and no priest officiated there who had not been a member of the college.

The richest of the inhabitants were merchants at the head of considerable houses, with commercial establishments under the management of partners in Odessa, Venice, Fiume, Trieste, Leghorn, Genoa, Marseilles, Vienna, and London. They lived here in elegantly-furnished houses, were hospitable to strangers, and in the enjoyment of a degree of ease and freedom which was nowhere else to be witnessed within the other territories under the dominion of the Turks.

The favourable circumstances in which the people lived was in a great part owing to the power over the island having been granted to a sultana, a sister of the sultan, who, satisfied with a sum of money annually collected by the people among themselves, left them almost to their own religion, laws, manners, and occupations; but she is said to have prided herself on the superiority of those under her sway to any other Turkish subjects.

Scio.

It was owing to this state of things that, when the revolutionary movements among the other Greeks in the Turkish dominions were commenced, no disposition was felt in Scio to embark in the same course. There was a small Turkish garrison in a fortress under an aga, to whom the people gave assurance that no disposition to revolt existed among them; and some of the most respectable heads of families gave themselves as hostages for the pacific and tranquil conduct of their countrymen. The Turkish fleets never molested them, but passed by to subdue the other islands then in a state of insurrection. One of the insurgent Greek leaders, however, with a fleet entered the harbour, and landed a body of troops to attack the arsenal, in which the small garrison of the Turks was collected. In the attack on the fort, the Sciotes of the lowest classes, in spite of the remonstrances of their primates, joined their fellow-Christians. The fort was taken, and the garrison, as well as all the Turks in the city, were put to the sword.

Soon afterwards, in 1822, whilst the island was under the dominion of the rabble and the small body of insurgent Greeks, the Turkish fleet entered the harbour, upon which the invaders escaped from the superior force. As the populace had joined them in spite of the remonstrances of the principal inhabitants, the latter, in number above two hundred, repaired on board the ship of the Capitan Pasha, with the most solemn assurance of their innocence, and the most unqualified submission to the Porte. The admiral received them with great civility, expressed himself willing to forget all that had passed, and ordered coffee and a variety of refreshments. He soon landed, taking with him a force of 10,000 men, a few of whom were regular troops, but the far greater number were volunteers, under no control, who had been induced to embark from the capital by the promise of plunder. Then consequently began a general massacre of the men, with the plunder of the houses, and the capture of the women, girls, and boys, as slaves, to be sold by the captors to the harems for the gratification of the natural and the unnatural vices of the Turks. The details given by eye-witnesses who escaped were such as to harrow up the soul. Every house and every garden were strewed with corpses; beneath the orange-trees, on the sides of the fountains, on the rich carpet, and on the marble pavement, lay the young, the beautiful, and the aged, in the midst of their loved and luxurious retreats. Day after day passed, and, lying as they fell, alone or in groups, no hand bore them to their graves, while survivors yet remained to perish. At last, when all was over, they were thrown in promiscuous heaps into large pits.

Twenty thousand persons are computed to have thus perished during the few days the massacre lasted. A few were happy enough to escape and pass the barrier of rocky mountains, and thus for a time were secure; and a few were received into boats or vessels on the coast, and thus were rescued from immediate destruction. The greater number, especially the younger women and boys, were made objects of plunder by the volunteers; they were mingled together as indiscriminately as a flock of sheep, were driven into the ships, and were thus transported to the capital, where they were exposed to sale like cattle, and a very few were redeemed by their friends, who, privately, it being unlawful for a Greek to buy a Greek, purchased them through Turkish agents.

Those who had delivered themselves up to the Capitan Pasha were removed to a solitary prison, and there, in spite of Lord Strangford's intercession, were, after he had thought their lives secure, all decapitated. Even the Sciotes in Constantinople were not spared, but in a short time were plundered and put to death. The English ambassador exerted himself in the cause of humanity, but no diplomatic personage of the other states of Europe interfered in behalf of these wretched sufferers.

Sciopius.

SCIOPPIUS, Gaspar, a learned German writer of the seventeenth century, was born at Neumark, in the Upper Palatinate, on the 27th of May 1576. He studied at the university with so much success, that at the age of sixteen he became an author, and published books, says Ferrari, which deserve to be admired by old men. But his dispositions did not correspond with his genius. Naturally passionate and malevolent, he assaulted without mercy the characters of eminent men. He abjured the system of the Protestants, and became a Roman Catholic, about the year 1599; but his character remained the same. He possessed all those qualities which fitted him for making a distinguished figure in the literary world; imagination, memory, profound learning, and invincible impudence. He was familiar with the terms of reproach in most languages. He was entirely ignorant of the manners of the world. He neither showed respect to his superiors, nor did he behave with decency to his equals. He was possessed with a frenzy of an uncommon kind, being a perfect firebrand, scattering around him, as if for his amusement, the most atrocious calumnies. Joseph Scaliger, above all others, was the object of his satire. That learned man having drawn up the history of his own family, and deduced its genealogy from princes, was severely attacked by Scioppius, who ridiculed his high pretensions. Scaliger in his turn wrote a book entitled the Life and Parentage of Gaspar Scioppius, in which he informs us that the father of Scioppius had been successively a grave-digger, a journeyman stationer, a hawker, a soldier, a miller, and a brewer of beer. These statements inflamed Scioppius with greater eagerness to attack his antagonist. He collected all the calumnies that had been thrown out against Scaliger, and formed them into a huge volume, as if he had intended to crush him at once. He treated with great contempt the king of England, James I., in his *Ecclesiasticus*, and in his *Collyrium Regium Britanniæ Regi graviter ex oculis laboranti munere missum*, that is, An Eye-salve for his Britannic Majesty. In one of his works he had the audacity to abuse Henry IV. of France in a most scurrilous manner, on which account his book was burned at Paris. He was hung in effigy in a farce which was represented before the king of England, but he gloried in his dishonour. Provoked with his insolence to their sovereign, the servants of the English ambassador assaulted him at Madrid, and corrected him severely; but he boasted of the wounds he had received. He published more than thirty defamatory libels against the Jesuits; and, what is very surprising, in the place where he declaims with most virulence against that society, he subscribes his own name with expressions of devotion: "I Gaspar Scioppius, already on the brink of the grave, and ready to appear before the tribunal of Jesus Christ, to give an account of my works." Towards the end of his life he employed himself in studying the Apocalypse, and affirmed that he had found the key to that mysterious book. He sent some of his expositions to Cardinal Mazarin; but the cardinal did not find it convenient to read them.

Ferrari tells us, that during the last fourteen years of his life he shut himself up in a small apartment, where he devoted himself solely to study. The same writer acquaints us, that he could repeat the Scriptures almost entirely by heart; but his good qualities were eclipsed by his vices. For his love of slander, and the furious assaults which he made upon the most eminent men, he was called the Cerberus of literature. He accuses even Cicero of barbarisms and improprieties. He died on the 19th of November 1649, at the age of seventy-four, at Padua, the only retreat which remained to him from the multitude of enemies whom he had created. Four hundred books are ascribed to him, which are said to discover great genius and learning. The chief of these are, 1. Verisimilium Libri iv. 1596, in 8vo; 2. Commentarius de Arte Critica, 1661, in 8vo; 3. De sua ad

Catholicos Migratione, 1660, in 8vo; 4. Notationes Criticæ in Phædrum, in Priapeia, Patavii, 1664, in 8vo; 5. Suspectarum Sectionum Libri v. 1664, in 8vo; 6. Classicum Belli Sacri, 1619, in 4to; 7. Collyrium Regium, 1611, in 8vo; 8. Grammatica Philosophica, 1644, in 8vo; 9. Relatio ad Reges et Principes de Stratagematibus Societatis Jesu, 1641, in 12mo. This last-mentioned work was published under the name of *Alphonso de Vargas*.

SCIOPTIC, or Scioptric Ball, a sphere or globe of wood, with a circular perforation, where a lens is placed. It is so fitted that, like the eye of an animal, it may be turned round every way, and is used in making experiments in a darkened room.

SCIPIO, Publius Cornelius, a renowned Roman general, surnamed *Africanus* for his conquests in that country. His other signal military exploits were, his taking the city of New Carthage in a single day; his complete victory over Hannibal, the Carthaginian general; and the defeat of Syphax king of Numidia, and of Antiochus in Asia. He was as eminent for his generous behaviour to his prisoners as for his valour. He died 180 B. C. aged about fifty-one.

Scipio, *Lucius Cornelius*, his brother, surnamed *Asiaticus* for his complete victory over Antiochus at the battle of Magnesia, in which Antiochus lost fifty thousand infantry and four thousand cavalry. A triumph, and the surname of *Asiaticus*, were the rewards of his valour. Yet his ungrateful countrymen accused him, as well as his brother, of peculation, for which he was fined; but the public sale of his effects proved the falsehood of the charge, for they did not produce the amount of the fine. He flourished about 190 B. C.

Scipio, *Publius Æmilianus*, was the son of Paulus Æmilius, but being adopted by Scipio Africanus, he was called *Scipio Africanus junior*. He showed himself worthy of adoption, following the footsteps of Scipio Africanus, whom he equalled in military fame and public virtues. His chief victories were the conquest of Carthage and Numantia; yet these signal services to his country could not protect him from an untimely fate. He was strangled in his bed by order of the Decemviri, who dreaded his popularity, 129 B. C. aged fifty-six.

SCIRO, an island of the Archipelago, to the west of Mytilene, to the north-east of Negropont, and to the south-east of Sciati. It is fifteen miles in length and eight in breadth. The vines form the beauty of the island, and the wine is excellent; nor do the natives want wood. There is but one village, and that is built on a rock, which runs up like a sugar-loaf, and is ten miles from the harbour of St George. The inhabitants are Greeks.

SCIROCHO, or Sirocco, a name generally given in Italy to every unfavourable wind. In the south-west it is applied to the hot suffocating blasts from Africa; and in the north-east it means the cold bleak winds from the Alps.

SCLAVONIA, a province of the Austrian empire, still occasionally dignified with the name of kingdom. It is bounded on the west by Croatia, on the north and east by Hungary, from which it is separated by the river Drave, and partly by the Danube, and on the south by Turkey, the river Save separating it from the territories of the sultan. The shape of this province is long and narrow, and it contains a superficies of about 5000 square miles. A chain of lofty mountains, which rises in Croatia, intersects it in its whole length from east to west. This elevated ridge is covered with forests, containing the finest oak and other valuable trees; but a proper water conveyance is wanting to render this natural product of the soil a valuable article of export. The rest of the country consists of fine plains, with a fertile soil, and a climate which, although mild, is cooler than might be expected under the parallels of forty-five and forty-six. This is to be attributed to the presence of the forest-covered mountain chain just mentioned. During dry years the open parts of the mountainous tracts are barren; in favourable years they produce excellent crops of wheat, barley, flax, hemp, and madder. The climate of the plains is sufficiently genial for the cultivation of maize, silk, and the fruits of the south of Europe. Limestone, sulphur, coal, salt, and some ferruginous substances, are amongst the most abundant mineral treasures of Sclavonia; but these have not yet been thoroughly investigated. Much of the mountain chain yet remains unexplored. The manufactures are too insignificant to require specific notice; those of glass and potash appear to be the most important. The exports consist of corn, tobacco, nuts, plums, hides, wax, honey, and madder; the imports are chiefly iron, salt, and oil. Domestic weaving and knitting is universally practised, so that few of the finer fabrics of Great Britain or France are required, especially amongst a people the bulk of whom live in mud-huts. The transit trade is of more importance, in consequence of the three great rivers, the Danube, the Drave, and the Save, which directly or indirectly communicate with a large tract of country.

Under the Romans, Sclavonia formed a part of Pannonia, and derived its present name from a tribe of Sclavi or Slavi, who settled here in the sixth or seventh century. Subsequently, the Venetians, having acquired an ascendency over Dalmatia, extended their acquisitions to this country. In the tenth century it came under the dominion of Hungary, to which it remained subject, until, in the year 1526, it was overrun and subdued by the Turks. It was finally subjected to the house of Austria by the peace of Carlowitz, which was ratified in 1699. The country remained divided into military districts until 1745, but since that time a beginning has been made towards giving some of them a civil constitution. These form three counties. The military district, or generalate, consists of Brod, Peterwardin, and Gradisca. It is under a military government, at the head of which is the commanding general in Sclavonia, who resides at Peterwardin. The counties are subject to the kingdom of Hungary, each having its governor and vice-governor. Although Sclavonia has undergone a material improvement since its annexation to Austria, yet the population is not characterized either by industry, or by that degree of intelligence necessary to turn the natural advantages of the country to good account. The Sclavonians proper, or aborigines, do not now form the majority of the inhabitants; they are largely intermixed with Magyars, Wallachians, Gypsies, Germans, Greeks, Jews, and Armenians. There are but few Protestants in the country. The most numerous religious denominations are the Roman Catholic, the Greek Catholic, and the Greek non-united Church. The population in 1831 amounted to 370,000, which is about eighty-five inhabitants to every square mile.

SCONE, a village of Scotland, now chiefly remarkable for being the place where the kings were anciently crowned. Kenneth II. upon his conquest of the Picts in the ninth century, having made Scone his principal residence, delivered his laws, called the Macalpine laws, from a tumulus, named the *Mote Hill of Scone*. The old palace was begun by the Earl of Gowrie, but was completed by Sir David Murray of Gospatrick, the favourite of King James VI. to whom that monarch had granted it; and the new possessor, in gratitude to his benefactor, put up the king's arms in several parts of the house. During the middle ages of the Scottish monarchy Scone was the occasional residence of the kings; and it was here that they were crowned, sitting on the famous stone called the stone of Dunstaffnage or stone of Scone, which, if the ancient chronicles may be believed, was the pillow on which Jacob slept when journeying through the plains of Luz. Edward I. carried it off, to the great mortification of the Scotch, who looked upon it as a kind of palladium. The abbey and palace were demolished by a mob from Dundee at the Reformation. Charles II., before the battle of Worcester, was crowned in the chapel at Scone.

The old pretender resided here for some time in 1715, and his son paid it a visit in 1745. On the site of the ancient palace a splendid edifice has been reared by the Earl of Mansfield, who represents the old family of Stormont. In the modern structure much of the old furniture has been preserved, particularly a bed that belonged to James VI., and another of which the curtains were wrought by the fair hands of Queen Mary when a prisoner in Lochleven Castle. The old market-cross stands in the midst of the pleasure-grounds. The modern village is regularly built, and of a neat appearance.

SCORE, or PARTITION, in *Music*. Either of these terms means that written or printed arrangement of different parts for voices or instruments, or for both, by which the structure of any piece of music, consisting of a number of such parts, is brought successively under the eye, measure after measure, so as to enable the student of composition to study the work, or the conductor of an orchestra to accompany the whole suitably on the piano-forte or organ, or instantly to perceive and correct errors in the performance, especially during rehearsals. In a score or partition, all the staves required in any given page for the different parts should be marked with their proper clefs, &c., and, on the left margin, with the names of the different voices or instruments, and then braced together at the left side, while at every bar of the measure a straight line is drawn down the page, from the top of the highest stave to the bottom of the lowest. For the sake of perspicuity, in every partition the same number of staves ought to be used from beginning to end on every page, even where many bars of rests occur in this or that part; and also the clefs, &c. ought to be marked on every page, as well as the names of the different voices or instruments. The general neglect of these simple precautions renders many partitions extremely confused and perplexing to their readers. In the article MUSIC, we have used the word *partition* in preference to the word *score*, for various reasons; and especially as we had already the word *partition* used in the sixteenth century by an English writer of eminent musical authority, in the very sense in which we employ it. Thomas Morley, in his "Plaine and easie Introduction to practicall Musicke," edition of 1597, page 34, has stamped the word *partition* as an English musical term. He says, "and to the ende that you may the more easily understand the contryving of the parts, and their proportion one to another, I have set it downe in *partition*." He then gives the example, part under part, in partition.

SCORIA, or DROSS, amongst metallurgists, is the recrement of metals in fusion, or, more determinately speaking, is that mass which is produced by melting metals and ores. When cold, it is brittle, and not dissoluble in water, being properly a kind of glass.

SCORIFICATION, in *Metallurgy*, is the art of reducing a body, either entirely or in part, into scoria.

SCOT, MICHAEL of Balwirie, a renowned Scottish worthy of the thirteenth century. This singular man made the tour of France and Germany, and was received with some distinction at the court of the Emperor Frederic II. Having travelled enough to gratify his curiosity or his vanity, he returned to Scotland, and gave himself up to study and contemplation. He was skilled in languages; and, considering the age in which he lived, was no mean proficient in philosophy, mathematics, and medicine. He translated into Latin, from the Arabic, the history of animals by the celebrated physician Avicenna. He wrote a book concerning the Secrets of Nature, in which he treats of generation, physiognomy, and the signs by which we judge of the temperaments of men and women. We have also a tract of his on the Nature of the Sun and the Moon. He there speaks of the grand operation, as it is termed by alchymists, and is exceedingly solicitous about the projected powder, or the philosopher's stone. He likewise wrote what he calls *Mensa Philosophica*, a treatise replete with astrology and chiromancy. He was much admired in his day, and was even suspected of magic; and he had Roger Bacon and Cornelius Agrippa for his panegyrists.

SCOT, *Reginald*, a judicious writer in the sixteenth century, was the younger son of Sir John Scot of Scotshall, near Smeethe, in Kent. He studied at Hart Hall in the University of Oxford; after which he retired to Smeethe, where he lived a studious life, and died in 1599. He published the Perfect Platform of a Hop-Garden; and a book entitled the Discovery of Witchcraft, in which he showed that all the relations concerning magicians and witches are chimerical. This work was not only censured by King James I. in his *Dæmonology*, but by several eminent divines; and all the copies of it that could be found were burned.

SCOTAL, or SCOTALE, is where any officer of a forest keeps an ale-house within the forest, under colour of his office, making people come to his house, and there spend their money for fear of his displeasure. We find it mentioned in the charter of the forest, "Nullus forestarius faciat *Scotallas*, vel garbas colligat, vel aliquam collectam faciat." The word is compounded of *scot* and *ale*, and, by transposition, is otherwise called *aleshot*.

SCOTALES were meetings formerly held in England for the purpose of drinking ale, of which the expense was paid by joint contribution. Thus the tenants of South Malling, in Sussex, which belonged to the Archbishop of Canterbury, were, at the keeping of a court, to entertain the lord or his bailiff with a drinking, or an ale; and the stated quotas towards the charge were, that a man should pay threepence halfpenny for himself and his wife, and a widow and cottager a penny halfpenny. In the manor of Ferring, in the same county, and under the same jurisdiction, it was the custom for the tenants named to make a scotale of sixteen pence halfpenny, and to allow out of each sixpence a penny halfpenny for the bailiff.

Common scotales in taverns, at which the clergy were not to be present, are noticed in several ecclesiastical canons. They were not to be published in the church by the clergy or the laity; and a meeting of more than ten persons of the same parish or vicinage was a scotale that was generally prohibited. There were also common drinkings, which were denominated leet-ale, bride-ale, clerk-ale, and church-ale. To a leet-ale probably all the residents in a manorial district were contributors; and the expense of a bride-ale was defrayed by the relations and friends of a happy pair, who were not in circumstances to bear the charges of a wedding dinner. This custom prevails occasionally in some districts of Scotland even at this day, under the denomination of a *penny bride-ale*, and was very common about half a century ago. The clerk's-ale was in the Easter holidays, and was the method taken to enable clerks of parishes to collect their dues more readily.

SCOTIA, in *Architecture*, a semicircular cavity or channel between the tores in the bases of columns.

SCOTISTS, a sect of school divines and philosophers, so called from their founder Joannes Duns Scotus, a Scottish cordelier, who maintained the immaculate conception of the Virgin, or that she was born without original sin, in opposition to Thomas Aquinas and the Thomists. As to philosophy, the Scotists were, like the Thomists, Peripatetics; only distinguished by this, that in each being, as many different qualities as it had, so many different formalities did they distinguish, all distinct from the body itself, and making as it were so many different entities; but these were metaphysical, and as it were superadded to the being. The Scotists and Thomists likewise disagreed about the nature of the divine co-operation with the human will, the measure of divine grace that is necessary to salvation, and other abstruse and minute questions, which it is needless to enumerate.

HISTORY OF SCOTLAND.

Sect. I.—*Roman Period.*

A. D. 85 to 446.

It will not be expected that in such a sketch of the history of Scotland as is alone suited to this work, we should enter into the great controversy concerning the origin of the Scottish people, a subject upon which much needless acrimony, and many unprofitable volumes, have been thrown away.[1] It will be more suitable to mark the progress of the great events in our national history, and to pass over its minor features; to fix the attention upon results rather than to perplex it with details; to establish a series of points by which an intelligent reader may guide his memory and direct his studies; and occasionally to note those authors from whose pages he may fill up the picture.

Julius Cæsar. Before Christ, 55.

Julius Agricola.

It is well known, that our first authentic knowledge of Britain comes from Julius Cæsar. Fifty-five years before the Christian era, this extraordinary man invaded the island from Gaul; but his operations were attended with little success, his stay was brief, and it is certain that he knew nothing of Scotland. It was not till nearly a century and a half after Cæsar's descent, and during the reign of the emperor Vespasian, that Julius Agricola, at the head of a Roman army, penetrated into the northern parts of Britain. The details of his various campaigns, the resistance which he encountered, and the vestiges of his progress which yet remain, have furnished matter of laborious investigation to our antiquaries. Among their conflicting accounts, it seems certain that he first pushed his conquests as far as the Friths of Forth and Clyde; that in succeeding campaigns he penetrated northwards; and that in his last great expedition, during which his army was accompanied by a numerous fleet, which sailed along the coast, he was opposed by a barbarian chief named Galgacus. A sanguinary battle was fought between this leader and Agricola, the exact site of which has been keenly disputed. There seems to be little doubt, however, that previously to its occurrence the Roman general had passed the Frith of Tay, and that although victorious over the fierce and undisciplined multitudes which opposed him, he experienced a check which compelled him to desist from any further aggression. Two great events marked the last years of the government of Agricola. He explored the northern coasts of Scotland by his fleet; and to him the Roman world, in all probability, owed its first certain knowledge that Britain was an island. He endeavoured, in the second place, to secure his conquests from future attack by a chain of forts connecting the Friths of Forth and Clyde. Having completed these defences, he was recalled by the jealousy of Domitian, and left Britain in the year 85.

gricola aves Bri- in. . D. 85.

adrian.

. D. 121 161.

Lollius Urbicus.

From this time till the reign of Hadrian, a period of thirty-six years, we hear little of the Romans, either in southern or northern Britain. Early in the second century, (A.D. 121), this emperor in person made an expedition into Scotland; and about twenty years later, Lollius Urbicus, the Roman governor under the emperor Antoninus, distinguished himself by the courage and ability which he displayed against the turbulent and warlike tribes which inhabited the northern parts of the island. Two facts, however, are admitted by the Roman writers, which demonstrate how uncertain was the tenure by which these masters of the world held their northern possessions in Britain. The emperor Hadrian, apparently distrusting the sufficiency of the line of forts already formed by Agricola, constructed a wall or fortified rampart from the Tyne to the Solway. It has been supposed by some antiquaries, that the emperor entirely abandoned to the barbarians the wide country between this new defence and the more ancient *Vallum* which united the Friths of Forth and Clyde; but the discovery of a succession of coins along the line of this last rampart, belonging to the intermediate emperors, appears to indicate the contrary.[2] From the adoption of this measure it is however evident, that the courage and successes of the barbarians had given much annoyance to the Romans; and this is corroborated by the second fact to which we allude, namely, that between the period of Hadrian's death and the succession of Antoninus Pius, (A. D. 138), the wall between the Forth and Clyde had been so completely destroyed, that Lollius Urbicus entirely reconstructed it. This fact is proved by inscriptions, which the reader may consult in Horsley's *Britannia Romana*.[3] During the remaining years of his government, this able officer devoted himself to opening up the country by roads; to the construction of various camps and fortalices, of which the site has been traced with much industry and success by the latest writer on the subject; and to the introduction of those useful arts which were best calculated to raise and humanize the character of the northern barbarians. His administration in Britain appears to have terminated with the death of his master, Antoninus Pius, A. D. 161.

Severus. A. D. 207.

From this period till the beginning of the third century, all is dark in Britain. But in the year 207, the emperor Severus received intelligence that the Caledonians had invaded the Roman provinces; and with a vigour and alacrity which, considering the distance of the seat of war, and the barren prize to be contested, is not easily explained, he hastened in person to reduce the insurgent Caledonians. This expedition, making every allowance for the exaggeration with which the exploits of an emperor were usually recorded, must have been an extraordinary one. In the comparatively civilized country which extended between the walls of Hadrian and Antoninus, he could meet with little opposition; but when he left this last line of defence, and conducted his army into the wild regions beyond the Frith of Forth, ultimately penetrating into Moray, we must suppose him to have encountered very formidable obstacles. The savage and uncleared state of the country, the extent of the forests, the unhealthy and

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[1] The reader is referred to Innes's Critical Essay on the ancient Inhabitants of Scotland, as the best work yet written on this subject. Its arrangement is defective; but its good sense, and the authenticity of the documents upon which its deductions are founded, are highly praiseworthy. Pinkerton's Dissertation on the Scythians or Goths, Dr. Jamieson's Dissertation on the Origin of the Scottish Language, and the first volume of the ponderous work of Chalmers, entitled Caledonia, may be consulted with the greatest advantage. In their pages, the critical student who may desire to pursue the subject, will find ample references to all the noted works upon this question.

[2] Chalmers's Caledonia, p. 116.

[3] Horsley's Britannia, Rom. l. i. c. 10; Innes's Critical Essay, vol. i. p. 12. The remains of the wall are popularly called Grim's Dyke. Grym in Welsh and Cornish, signifies strong, and is used perhaps metaphorically, as Chalmers conjectures, for a "strength or a rampart." Caledonia, vol. i. p. 129.

[4] We may here refer the critical reader to Chalmers's dissertation on the actions of Lollius Urbicus, contained in the first volume of his Caledonia.

Severus. A.D. 207.

His great northern expedition.

interminable marshes, the mountainous ranges which presented such formidable obstacles to the march of a regular army, the rivers, of which the fords were unknown, and the want of subsistence for his troops, except what he carried along with him, must have combined to throw infinite difficulties in his way. The classical writers who have described his campaign inform us, in general terms, that he was obliged to fell the forests, to drain the marshes, to open up the country by roads, and to construct bridges; and they affirm that the Roman emperor did not retrace his steps till he had proceeded so far north, that the soldiers remarked the extraordinary length of the days and shortness of the nights, in comparison with those of Italy.[1] There seems good reason to believe that the spot where the Roman eagles terminated their flight in this memorable expedition, was the promontory separating the Cromarty and the Moray Friths. Here, according to Chalmers, the Caledonians sought for peace, surrendered their arms, and relinquished a portion of their country.[2] The critical student must pardon the vagueness of these expressions, as the historians of the time do not enable us to be more definite.

Death of Severus at York. A.D. 211.

Severus retired to York in a feeble state of health; but it was not to repose upon his laurels, for scarcely had he reached that station when news arrived that the Caledonians were again in arms. Irritated by disappointment and disease, he determined instantly to renew the war; intrusted the leading of the army to his son Caracalla; and issued orders to spare neither age nor sex. But death happily arrested these inhuman projects. The emperor expired at York, and the son does not appear, on any good evidence, to have executed the orders of the father.

Previously to his celebrated northern campaign, Severus is said to have reconstructed the rampart originally built by Hadrian between the Tyne and the Solway; a circumstance from which there arises a strong presumption that the Caledonians had encroached upon the Roman provinces, and regained much of the intermediate country between the walls of Hadrian and Antoninus.

A.D. 211 to 446.

Decay of the Roman power.

Constans. A. D. 306.

Theodosius.

Honorius. A.D. 422.

From this period, (A.D. 211), which marks the commencement of the third, to nearly the middle of the fifth century, (446), the Romans appear to have abandoned all thoughts of extending their conquests. The vast fabric of their empire was now, as is well known, in a state of melancholy feebleness and decay; attacked on every side by those fierce tribes who were destined to destroy it; and unable to retain provinces far nearer and more important than those in Britain. For some time, however, an effort was made to defend the northern Romanized Britons from the repeated incursions of the Caledonians. In the commencement of the fourth century, (A.D. 306), Constans revisited Britain for this purpose; in the year 368, after a sanguinary and destructive invasion of the barbarians, a temporary tranquillity was restored by the arms of Theodosius; in 398, Stilicho, alarmed by new excesses and increasing weakness in the northern provinces, sent such effectual aid as enabled the Roman governors once more to repel the enemy; and, lastly, in the year 422, the emperor Honorius, having in vain endeavoured to rouse the provincial inhabitants to a vigorous effort in their own defence, sent a legion to their assistance, by whose efforts the fortifications of the two walls were repaired, and the barbarians once more driven back into their more northern seats. But this was the last relief which could be wrung by her miserable children from a parent who was herself expiring; and it secured for them but a brief period of tranquillity. Imperial Rome, with a tardy and ostentatious justice, conferred freedom on the southern Britons; and restoring a country which she was no longer able to hold, informed them that henceforth they must trust to their own efforts for the defence of their independence. Having given this parting advice to men who appear to have been little able to follow it, the Romans abandoned Britain for ever.

A.D.

SECT. II.—*The Pictish Period.*

A.D. 4 to 843. The a- ginal tr s.

In the brief sketch which has been given of the Roman dominion in north Britain, which extended from the year 85 to 446, a period of little more than three centuries and a half, we have seen that the Romanized Britons were constantly exposed to the invasions of their more northern neighbours, who threatened at last to wrest from them the whole of the country, which had been fortified by Roman skill and mainly defended by Roman soldiers. The question now arises, who were these fierce and indomitable tribes? And to this inquiry, in which antiquaries have spilt almost as much ink as the Romans did blood, the research of a laborious writer enables us to give a satisfactory answer. It appears from the investigation of Chalmers that "at the epoch of Agricola's invasion, the ample extent of north Britain was inhabited by one-and-twenty tribes, who were connected by such slight ties as scarcely to enjoy a social state. These were the *Ottadini*, who appear to have occupied the whole extent of coast from the southern Tyne to the Frith of Forth;[3] the *Gadeni*, whose seats lay in the interior country, from the Tyne on the south to the Frith on the north; the *Selgovæ*, whose western boundary was the Dee, and their southern limit the Solway Frith; the *Novantes*, who inhabited the midland and western parts of Galloway; and the *Damnii*, who possessed the shires of Ayr, Renfrew, and Stirling, with a portion of Dunbarton and Perth. Such were the five tribes," says this author, "which occupied, during the first century, that ample region extending from the Tyne and the Solway on the south, to the Forth and the Clyde on the north, varying their limits with the fluctuations of war, conquest, or internal dissensions, during the succession of many ages."[4] Beyond the Forth we find the Horestii, the Venricones, the Taixali, the Vacomagi, the Albani, the Attacotti, the Caledonii, the Cantæ, the Logi, the Carnabii, the Catini, the Mertæ, the Carnonaceæ, the Creones, and the Epidii. The names of these twenty-one original tribes, which are taken from Chalmers, are by him transcribed from the account of Ptolemy, checked by the ancient treatise and map of Richard of Cirencester.[5] Of the manners of this ancient people, it is impossible, in the absence of all authentic documents, to speak with certainty. From the general account given by Cæsar, they were little removed in the scale of social life or of civil government from the rudest savages. They led a pastoral life, living on the milk of their flocks, or the produce of the chase; they were polygamous and idolatrous; their religion, which was Druidical, was stained with human sacrifices; and their rude form of civil government was intimately connected with their religion. They were armed with slight shields, short spears, and daggers; and sometimes fought in small cars, which were drawn by little spirited horses. They raher burrowed in huts than lived in houses, went naked from choice, were brave to excess, capable of enduring all sorts of privation and fatigue, and had such loose ideas of property, that Dio does not hesitate to call them robbers. This character, with the exception of their Druidical form of worship, exhibits little more than the general features of every savage people; and there seems no reason to believe that the lapse of three centuries created any great change in those fierce and indomitable tribes which, inhabiting the more northern parts of the island from the Forth to Caithness, and latterly wresting from the Romans the provinces which they had subdued, were never brought under the yoke, or humanized by the arts of that great people.

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[1] Caledonia, vol. i. p. 186, 187.

[2] The son of Severus is indeed affirmed to have fought on the banks of the Carron with the heroes of Ossian; but much has yet to be proved before we venture to transplant these shadowy contests into the field of history.

[3] Including the half of Northumberland, the eastern portion of Roxburghshire, all Berwickshire, and East Lothian.

[4] Caledonia, vol. i. p. 62.

[5] It ought however to be stated, that some grave doubts hang over the genuineness of this early writer. Dr. Stukeley's account of him is vague, and the story told by Professor Bertram regarding his discovery of the manuscript and the map is still more suspicious. I have abstained from giving from Chalmers the exact limits of the possessions held by the last sixteen tribes, who inhabited the whole extent of country beyond the Forth to the extremity of Caithness. The research and erudition which he has displayed is entitled to all praise; but it is difficult to believe that the boundaries of these remote, fierce, and wandering aborigines should be ascertainable with as much precision after the lapse of eighteen centuries as the *marches* of Middlesex or Yorkshire. Two points, however, and these of leading importance, Chalmers conceives that he has established: the first, that Britain, from its extreme southern to its most remote northern point, was peopled from Gaul; and the second, that the aborigines over the whole island were a Celtic race.

A.D. 446.
The Picts.

At the period of the Roman abdication, we find that north Britain was inhabited by the descendants of the Caledonian clans which we have enumerated, who, under the name of Picts or Picti, became for four centuries the predominating nation in Scotland. Among these we must be careful to distinguish the five Romanized tribes who possessed Valentia, or the country between the walls of Agricola and Antoninus, not as a race of different descent, but of improved civilization, while their fiercer brethren beyond the Forth bore fresh upon them all the stamp of barbarian life. The name of Picti is conjectured to be derived from Peithi, a British word which characterises *those that are without*, or the people of the open country.[1]

Thirty-eight Pictish kings.

From Drest to Bred.

It would be a vain, and in a sketch of this nature, an idle labour, to enter upon the obscure and sanguinary annals of the Pictish period; an era upon which, to use a quaint expression of Chalmers, archæology is loquacious, and history silent. From an ancient manuscript, first printed by Innes,[2] and which had belonged to Lord Burleigh, this author has given us a list of their kings, from Drest, who succeeded in the middle of the fifth century, (A. D. 451), to a prince named Bred, who died about the middle of the ninth century, (A. D. 843). During the four centuries which elapsed between the accession of the first and the last of these monarchs, thirty-eight Pictish kings are enumerated. Of their authentic history there is scarcely a vestige; but the blank has been filled up by the fables of Boyce, which unhappily were afterwards embalmed in the elegant Latinity of Buchanan.

Rise of the kingdom of Strathclyd.

Origin of Dunbarton.

King Arthur.

Some points in this period, however, have been ascertained, and they are well worthy of notice. We have already seen, that on the entire abdication of Britain by the Romans, the five tribes which inhabited Valentia were declared independent. They were no longer provincial subjects of Rome, but a free, though an effeminate people. The constant attacks of the Picts rendered it necessary for them to unite in their own defence; and from this union arose a new kingdom, denominated by ancient authors sometimes the *Regnum Cumbrense*, or more frequently the kingdom of Strathclyd. It appears to have included the present Liddesdale, Teviotdale, Dumfries-shire, Galloway, Ayrshire, Renfrew, Strathclyde, the midland and western parts of Stirlingshire, with the largest portion of Dunbartonshire.[3] "The metropolis of this kingdom," says Chalmers, "was Alclyd, a city which they still retained when the pen dropt from the hand of the venerable Bede, in 734, and which is situated on the north bank of the Clyde, at the influx of the Leven. The descriptive name of Alclyd, which signifies the rocky height on the Clyde, was applied to the bifurcated rock, on the summit of which these associated Britons had a strong hill fort, which formed a secure residence for their reguli or kings. To this fortress the Scoto-Irish subsequently applied the name of *Dun*-Briton, signifying the fortress of the Britons, an appellation which, by an easy transition, has in modern times been converted into Dunbarton.[4] Among the little kings who reigned over Strathclyd, there are none whose names or exploits are worthy of preservation, with the single exception of the semi-poetic Arthur. It is sad that the severer hand of history should strip this glorious "Childe" of his many-coloured robes, and reduce him to the cold reality of a Cumbrian Pendragon. At the commencement of the sixth century, Arthur, the chief military leader or Pendragon of the Cumbrian Britons, expelled his sovereign, Huail or Hoel, from Strathclyde, and commenced a reign of which it is impossible to separate the facts from the fictions with which they have become incorporated.

The Saxons in Scotland.
A.D. 449.

A.D. 547.
Ida.

Northumbria founded.

Aella.

Edwinsburgh or Edinburgh.

But the Pictish period is not only distinguished by the rise of a new kingdom, it is marked by the arrival in Scotland of a new people, the Saxons, a race of Gothic origin, who invaded and finally effected a settlement in Lothian. This remarkable event, so important in its remote consequences upon our national history, took place in the middle of the fifth century (A. D. 449). It was not difficult for the Saxons, a people who certainly were far their superiors in courage and in arms, to subdue the feebler race of the Ottadini. They do not at first appear to have attempted to push their conquests to the northward of the Forth, but contented themselves with the occupation of a portion of the province of Valentia. After the lapse of a century, however, Ida, one of the boldest and most adventurous of the sons of Woden, landed at Flamborough, and brought an important accession to the strength and numbers of his countrymen. It was by this great chief that the Saxon kingdom of Northumbria was founded; nor was he arrested in his victorious career, till he had extended his dominions from the Humber to the Forth. Ida was succeeded in the Northumbrian kingdom by Aella, and Aella by Ethelred, under whose reigns occurred no event of importance; but Edwin his successor, who came to the throne in the beginning of the seventh century, appears to have added essentially to the extent of the Saxon conquests, and to have impressed not only the southern Britons, but his fiercer and more northern neighbours the Picts, with the terror of his arms. There appears little doubt that Edinburgh or Edwinsburgh, the present capital of Scotland, owes its foundation to this energetic Saxon chief.[5]

Hitherto, in speaking of the northern inhabitants beyond the Forth, we have designated them by the single appellation of the Picts. We must now mark the arrival of a different people, although probably sprung from the same ancient stock.

The Scots.

A.D. 503.

Scots settle in Kintire.

At the commencement of the fourth century, we find that the ruling or dominant people in Ireland were the Scots, a Celtic race; and although there is no sufficient evidence that they had formed any permanent settlement in Britain previously to the abdication of the island by the Romans, it is certain that in the year 360 they invaded the Roman provinces in that kingdom, and were repelled by Theodosius. In the beginning of the sixth century, three Irish chiefs, Loarn, Fergus, and Angus, sons of Erc, king of Dalriada, by which we are to understand the province of Ulster, led a colony into the ancient province of the British Epidii, and effected a settlement upon the promontory of Kentire.[6] As far as any light is afforded by the Irish annals, in this occupation of Kentire the Scoto-Irish met with but feeble opposi-

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[1] Chalmers's Caledonia, vol. i. p. 203.

[2] Innes's Critical Essay, vol. ii. Appendix.

[3] Caledonia, vol. i. pp. 237, 238.

[4] Caledonia, vol. i. p. 238.

[5] Caledonia, vol. i. p. 254.

[6] Ibid. 274.

A.D. 503–843.

tion; and a long period of obscurity succeeds, in which little more is distinguishable, except the fact that a series of Scoto-Irish kings, or reguli, are found in Scotland, from the commencement of the fifth century, (503), when Fergus held the throne, till the accession of Kenneth, the son of Alpin, who reigned from the year 836 to 843, under whom the ascendancy of the Scoto-Irish or Scotch, appears to have been established. Upon this portion of our history we are tempted to transcribe the following observations of Chalmers.

"In the records of time, there scarcely occurs a period of history so perplexed and obscure, as the annals of the Scoto-Irish kings and their tribes. The original cause of this obscurity is the want of contemporaneous writing. An ample field was thus left open for the contests of national emulation. Ignorance and ingenuity, sophistry and system, have all contributed to make what was dark still more obscure. The series and genealogy of the kings have been involved in peculiar perplexity by the contests of the Irish and Scottish antiquaries, for pre-eminence in antiquity, as well as in fame. And Cimmerian darkness has overspread the annals of a people too restless for the repose of study; too rude for the elaboration of writing."[1] After such an acknowledgment, it would be idle labour to follow this indefatigable inquirer into the twilight-history of these times; but this period is distinguished by one great event which shines brightly amidst the surrounding gloom, namely, the conversion of northern Britain to Christianity.

Conversion to Christianity.

Columba. A.D. 521.

Conversion of the Northern Picts.

A.D. 568.

Already the Romanized Britons of the South had received the true faith, and the Scoto-Irish appear to have been converted to Christianity by St. Patrick, previously to their establishment in Kentire. St. Ninian, himself a Briton, though educated as a monk at Rome, had, in the commencement of the fourth century, founded a monastery in Galloway; and in the sixth century, St. Kentigern signalized himself by his pious labours among the Britons of Strathclyde; but the conversion of the northern Picts was reserved for St. Columba. This great and good man was born in Ireland, in the year 521. His descent was royal, and his education was at first carefully conducted under the best masters which his native island, long before this converted to Christianity, could supply. Of these the most noted was St. Ciaran, the apostle of the Scoto-Irish of Kentire; and from him, in all probability, Columba imbibed his first desire to introduce the gospel into the desolate and barbarous dominions of the northern Picts. It was in the year 568, that embarking with twelve of his friends, in a boat of wicker work which was covered with hides, he set out upon his benevolent mission, and landed in the Island of Hy, or Iona, which was situated near the confines of the Scottish and Pictish territories. The difficulties which he had to encounter on his first arrival, were of the most formidable kind. He found a people so barbarous that his life was attempted; the king, when the holy man first approached his residence, ordered its gates to be shut against him; the priests, who were druids, and possessed much influence, employed all their eloquence to counteract his efforts; and the nature of the country, woody, mountainous, and infested with wild beasts, rendered travelling most dangerous and painful.[2] It is also said that at first the saint required an interpreter to make himself intelligible, although after a short residence he appears to have found little difficulty in conversing with the barbarians. But none of these obstacles was sufficient to baffle the zeal and courage of Columba; and so blest were his labours, so rapid the effects produced by the example of his virtues, that in a few years the greater portion of the Pictish dominions was converted to the Christian faith; churches were erected, monasteries established, in various places, and Columba, as primate, became an object of the utmost love and veneration among the barbarous tribes, and fierce and warlike princes whom he had called from darkness into light. At that time his monastery was perhaps the chief seminary of learning in Europe. It was from this nursery, that not only all the monasteries, and above three hundred churches which he himself had established, were supplied with learned pastors, but which also gave divines to many of the religious establishments among the neighbouring nations.[3] Columba died in the year 597, in the seventy-seventh year of his age; a man not less distinguished by his zeal and labour in the dissemination of the gospel, than by the simplicity of his manners, the sweetness of his temper, and the holiness of his life.

A.D. 597. Death of Columba.

Disappearance of the Picts.

We have already observed, that it would be foreign to the object of this historical sketch, to involve our readers in the dark and wholly uninteresting annals of the Pictish kings. But one remarkable event must not escape our notice, we mean the disappearance of the Pictish people after the middle of the ninth century. There seems every reason to believe, that the story of the total extermination of the Picts by the sword of the victorious Kenneth Macalpin, is a fable invented at a later period, and certainly supported by nothing approaching to contemporary evidence. A more rational and intelligible account ascribes this event, not to the destruction, but to what may more correctly be denominated the absorption of the Picts by the predominating nation of the Scots. Both were probably a people of the same race, speaking a similar language, and little different in their manners and civil government. Both were animated by the emulation of outstripping each other in power and extent of territory; and this led to protracted struggles, in which the Picts maintained their independence with difficulty, and the Scots, gradually enlarging their dominions, acquired a predominating influence. Such being the relative condition of the two nations, an event took place which united in one person the claim to the Pictish and the Scottish throne.[4]

Kenneth Macalpin. A.D. 836.

Achaius or Eocha, king of the Scots, who died in the year 826, had married Urgusia, a Pictish princess, the sister of Constantine and Ungus, successively kings of the Picts. His grandson was Kenneth Macalpin, a prince of great hardihood and ambition, who succeeded to his paternal throne in 836. On the death of Uven, the Pictish monarch, in 839, Kenneth asserted his claim to the Pictish throne, in right of his grandmother, Urgusia. The feeble state of the nation, and the incapacity of the true heir, combined to favour his ambitious designs; and after a struggle of three years, he succeeded in uniting the two crowns in his own person.[5] The observations of Chalmers upon this event, and the important consequences which it drew after it, are well worthy of notice. "During such confusions," says this author, "amidst a rude people, whose forms of government were little fixed, and whose laws were less regarded, the loss of a battle, or the death of a king, was an adequate cause of an important revolution. Of all these events, Kenneth dexterously took advantage; and finding a feeble competitor, he easily stept into the vacant throne. In his person a new dynasty began. The king was changed, but the government remained the same. The Picts and Scots, who were a congenial people, from a common origin, and spoke cognate tongues, the British and Gaelic, readily coalesced; yet has it been asserted by ignorance, and believed by credulity, that Kenneth made so bad a use of the power which he had adroitly acquired, as to destroy the whole Pictish people in the wantonness of his cruelty. To enforce the belief in an action which is in itself unknown, and so inconsistent with the interest of a provident sovereign, requires stronger proofs than the assertions of uninformed history, or the report of vulgar tradition. The Picts continued throughout the succeeding period (from 843 to 1097) to be mentioned by contemporary authors, though they were governed by a new race, and were united with a predominant people."[1]

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[1] Caledonia, vol. i. p. 276.

[2] Smith's Life of St. Columba, pp. 6 to 17 inclusive.

[3] Smith's Life of St. Columba, pp. 18, 19.

[4] Caledonia, vol. i. pp. 299—302.

[5] Caledonia, vol. i. p. 304.

Sect. III.—*The Scottish Period.*

A.D. 843–1097

The union of the two nations of the Picts and the Scots, under one powerful prince, forms the commencement of the third great division of Scottish history, which extends from the middle of the ninth century (843) to the expiration of the eleventh (1097), a period of two centuries and a half.

Extent of the Pictish and Scottish kingdoms.

For ages before the time of this union, the Pictish dominions were confined by the Forth on the south, Drumalban on the west, and the German Ocean on the east and north; while at the period of its occurrence the Scots possessed the whole western coast, from the Clyde to Loch Torridon, with the extensive kingdom of Argyle, which stretched its arms from the Clyde on the south to Loch Eir and Loch Maree on the north, and reached from the sea on the west to Drumalban[2] on the east. These extensive dominions were now united; the name of Scotia, as marking the whole kingdom, gained ground over that of Pictavia; and from the tenth century (934), when the Saxon Chronicle first mentions *Scotland* as invaded by Athelstan, this distinctive appellation for the kingdom of North Britain gradually gained ground till it excluded every other.

It has been observed by Sir Walter Scott, "that the descendants of Kenneth Macalpine pass us in gloomy and obscure pageantry, like those of Banquo in the theatre;" and it might have been added, that the impression left upon the mind by the perusal of their various reigns is as shadowy and unsubstantial. To fatigue and perplex the reader, by a detail of historical passages, which led to no great results, is not the purpose of this sketch, but to mark the features which prominently distinguish the period. Nor were these either few or unimportant.

Invasions by the Danes.

1. The first event which demands our notice, is the commencement of those invasions by the Danes, which for several centuries continued to be the greatest scourge of Scotland. It was under the reign of Constantine, the second monarch in succession from Kenneth, that these fierce pirate leaders, known under the name of *Vikinghr*, or sea-kings, first made their appearance in North Britain. Having established a settlement in Ireland, they soon became acquainted with the commodious havens of the Scottish coasts; and after a partial visit in 866, a more formidable armament sailed from Dublin, under Anlaf and Ivar, in 870. During this invasion, they took Alcluyd, or Dunbarton, ravaged the whole extent of North Britain, and returned glutted with slaughter and booty to Ireland. These sea-wolves having once tasted blood, were not slow to return. Thrice under the same reign were their vessels seen on the coasts of the devoted country, in 871, 875, and 876; and at last, in 881, the Scottish monarch met his death on the banks of the Forth, in an ineffectual attempt to defend his people, and repel their ravages. Reappearing under the reign of Donald, who succeeded to the throne in 893, they were defeated on the banks of the Tay, in the vicinity of Scone, and again, in 904, repulsed by the same prince, who lost his life, after he had slain their leader. This, however, did not prevent their return in 907, and afterwards, in 918, under the reign of Constantine the Third, who, with the assistance of the northern Saxons, encountered and repulsed them at Tinmore; a check which appears for a considerable period to have given repose to the kingdom.

A.D. 866. Anlaf and Ivar.

Defeated by Donald, 904.

The Danes repeatedly invade Scotland.

A.D. 970.

In 961, under the reign of Indalf, who had succeeded to the throne in 953, the Vikinghr made a descent in the bay of Cullen, in Banffshire; and this monarch with difficulty defeated them in a desperate action, in which he lost his life. In 970, Kenneth the Third, who is represented as a monarch of extraordinary vigour and ambition, succeeded to the throne, and under his reign the Danes reappeared with a numerous fleet in the Tay; but after a sanguinary struggle, in which they at first succeeded, were ultimately defeated by the bravery of the Scots, commanded by Kenneth in person. This contest, which appears to have been attended with an enormous loss on both sides, took place at Luncarty, where many tumuli still remain, to mark the field of battle.[3]

Kenneth the Third defeats them at Luncarty.

Danes defeated at Mortlach by Malcolm the Second. A.D. 1010.

After this the country enjoyed a quiet of nine years; but in 1003, the Norsemen, who had now for some time permanently settled themselves in Orkney, again made their appearance in great strength upon the coast of Moray. They seized and fortified the promontory known by the name of the Burgh-head of Moray, where they found a commodious harbour, and from which, in 1010, they led an army to plunder that fertile region. But they were met and defeated with great slaughter by Malcolm the Second, in the battle of Mortlach, where the king, in gratitude for his victory, endowed a religious house, which became the seat of the earliest Scottish bishopric.

Treaty between Malcolm and Sweno, A.D. 1014. Final departure of the Danes.

These repeated repulses checked and disheartened the pirate kings; but they disdained to relinquish the contest. Their last efforts appear to have been made on the coast of Angus and Buchan, where they were repulsed in successive conflicts, fought at Aberlemno, Panbride, and Slaines Castle. At length a convention, or pacific treaty, was entered into between Malcolm, and Sweno, king of Denmark, in the year 1014, which was followed by the evacuation of the Burgh-head of Moray, and the final departure of the Danes. Thus, after a severe struggle, which at various intervals, and with various success, appears to have continued for nearly a century and a half, (866 to 1014), the energy of the Scots ultimately triumphed over the efforts of the Norsemen; and while the Danish rovers established themselves in some of the finest countries in Europe, and in England alternately fixed themselves as permanent settlers, or extorted an odious tribute as the price of their absence, Sweno, though one of their most powerful princes, found himself at last compelled to desist from the contest.

Acquisition of Cumberland by Malcolm the First.

2. The second event of importance which marked this period, was the enlargement of the Scottish provinces of Malcolm the First, by the pacific acquisition of Cumberland from Edmund the Saxon king of England. Against this young prince, the Danes, who had established themselves in the northern part of his dominions, declared war, and calling the Norwegians to their assistance, threatened to subdue the whole country. Edmund opposed them with great courage and success, reduced Northumberland, then a Danish province, and next turned his arms against Cumbria, or Cumberland. After wasting this little country, then inhabited by the Britons, under their king or chief leader, Dunmail, the English prince, aware perhaps of the difficulty of retaining his new acquisition, delivered it up to Malcolm the First, under the condition that he would become his associate *(medwertha)* in war, or, as the terms are explained by Matthew of Westminster, "that he would de-

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[1] Chalmers's Caledonia, vol. i. p. 333.

[2] Drumalban, the ridge of mountains which separates the rivers running into the sea on the west coast of Inverness-shire and Argyll from those which run into the sea of Norway. Macpherson's Geographical Illustrations.

[3] Chalmers's Caledonia, vol. i. p. 394, 395.

fend the northern parts of England from the invasions of his enemies, whether they came by sea or by land."[1] It is to be remembered, that this transaction was entered into between two independent princes, the one of Saxon, the other of Celtic race, more than a century before the feudal usages or tenures were introduced into England by the Normans; an observation which might have been deemed unnecessary, had not some ingenious writers affected to detect in the stipulations of Malcolm the acknowledgment of feudal dependence. In this manner did Cumbria, in the middle of the tenth century, become a portion of the Scottish dominions.[2]

Kenneth III.
A.D. 970.
Conquest of Strathclyd.

3. This treaty was followed by the reigns of Indulf, Duf, and Culen, a dark and sanguinary period, occupied by domestic war and civil commotion; but under Kenneth the Third, who came to the throne in 970, occurred another event of no little moment in the history of the country. This was the conquest of the ancient British kingdom of Strathcluyd by the arms of that monarch. We have seen this independent state arise, in the middle of the fifth century, from a union of the Romanized British tribes, who, on the desertion of the island by the Romans, were drawn together by the ties of common danger and mutual defence. From this time, (446), they had, under various reverses and multiplied attacks, enjoyed a precarious independence for upwards of five centuries; nor did they permit themselves to be incorporated in the Scottish monarchy without a determined struggle. The arms and the energy of Kenneth, however, were successful; and one of those gleams of romantic light, which sometimes soften the gloomy annals of these ages, fell on the ruins of Strathcluyd. Dunwallon, the last of its kings, after exhibiting the utmost courage and resolution in defence of his people, assumed the religious habit, travelled to Rome, and died a monk.[3]

Acquisition of Lothian by Malcolm II.
A.D.1018.

The last prominent feature which marks this period, was the further enlargement of the Scottish dominions, by the acquisition of Lothian, hitherto a part of England. It took place in 1016, under the reign of Malcolm the Second, the son of Kenneth the Third, to whose conquest of Strathcluyd we have just alluded. It was this same Malcolm whose courage we have seen victorious over the Danes at Mortlach, and to whose convention with Sweno Scotland owed its freedom from the ravages of the pirate kings. In the beginning of the eleventh century, (1018), this warlike prince engaged in hostilities with Ughtred, earl of Northumberland. Their forces met at Carham, near Werk, on the southern bank of the Tweed, and a sanguinary battle was fought, which effectually checked the Scottish prince. Ughtred, however, having been assassinated, was succeeded by his brother Eadulph, a feebler ruler, who, from a dread of a second invasion, was induced to purchase the friendship of Malcolm, by the cession of the whole of Lothian.[4]

Such are the great features which distinguish the early history of Scotland, from the middle of the ninth to the commencement of the eleventh century, (843 to 1018), and upon which it is both wiser and easier to fix the mind than to crowd and burden it with lists of barbarous and forgotten kings. We see a people, still rude, ignorant, and, except for the sweetening influences of Christianity, little removed from savage life; but we find them able not only to vindicate their freedom against those incessant and cruel invasions, which broke, and for a time subdued the neighbouring country of England, but animated by an ambition which, under successive princes, largely extended their dominions, by the successive acquisitions of Cumberland, Strathcluyd, and Lothian. Nor is the remaining portion of the Scottish period, from 1018 to 1097, unmarked by some great events. In 1031, under the reign of Malcolm the Second, Canute, the Danish king of England, invaded Scotland. This prince, the most powerful monarch of his time, as he possessed not only England, but Denmark and Norway, led an army against Malcolm. The cause of the war is involved in much obscurity. It was however connected with some claim or dispute regarding Cumberland, and it terminated in Malcolm retaining the possession of that province, and performing the conditions upon which it had been transferred to him.[5]

A.D. 31.
Malco II.

In the historical romance of Boyce, and the classical pages of Buchanan, Malcolm the Second figures as the first and one of the greatest of Scottish legislators. It was referred for the learning and acuteness of Lord Hailes to detect his apocryphal laws as the forgery of a much later age.

Malcolm the Second, whose severe and vigorous reign had been marked by many sanguinary domestic feuds, not necessary to be detailed, was succeeded in 1033 by his grandson Duncan, the "gracious Duncan" of Shakspeare, whose imperishable drama is founded upon a fictitious narrative, which Holinshed copied from Boyce. Let us for a moment, in a spirit rather of homage than of criticism, disentangle the dross of fact from the ore of fiction. Lady Macbeth was the Lady Gruoch, and had regal blood in her veins. She was the grand-daughter of Kenneth the Fourth. Her husband, Macbeth, was the son of Finlegh Maormor, or the supreme ruler of Ross. The real wrongs of the Lady Gruoch, the root of her implacable revenge, were even more deep than those of her mighty counterpart. She had seen her grandfather Kenneth dethroned by Malcolm, her brother assassinated, and her husband burned, griefs amply sufficient to turn her milk to gall. Macbeth, on the other hand, had wept a father slain also by Malcolm; and thus revenge and ambition were equally roused in both their bosoms. The purpose which had been arrested by the superior vigour and courage of Malcolm, was executed on his more feeble grandson. Duncan, in 1039, was assassinated at Bothgowanan, near Elgin;[6] and Macbeth seized the sanguinary sceptre, which he held with a vigorous grasp for fifteen years, until he was defeated and slain by Macduff, in 1054.

On his death, a contest for the throne arose between Lulach, the son of the Lady Gruoch, and great-grandson of Kenneth the Fourth, and Malcolm Ceanmore, great-grand- of Malcolm the Second; and this struggle terminated in son 1057, by the defeat of Lulach, and the accession of his rival, Malcolm, who was contemporary with Edward the Confessor.

Malcolr III.
Malcolr marries Margare sister of Edgar Ætheli

The accession of Malcolm Ceanmore to the Scottish throne was soon afterwards followed by an event, which, although taking place in the sister country, produced the most important effects upon the history of Scotland. This was the invasion and conquest of England by the Normans, and the establishment of an entirely new dynasty in that country. The first consequence of this change was favourable to Malcolm, as it led to his marriage with a Saxon princess, whose character had a marked and favourable influence upon the ruder manners of her husband and his people. This lady was Margaret, who was the sister of Edgar Ætheling. It is important to trace her lineage. Canute, the Danish king of England, had banished Edwin and Edward, the children of Edmund Ironside, the last of the pure Saxon dynasty, for Edward the Confessor was half a Norman. They found a retreat in Hungary, where Edwin died; but from this country Edward, in 1057, was recalled by Edward the Confessor. This prince had three children, a son, Edgar, commonly called Edgar Ætheling, the heir of the Saxon line, and two daughters, Margaret and Christian. On the conquest of England, the nobles of Northumberland, who were principally of Danish origin, led by two chiefs, named Maerleswegen and Gospatric, becoming disgusted at the Norman tyranny, fled to the court of Malcolm, taking with them Edgar and his two sisters. Edgar was weak, almost to imbecility; and in the event of his dying, or being found incapable of filling the throne, his claims as heir of the Saxon line descended to his sister. She was beautiful, accomplished, and pious; and a union which perhaps, at a distance, had been suggested to Malcolm by ambition, on a nearer view was perfected by love.

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[1] Matthew of Westminster, p. 367. Brady's Compleat History of England, p. 120.

[2] Chalmers's Caledonia, vol. i. p. 389.

[3] Chalmers's Caledonia, vol. i. p. 389, 393.

[4] Ibid. vol. i. p. 402. Simeon of Durham, apud Twysden, vol. i. p. 81.

[5] Ibid. vol. i. p. 402.

[6] Ibid. vol. i. p. 405.

Invasion of England.

The marriage of the Scottish monarch was soon followed by an invasion of England, in which Malcolm mercilessly ravaged the bishopric of Durham. The manner in which this predatory inroad was conducted marks the ferocity of the times. Malcolm and his subjects were Christians; yet even the churches were destroyed and burnt, while the unhappy persons who had fled to them for sanctuary were massacred, or consumed in the flames. During the occurrence of these savage scenes in England, Gospatric, one of the most powerful of the Northumbrian barons, whose assistance William the Conqueror had secured, swept through Malcolm's territory of Cumberland, and laid waste the country in a miserable manner, upon which the Scottish prince returned home, leading captive, says an English historian, such a multitude of young men and maidens, "that for many years they were to be found in every Scottish village, nay, even in every Scottish hovel."[1]

A.D. 1069.

There seems to be little doubt that this expedition of Malcolm was intimately connected with the determined stand made against William the Conqueror by the Northumbrian earls who had carried Edgar Ætheling into Scotland. Combining in 1069 with their brethren, the Danes, who brought a powerful fleet to their assistance, they advanced as far as York, where they put the Norman garrison to the sword; and here it is probable they expected to be joined by Malcolm, but being disappointed in their hope, they made peace with William, who had the address to dissolve the confederacy. Malcolm alone continued faithful to the cause of the Saxon prince; and, though deserted by his confederates, yet by invading England fulfilled his agreement.

William the Conqueror retaliates.

This inroad led to a dreadful retaliation on the part of William. "To punish the revolt," we use the words of Lord Hailes, "and to oppose a wilderness to the invasions of the Danes, he laid entirely waste the fertile country which lies between the Humber and the Tees." "At this time," says William of Malmesbury, "there were destroyed such splendid towns, such lofty castles, such beautiful pastures, that had a stranger viewed the scene he might have been moved to compassion, and had one inhabitant been left alive, he would not have recollected the country." Of this fine district the inhabitants seem to have been almost wholly exterminated. Many who escaped the sword died of famine, many sold themselves for slaves, while those of higher quality, Norman as well as Saxon, sought an asylum in Scotland, and found at the court of Malcolm a favourable reception.

Invasion of Scotland in 1072.

William having secured peace at home, prepared an armament against Scotland, and in 1072 he invaded that country, both by sea and by land. Malcolm wisely met superior power by an offer of submission. He sought and obtained peace, gave hostages, and performed homage. So far all is certain; but a question arises, for what was this homage performed? The answer may be given in the words of one of the most able inquirers upon the subject: "According to the general and most probable opinion, this homage was done by Malcolm for the lands which he held in England."[2]

Gospatric settles in Scotland.

We have already met with Gospatric, the powerful Northumbrian earl who fled from the Conqueror to the court of Malcolm, bringing with him the heir of the Saxon line, with his sisters. Proving treacherous to Malcolm, Gospatric obtained from William the government of Northumberland; but on his return from his successful expedition against Malcolm, the Norman conqueror, from jealousy or disgust, degraded his Northumbrian ally, who once more fled to the Scottish king. Malcolm, on his part, not only forgave him, but presented him with the lands and castle of Dunbar, and the castle of Cockburnspath. He who held these estates, lying on the borders between the two countries, might be said to have the keys of Scotland at his girdle; and the circumstance is worthy of remembrance, not only as marking the origin of a potent family, destined to act a leading part in the future history of the country, but as indicating the policy of Malcolm, who, conscious of the inferiority of his own Celtic race, manifested a wise anxiety to prevail on strangers, whether Normans, Danes, or Saxons, to settle in his dominions.

A.D. 1079-1093. William Rufus.

The remaining portion of the reign of this energetic prince (1079–1093), is chiefly distinguished by a struggle with William Rufus, who, upon the death of the Conqueror, had succeeded to the English throne. This prince appears to have withheld from Malcolm part of the English possessions to which he claimed a right; and with the view of compelling a surrender of them, the Scottish king invaded England, and penetrated as far as Chester, on the Were. Rufus led against him a superior force; and Malcolm, aware of his approach, prudently declined a contest, and by a timely retreat, secured his plunder and his captives.

Rufus invades Scotland, A.D. 1091.

This appears to have taken place in May 1091; and in the autumn of the same year, the Norman prince, having equipped a fleet, and levied a numerous land force, led his army in person against Scotland. He continued his march to the shores of the Forth; but here his progress was stayed, in consequence of his receiving intelligence that his fleet had been destroyed by a tempest. There were no vessels to transport his troops across the Forth. The Scots, with a policy which they early learned, and repeatedly practised, had driven away their cattle, and cleared the country of its provisions; and at this crisis, when his soldiers were perishing from famine, Malcolm led his army against the English, crossed the Forth, and advanced into Lothian; a territory originally, as we have seen, acquired from the Angles, and therefore esteemed a part of England, although now subject to the Scottish king. Here having chosen a strong position, he encamped, and avoiding a battle, harassed the enemy, proposing to cut off his supplies, and expel him by famine. While both parties were thus situated, Edgar Ætheling, now with Rufus, and Robert, the king's brother, exerted themselves to conciliate a peace. The English monarch, notwithstanding his fiery temper, knew how to bend his fury to his interest; and Malcolm, perceiving that he could obtain his purpose by treaty, wisely preferred this to the risk of a battle. It is important to mark the conditions of the agreement. William Rufus, we find, consented to restore to Malcolm twelve manors, which the Scottish prince had held under the Conqueror, and to make an annual payment to him of twelve marks of gold.[3] Malcolm, on his part, consented to do homage to William, and to hold his lands under the same tenure of feudal service and obedience to him, as he had formerly paid to his father the Conqueror.

Peace between Malcolm and Rufus.

Here pausing for a moment upon a subject which has

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[1] Simeon of Durham, 201. Translated by Lord Hailes, vol. i. p. 1.

[2] Hailes's Annals, vol. i. p. 13.

[3] Simeon Dunelm., apud Twysden, vol. i. p. 216.

Question of homage.

given rise to some discordant opinions, and which, now that the bitterness of national rivalry is at an end, may, we trust, be calmly considered, we would remark that, taking the testimony of English historians as our guide, all as yet seems clear, as to the much debated subject of homage. Simeon of Durham expressly declares that Malcolm agreed to obey William Rufus on the same conditions as those on which he had obeyed William the Conqueror. Under the Conqueror it is certain that Malcolm held twelve manors in England. These Rufus had seized; but he now restored them, and Malcolm renewed his obligation of homage. On a former occasion when, as we have seen, the Scottish king, in 1072, paid his homage to the Conqueror in person, the ground upon which he paid it is equally clear. Previously to the battle of Hastings, the Scottish monarchs had obtained from the Saxon kings some possessions in England. This was before the introduction of the strict feudal tenures, which came in with the Normans; but there is no doubt that these possessions were held under the condition of aiding the Saxon princes in repelling the incursions of the Danes.[1] When William the Conqueror established himself in England, Malcolm, as we have seen, considered him as a usurper of the rights of his brother-in-law, Edgar Ætheling; and, on this ground, as well as perhaps from an indisposition to embrace a system which must have been new to him, he had at first refused to pay his homage for the lands he held in England. Circumstances, however, made him change this resolution. The prevailing power of William, the acquiescence of the English under his government, and the inactivity and imbecility of Edgar Ætheling, his brother-in-law, induced him to desist from a conflict in which he ceased to have an interest. A more intimate acquaintance with the feudal tenures introduced into England taught him that, in the acknowledgment of superiority for the lands which he held in that country, there was no sacrifice of dignity as an independent monarch, and as all idea of restoring Edgar was abandoned, he paid his homage to the conqueror.[2]

New disputes between Malcolm and Rufus, A.D. 1092.

The point of homage seemed thus prudently settled; but the proud and fiery temper, which appears to have been an infirmity of both princes, soon led to a new contest between Malcolm and Rufus. A jealousy of the incursions of the Scots had formerly led the Conqueror to build two strong castles, the one at Durham, the other at Newcastle. To these his successor now added a third at Carlisle; a barrier which, however necessary, might possibly be considered as encroaching on the freedom of the lands which Malcolm held in Cumberland. A dispute arose, and a personal interview between the two kings having been considered the best mode of settling their differences, Malcolm repaired to Gloucester, where Rufus met him and proposed that he should do homage in presence of his English barons. This the Scottish monarch refused; although he was ready, he said, to perform his homage on the frontiers of both kingdoms, as had been the ancient usage. The reply was angrily received, and the two kings having parted with expressions of defiance, Malcolm assembled an army, and advancing with a speed whetted by the indignity with which he had been treated, burst into Northumberland, which he wasted with fire and sword. Sweeping onwards to Alnwick, he was about to possess himself of the castle, when the Scottish army was attacked by Robert de Mowbray. In the battle which ensued Malcolm was slain, and Edward, his eldest son, shared the fate of his father.

Death of Malcolm, A.D. 1093.

We have already observed that the mild and gentle disposition of his queen, St. Margaret, had an admirable influence over the fierce and impetuous character of this prince. Of her life we have an interesting account from the pen of Turgot her confessor; and we cannot resist borrowing a few touches from this early specimen of biography. When the king set out on his last expedition against England, Margaret was suffering from a fatal and lingering complaint. She only lived to hear of the death of her husband and her son. Her last moments are thus described by that faithful minister, who related what he saw: "During a short interval of ease, the queen devoutly received the communion. Soon after, her anguish of body returned with redoubled violence; she stretched herself upon her couch and calmly waited for the moment of her dissolution; cold, and in the agonies of death, she ceased not to put up her supplications to heaven. These were some of her words: 'Have mercy upon me, O God; according to the multitude of thy tender mercies blot out mine iniquities; make me to hear joy and gladness, that so the bones which thou hast broken may rejoice.' At that moment," continues Turgot, "her son, Edgar, returning from the army, approached her couch. 'How fares it,' said she, 'with the king and my Edward?' The youth stood silent. 'I know all; I know all. By this holy cross, by your filial affection, I adjure you to tell me the truth.' He answered, 'your husband and your son are both slain.' Lifting up her eyes and her hands to heaven she then said, 'Praise and blessing be to thee, Almighty God, that thou hast been pleased to make me endure so bitter anguish in the hour of my departure, thereby, as I trust, to purify me in some measure, from the corruption of my sins; and thou, Lord Jesus Christ, who, through the will of the Father, hast enlivened the world by thy death, oh deliver me.' While pronouncing the words 'deliver me,' she expired."[3]

Death St. M garet.

Chara of Ma colm.

"In reviewing the reign of Malcolm the Third," says Lord Hailes, "we may discern a character of steady persevering courage. From his early youth to his last invasion of England, his conduct was uniform. He maintained his throne with the same spirit by which he won it. Though he was the ruler of a nation uncivilised, and destitute of foreign resources, and had such antagonists as the Conqueror and William Rufus to encounter, yet, for twenty-seven years, he supported this unequal contest, sometimes with success, never without honour. That he should have so well asserted the independency of Scotland is astonishing, when the weakness of his own kingdom, and the strength and abilities of his enemies are fairly estimated."[4]

Donal seizes crown A.D.

Malcolm's eldest son had fallen, as we have seen, with his father. His remaining sons, Ethelred, Edmund, Edgar, Alexander, and David, were all under age; and his brother Donald, who, on the usurpation of the throne by Macbeth, had taken refuge in the Hebrides, appears to have remained in that distant retreat during the whole reign of the late king. These islands were then independent of the Scottish crown. They were inhabited by a warlike race, whose chiefs yielded to the Norwegian king a fluctuating subjection; and many of these leaders having joined him, Donald, with a powerful fleet, invaded Scotland and seized the crown; but it was for a very brief season. Duncan, a son of Malcolm, but illegitimate as is generally believed, had, in 1072, been delivered to William Rufus as a hostage for his father's fidelity. He had received his education at the Norman court, and having been knighted by the English monarch, was retained in his service. With permission of William, he now invaded Scotland, and assisted by a band

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[1] Caledonia, vol. i. p. 394.

[2] In this account of the expedition of William Rufus into Scotland, and in the remarks on the disputed point of the homage, we have been induced to treat the subject a little more in detail, availing ourselves of some manuscript notes of the late David Macpherson, a writer of great research and judgment. This seemed the more necessary, as the subject of Rufus's invasion of Scotland, and Malcolm's stipulated homage, has been considered by high authority as one involved in extreme obscurity.

[3] Hailes's Annals, vol. i. pp. 40, 41, 4to edit. We have availed ourselves of Lord Hailes's translation of the passage from Turgot describing the queen's death.

[4] Ibid. vol. i. pp. 25, 26, 4to edit.

Duncan. Donald.

Edgar. A.D.1097.

of English and Norman adventurers expelled Donald Bane. He, in his turn, after a reign of little more than a year, was assassinated, and Donald once more ascended the throne, from which, in 1097, he was again expelled by William Rufus, who dispatched Edgar Ætheling with a powerful army into Scotland. By this prince the aged usurper was defeated, and Edgar, the son of Malcolm and Margaret, the nephew of Edgar Ætheling, ascended the throne. This event took place in the close of the eleventh century; and, with the captivity and death of Donald Bane, who is the last of the race of Scoto-Irish kings, the Scottish period expires.

And here, after having passed over a portion of our history which extends from the middle of the ninth to the end of the eleventh century, let us pause to say a few words on the condition of the church, the state of the laws, and the manners of the people. To every critical student of this period one thing appears certain. Throughout its whole extent, we find the predominant people a Celtic race. The laws were Celtic, the government Celtic, the usages and manners Celtic, the church Celtic, the language Celtic. "If," says Chalmers, "Malcolm Canmore, a Celtic prince, who did not arrogate the character of a lawgiver, had been disposed to effect a considerable change in this Celtic system, he would have found his inclination limited by his impotence. The Scottish kings, during those times, seem not to have possessed legislative power. Whenever they acted as legislators, they appear to have had some coadjutors; either some maormors, a term by which we are to understand the chief civil ruler of a district, or some bishops." We shall see, when we pursue our inquiry into a later period, that the children and grandchildren of this Celtic monarch, when they attempted to introduce new maxims of government, were opposed in Galloway and in Moray by frequent insurrections.

State of the Church.

Looking now first to that most important and interesting point, the state of the church, we have already seen that, at the commencement of the Pictish period in 446, Christianity had been introduced into North Britain. Of the exact constitution, discipline, and orders in the early Scottish church, from the conversion of the Scots to the commencement of the Scoto-Pictish period (843), much has been written; and it is well known that the advocates of episcopacy and the supporters of presbyterianism have each endeavoured to deduce, from an examination of these remote ages, irrefragable arguments for their peculiar opinions. Into this discussion it belongs not to our plan to enter. We deal with general results, and dare not embark in controversy; but we may be permitted to observe, from the authentic monuments which still remain in our own times, and it seems difficult to avoid the conclusion, that the primitive and most ancient form of church government in Scotland was episcopal. At the memorable epoch of the union of the Picts and the Scots, we find a bishopric of Lindisferne extending far into Lothian. In Lothian itself, the religious houses of Melrose, Coldingham, Tyningham, Pefferham, and Abercorn, had been long established. In Galloway, the bishopric of Whithorn, which we have seen founded by St. Ninian, had fallen soon after the commencement of the ninth century. Looking beyond the Friths, we find that, at the same period, various religious cells had been settled by the disciples of Columba; and that not long afterwards, Kenneth Macalpin, anxious to testify his respect for the relics of this apostle of the Scots, removed his relics from Iona to Dunkeld, where he built a church, which became not only the seat of a bishop, (849), but, till supplanted by St. Andrews, the seat of the primate of the Scottish church. There is an ancient legend quoted by Spottiswood from the register of St. Andrews, which, if any credit is to be attached to it, gives the honour of founding the see of St. Andrews to Hungus king of the Picts, who died in 833. This prince, it appears, had invaded Northumberland, and upon his return was overtaken by Athelstan, king of the West Saxons, at the head of a powerful army. "Having given order for battle against the next day," says the historian, "Hungus betook himself to prayer, spending most part of the night in that exercise. A little time before day, falling into a slumber, it seemed to him that the apostle St. Andrew stood by him and assured him of the victory, which vision being related to the army, did much encourage them. The history addeth that, in the joining of the battle, there appeared in the air a cross in the form of the letter X, which so terrified the enemies as presently they gave back, king Athelstan himself being killed. Hungus, to express his thankfulness for the victory, gave to the church of Regulus, now called St. Andrews, divers rich gifts, as chalices, basons, the image of Christ in gold, and of his twelve apostles in silver. He gave likewise a case of beaten gold for preserving the relics of St. Andrew, and restored to the spirituality the tithe of all corn, cattle, and herbage within the realm, exempting them from answering before any temporal judge; farther, he did appoint the cross of St. Andrew to be the badge and cognizance of the Picts, both in their wars and otherwise, which, as long as that kingdom stood, was observed, and is by the Scots as yet retained."[1]

State of the Church. A.D. 843–1097.

This extract we have given rather as a curious example of the earliest tradition as to the national emblem of the cross of St. Andrew, than from any high opinion of the authenticity of king Hungus's devotion. The following list of the Scottish bishoprics, according to the date of their foundation, is taken from Keith's Catalogue. It is to be observed, however, that in some of its dates we must regard it rather as an approximation to the truth, as far as it can be ascertained from authentic sources, than as fixing the exact years of the erection.

	A.D.		A.D.
1. See of the Isles......	447	7. See of Ross..........	128
2. See of Galloway.....	450	8. See of Brechin......	1150
3. See of Glasgow......	560	9. See of Caithness....	1150
4. See of Dunkeld......	729	10. See of Dunblane....	1160
5. See of St. Andrews..	892	11. See of Moray.........	1162
6. Mortlach, afterwards Aberdeen............	1010	12. See of Argyle.......	1200

Parishes early established.

Of these episcopal sees, the reader will observe, that only the bishoprics of the Isles, Galloway, Glasgow, Dunkeld, St. Andrews, and Mortlach, afterwards Aberdeen, belong to the period of which we now treat, from 843 to 1097; although the remaining sees are added, to afford to the reader some idea of their comparative antiquity. "The united kingdom of the Picts and Scots," says Chalmers, "was formed under the regimen of parishes, though neither the times nor the circumstances of this formation can be clearly ascertained amid the gloom which hangs over the Scotican church during the Scottish period. We may easily suppose that those ecclesiastical districts were gradually established subsequent to the great epoch of 843. They were pretty generally settled during the Scottish period, though they were inconveniently large. They were established by private persons, rather than by public authority. But that parishes existed during the reign of Malcolm Canmore, is certain from unquestionable records. Thus, in the charter of David the First to the monastery of Dunfermline, this monarch uses these words: Preterea pater meus (his father was Malcolm the Third,) et mater mea dederunt ecclesiæ Sanctæ Trinitatis *parochiam* totam de Fotheriff.[2] It seems equally certain," he continues, "that when churches were erected, parishes laid out, and parochial duties statedly performed, ecclesiastical dues must have been incidentally paid. In the charters of Alexander the First, and of David, tithes are mentioned as if they were familiarly known, and had been long established. It is clear that tithes were paid to the clergy during the reign of Malcolm Canmore, and probable that such ecclesiastical dues were payable as early as the commencement of the tenth century (910,) when Constantine the king, and Kellach the bishop, solemnly vowed to observe the faith, discipline, and rights of the churches."[1] During the reign of Malcolm Canmore, according to the high authority of Innes,[2] several national councils were held in Scotland for the establishment of ecclesiastical discipline, and the reformation of the rude and fierce manners of the people. Some extracts from the canons passed in these councils are inserted by Turgot, the confessor of Malcolm's pious consort St. Margaret, in the interesting life which he has given us of this princess.[3]

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[1] Spottiswood's History of the Church of Scotland, p. 23.

[2] Chalmers's Caledonia, vol. i. p. 432.

Tithes. Ecclesiastical councils.

The Culdees.

During this obscure period, we meet with frequent mention of an order of religious men named Culdees, who first appear in the beginning of the ninth century. They seem to have been a kind of secular presbyters or monks, the Gaelic term Culdee meaning a recluse or hermit. With the exception of the form of the tonsure and the rule of observing Easter, they professed the same rites and ceremonies as the rest of the church. It has been erroneously pretended that the Culdees rejected bishops. So far was this from being the case, that we have repeated instances of the colleges of these Celtic monks having been instituted and ordained by the bishops themselves, while they, wherever they had a college about the see, possessed a vote in the election of the bishop.[4] Of this distinct order, we find that there existed in North Britain, during the Scottish period, religious houses at Abernethy, Dunkeld, St. Andrews, Dunblane, Brechin, Mortlach, Aberdeen, Monymusk, Lochleven, Portmoak, Dunfermline, Scone, and Kirkcaldy.[5]

Laws, manners, and language.

It remains to say a few words on the laws, manners, and language of the Scottish period. To affect to speak with certainty upon the laws which regulated the government, restrained the crimes, or directed the succession of a fierce and barbarous people who have left no written muniments, would betray presumption and ignorance. As far as can be conjectured, we find the crown neither strictly hereditary nor strictly elective, but directed in its descent by what has been termed the law of *Tanistry;* an institution by which the person in the family of the reigning prince who was judged best qualified, whether son, brother, or even more remote relative, was chosen under the name of Tanist, to lead the army during the life of the king, and to succeed to him after his death. Chalmers has asserted, that, at this era, the tenure of land throughout the country determined with the life of the possessor; an opinion requiring some modification, as it indicates a state of barbarism even greater than is discovered by the few glimpses of light which sometimes shoot athwart this twilight of our history. By a custom which the Scots evidently brought with them from Ireland, denominated in Irish *gabhail-cine,* meaning literally family settlement, it appears, that the fathers of families divided their lands among their sons, sometimes in equal, sometimes in unequal portions, and strictly excluded females from any share in this appropriation. As to their legislative code, there seems to be little doubt that the nearest approach we can make to the laws or usages of Celtic Scotland, must be by the study of such fragments as remain to us of the brehon laws of Ireland. "This brehon law," says Cox, "was no written law, it was only the will of the brehon or lord; and it is observable that their brehons or judges, like their physicians, bards, harpers, poets, and historians, had their offices by descent and inheritance. These hereditary judges or doctors," continues he, "were but very sad tools. The brehon, when he administered justice, used to sit on a turf or heap of stones, or on the top of a hillock, without a covering, without clerks, or indeed any formality of a court of judicature." This state of law, observes the author of Caledonia, may be traced among the Scoto-Irish in Scotland till recent times. Every baron had his mote-hill, whence justice was distributed to his vassals by his baron bailie.[6] There seems to be little doubt that Malcolm, from his marriage with a Saxon princess, and his frequent intercourse with the Saxon and Norman people, was an admirer of their superior civilization, and anxious to introduce their usages among his own ruder subjects. But that he succeeded to any material degree is extremely problematical; and the notion that he introduced the complicated system of the feudal law into Scotland, has been long ago exploded.

Tanistry.

Laws.

Manners of the people.

In a rapid sketch of this nature, little room can be given to any detailed description of the manners of the people during the Scottish period. The natural state of the Celtic tribes in Scotland was similar to that which we find existing among them in Ireland, namely, a state of constant war; and to those who consider how slow is the progress of improvement, and how strong the principle of imitation and tradition among a savage people, it will be no subject of wonder that we find little change produced by the lapse of centuries upon the manners of the ancient British, whether we look to Wales, Ireland, or North Britain. Their marriages, their mode of burial, their dress, their war cries, were similar. Armorial bearings, during this whole period, were unknown; seals, and coined money they had none; and it has been remarked by Chalmers, that the Gaelic people of Scotland borrowed their very terms for the several denominations of money from the Scoto-Saxon inhabitants. Thus, the Gaelic feorling, farthing, is from the Saxon feorthing; the Gaelic peighin, a penny, is from the Saxon penig.

Inaugural stones.

In those rude ages of which we now write, stones of memorial were frequently employed, and many of them still remain; yet as they are found without inscriptions, and only occasionally ornamented by rude hieroglyphics, the memory of the events which they describe has perished, and the field is left open to antiquarian conjecture. Inaugural stones also were used by them, upon which not only the Irish and Scottish kings were placed on their accession to the crown; but the chiefs of septs or petty *reguli,* were accustomed on the same to take the oaths to their vassals, when they succeeded to the power of the former chief. To the same class of inaugural stones belongs, as is well known, the famous coronation stone of Scotland. Tradition reports this singular relic to have been brought from Ireland by Kenneth; it was undoubtedly carried off from Scone by Edward the First, who inserted it into a chair, which he placed before the shrine of Edward the Confessor in Westminster Abbey. It is almost impossible to speak with any precision of the state

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[1] Innes, p. 785. Chronicle. Codex Colbertinus. See also Innes, 603.

[2] Idem. p. 588.

[3] And here having spoken of St. Margaret, we cannot refrain, in these brief remarks on the early state of the Scottish church, from alluding to a beautiful picture preserved by this same worthy Bishop Turgot, in which he describes the love of Malcolm for St. Margaret, and the influence which the mild piety of the Saxon princess acquired over the fiery temper of her Celtic husband. "Malcolm," says he, (we use Lord Hailes's translation), "respected the religion of his spouse, was fearful of offending her, and listened to her admonitions. Whatever she loved or disliked, so did he. Although he could not read, he frequently turned over her prayer-books, and kissed her favourite volumes. He had them adorned with gold and precious stones, and presented them to her in token of his devotion. She instructed him to pass the night in prayer, with groans and tears. I must acknowledge, that I often admired the works of the divine mercy, when I saw a king so religious, and such signs of deep compunction in a layman."—Hailes, vol. i. p. 15.

[4] Goodal's Introduction to the History and Antiquities of Scotland, p. 117.

[5] Chalmers, vol. i. p. 434.

[6] Caledonia, vol. i. p. 308.

Manners.

of society in this remote period, yet a few incidental gleams of light are reflected from the lives of the early saints. Thus, in Adomnan's life of Columba, which was written only eighty years after the saint's death, we find frequent mention of houses of wattle, similar probably to those which the Constable Richard de Moreville, in a charter of the twelfth century, denominates *claiæ niscatæ*.[1] Even the abbey of Iona was built of the same rude materials. The clothing of the monks seems to have been often composed of the skins of beasts, though latterly they had woollen stuffs and linen; the first probably manufactured by themselves, the linen imported from the continent. Venison, fish, milk, flesh, and wild fowl, were the common food of the people. "The monks of Iona," says Chalmers, "who lived by their labour, cultivated their fields, and laid up corn in their garners." But it is to be recollected that the monks were every where, for ages, the improvers themselves, and the instructors of others in the useful arts. Even Iona had its orchards in the rugged times of the ninth century, till the *vikinghr*, or pirate kings, ravaged and ruined all. Looking to their shipping, we find that their little vessels were constructed by covering a keel of wood and a frame of wicker work with the skins of cattle and of deer. These were denominated *currachs*. Afterwards they were enlarged and made capable of containing a respectable crew. It was in a vessel of this description, a wicker boat covered with hides, that Columba, accompanied by twelve of his friends, embarked from Ireland, in the year 563, and landed in Iona. With these few remarks, we close the Scottish period of our national history.

Sect. IV.—*Scoto-Saxon Period.*

A.D.1097–1306.

We have already seen, that the death of Malcolm Canmore at Alnwick gave rise to a temporary usurpation of the throne by Donald his brother, that he was expelled by Duncan, an illegitimate son of Malcolm, who had been educated at the court of William Rufus; and this Duncan having been assassinated, Edgar Atheling led an English army into Scotland, and placed Edgar, the son of Malcolm Canmore, on the throne.

Alexander I. A.D.1106

Edgar's reign was brief, pacific, and of little interest; but his successor, Alexander the First, the eldest surviving son of Malcolm, was a prince of a powerful and vigorous character. From his accession to the throne, in the commencement of the twelfth century, (1106), to the death of Alexander the Third (1285), in the close of the thirteenth, a period little short of two centuries, the nation was progressive and prosperous in a degree unequalled during the whole course of its future history. Under a succession of six monarchs, Alexander the First, David the First, Malcolm the Fourth, William the Lion, Alexander the Second, and Alexander the Third, it maintained its independence against foreign aggression, and not only preserved the integrity, but extended the boundaries of its dominions. Its commerce, its manufactures, its agriculture, and all the arts which improve and humanize an ignorant and fierce people, were encouraged; and throughout this long period, in the personal characters of each of these successive princes, though varying in their shades, there was that ingredient of energy and boldness which communicated itself to their people, and maintained the nation at the standard to which each ruler in his turn had raised it.

A.D.1106–1285.

Let us for a moment pursue our system, and like a traveller gazing from a mountain height, and noting the landmarks of a new country, endeavour to detect the leading and influential events in this division of our national history. In the character of Alexander the First, every thing seems to have been in excess; but happily the qualities which were so overcharged, were most of them of the better sort. He is traditionally remembered by the epithet of the *fierce;* and though humble and courteous to his clergy, whom he deemed entitled to this homage as God's servants, not his, he was, to use the words of an ancient and authentic writer, "terrible beyond measure to his subjects." The leading event of his reign was the struggle which he maintained for the independence of the Scottish church against the pretended rights claimed, first by the see of York, and afterwards by that of Canterbury. On the election of Turgot, a monk of Durham, to the bishopric of St. Andrews (1109,) the archbishop of York insisting on his having the right of consecrating him. To this the Scottish king declared he would never agree; and a compromise having taken place, by which the point was left undecided, Alexander, on the death of Turgot, altered his ground, and chose for his successor Eadmer, a monk of Canterbury. The same right of consecration, and founded on the same ground of the alleged dependence of the Scottish church upon the primacy of England, was now advanced by Canterbury; but it was still more haughtily and peremptorily refused by Alexander. A compromise again took place. Eadmer accepted the ring from the king, and took the pastoral staff from the altar, as if receiving it from the Lord; but finding his authority weakened, and the countenance of the monarch withdrawn from him, he intimated his resolution of repairing to Canterbury for advice. This Alexander violently opposed, declaring that as long as he lived, the bishop of St. Andrews should never be subject to that see. Nor did he fail here, as in all his other enterprises, to keep his word; Eadmer remained an elected but unconsecrated bishop. At length weary of the contest, and trammelled in his usefulness, he desired permission to resign, restored the ring to the king, replaced the pastoral staff on the high altar, and returned to Canterbury. Robert, prior of Scone, was elected to fill the vacant see, and the king's determined efforts to maintain the independence of the Scottish church were crowned with success. It had continued for fourteen years, and Alexander survived its termination only a single year. He died in 1124, leaving no children by his wife Sybilla, a natural daughter of Henry the First, and was succeeded by his brother, David the First.

Alexander I. A.D. 1106-1124

Struggle for the independence of the Scottish Church

Death of Alexander I.

David I. A.D.1124.

Edgar, the brother of this prince, had, on his death-bed, bequeathed to him that portion of Cumberland which was possessed by the Scottish kings. The legacy had two good effects. It called the young prince early to the cares and labours of administration; and it removed him from Scotland to a country where he became acquainted with a more advanced civilization and with better regulated government. These advantages were not thrown away upon David. His natural dispositions were excellent; his love of justice, his capacity for labour, his sense of the national honour and independence, his affection to every class of his people, his tenderness to his children, his piety to God, were all so conspicuous in his character, that Buchanan, an author who cannot be suspected of adulation, pronounces him the perfect exemplar of a good king; and the progress made by the country during the twenty-nine years of his reign goes far to justify the assertion.

War with Stephen.

His reign was contemporary with that of Henry the First and of Stephen in England, and it opened with many difficulties. The question of the independence of the church was again started; and before it could be brought to a termination, the forcible seizure of the English crown by Stephen, who deposed Matilda, the daughter of Henry the First, involved him in a war with that usurper. During the life of Henry the First, David and Stephen had sworn to maintain the right of Matilda; and the Scottish monarch, in obedience to his oath, invading England, compelled the barons of the northern portion of that kingdom to swear fealty to this princess. His efforts however were more honourable than successful; and after a war which lasted three years, David was ultimately defeated in the great battle of the Standard, fought on Cutton Moor, in the neighbourhood of Northallerton. Peace was now concluded, and the terms to which Stephen consented, indicate that, although defeated, the Scottish king was but little humbled.

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[1] Liber de Melrose, vol. i. p. 95.

Battle of the Standard. A.D. 1138.

The earldom of Northumberland, with the exception of the two castles of Newcastle and Bamborough, was ceded to Prince Henry, David's eldest son. As an equivalent for these fortresses, lands were granted to him in the south of England; the barons of Northumberland were to hold their estates of Henry the Prince of Scotland, reserving their fealty to Stephen; and in return, David and all his people became bound to maintain an inviolable peace with England.

Character of David I.

The remaining years of the reign of this wise monarch were pacific and prosperous. The war had convinced him that the English were far superior to his people in arms and discipline; it had been undertaken in fulfilment of his oath to Henry, not from any love of conquest, and having satisfied his conscience, he devoted his life to the arts of good government. "During the course of his sage administration," says Lord Hailes, "public buildings were erected, towns established, agriculture, manufactures, and commerce promoted. The barbarities of his people in their invasions of England, had affected him with the deepest anguish, and believing that religion was the only agent which could humanize and improve the savage multitudes whom he had led, but could not restrain, he endowed the church with new privileges, enriched it with extensive grants of land, founded various bishoprics, built many monasteries, and exhibited in his own person so fine an example of royal greatness, chastened and purified by Christian humility and devotion, that it could not fail to have the best effects upon his people."

Death of Prince Henry. A.D. 1152.

Towards the close of his reign, it was his misfortune to lose his eldest son, Prince Henry, just as he had reached manhood, and exhibited many of the excellent qualities of his father. The blow sunk deep into his heart; but David's first care had been for his people, and he roused himself to provide for the pacific succession of his grandson, Malcolm, a child in his twelfth year. By his orders, this boy, the son of Prince Henry, was carried in a progress through his dominions, to receive the homage of the barons and the people, and was solemnly proclaimed heir to the crown. Having performed this wise but mournful duty, the aged king within a year followed his son to the grave. It is a remarkable and beautiful circumstance, that he was found dead in an attitude of devotion. "His death had been so tranquil," says Aldred, who knew him well, "that you would not have believed he was dead. He was found with his hands clasped devoutly upon his breast in the very posture in which he seems to have been raising them to heaven."

Death of David I. A.D. 1153.

Malcolm IV.

The reign of Malcolm the Fourth, which lasted only twelve years, offers little for our observation. It began with those evils which so invariably attend a minority; war without, and insecurity within the kingdom. Somerled the thane of Argyle, strengthened by the naval powers of the Isles, invaded Scotland, and for some years continued to harass the country by repeated attacks, which at length terminated in an amicable agreement. The transactions of Malcolm with Henry the Second of England impress us with an unfavourable notion of this young prince. It had been a promise of the English monarch made to David the First, in 1149, that if he succeeded to the crown of England, he would cede to Scotland for ever the territory between the Tyne and the Tweed. Instead of insisting on this, Malcolm, overreached by the superior sagacity of Henry, or betrayed by the treachery of his councillors, abandoned to England his whole possessions in the northern counties, and received in return the honor of Huntingdon; a measure which created universal discontent in the nation. These feelings of disgust were imprudently increased by an expedition of the young prince into France, where he joined the army of Henry, claimed from him the distinction of knighthood, and outraged the feelings of national jealousy, by forgetting his station as an independent prince, and fighting under the banner of the English monarch. A deputation from the Scots was sent into France to remonstrate against this conduct, nor did they hesitate in bold language to reproach their king for the desertion of his duty. Galloway rose into rebellion; the inhabitants of Moray about the same time threw off their allegiance; and Somerled the thane of Argyle invaded the country with a formidable fleet. Although the obstinacy of the king had brought these disasters upon himself, his energy and decision met and overcame them. He hurried from France, conciliated his nobles, invaded and subdued Galloway, repulsed Somerled, and after suppressing the rebellion in Moray, adopted the extraordinary measure of dispossessing its ancient inhabitants, compelling them to settle in more distant parts of his dominions, and planting new colonies in their room. These energetic measures were his last, for he died immediately after, at an early age, and was succeeded by his brother William the Second, son of Henry, prince of Scotland, and grandson of David the First.

Malc IV. A.D. 53- 1165.

Willia the L A.D. 5- 1214.

The administration of this prince presents us with the longest reign in the range of Scottish history, extending from 1165 to 1214, nearly half a century. In this protracted division, the most important event was, the disgraceful surrender of the national independence to Henry the Second in 1174, and its recovery by William in 1189. Both transactions require our serious notice. It was the weakness of William to be guided by impulse. Smitten with an admiration for the warlike qualities of Henry the Second, and uninstructed by the misfortunes of his predecessor Malcolm, he first courted this prince, and being disappointed in his object of procuring from his justice the restitution of Northumberland, he imprudently defied him. War ensued; and the king of the Scots having advanced with his army to Alnwick, was surprised, made prisoner, and shut up in the castle of Falaise in Normandy. His impatience under captivity, and the longing of the barons and clergy for their king, led to a pusillanimous treaty, which will ever remain a blot upon the national honour. With consent of his barons and clergy, given at Valogne on the 8th of December 1174, William agreed to become the liegeman of Henry for Scotland, and all his other territories; to deliver up to the English monarch the castles of Roxburgh, Berwick, Jedburgh, Edinburgh, and Stirling; to give his brother David and some of his chief barons as hostages, and to receive in return his liberty. In this treaty, it is remarkable, that while little care was shown as to the independence of the people, a prudent, and, as it has been well denominated, a memorable clause was introduced, which left entire the independence of the Scottish church; and this clause, the bishops and clergy took the first opportunity of asserting before the Papal legate in a council held at Northampton (1176).

Returns Scotlan

On his return to his dominions, William appears to have devoted himself with much energy and success to the cares of government. His dominions were weakened and distracted by repeated insurrections in Ross and in Galloway. In these wild and remote districts, the native chiefs claimed almost a royal sway; and the people, ferocious in their habits, and jealous of all intercourse with England, were ready, upon the slightest provocation or encouragement, to

William the Lion.

rise in rebellion. A pretender to the crown also appeared in Galloway, in the person of Donald, the grandson of Duncan, commonly called the bastard king of Scotland. This adventurer having seized Ross, and wasted Moray, William led an army against him; nor was it till after a desperate struggle that Donald fell near Inverness, and by his death restored tranquillity to the country.

The Scottish Church declared independent. A.D. 1188.

We have already seen how firmly the Scottish church had renounced the idea of any dependence upon the metropolitan sees of York or Canterbury; we have adverted to that careful reservation of their rights at the moment when the king and the nobles bartered away what was not theirs to give, the national independence. In this resolute conduct the clergy were supported by the king; and in 1188, Clement the Third pronounced a solemn decree, by which he declared the "church of Scotland to be the daughter of Rome, and immediately subject to her; and that to the Pope alone, or his legate de latere, should belong the power of pronouncing any sentence of excommunication against that kingdom."

The kingdom recovers its independence.

This important declaration was soon followed by another event still more memorable, in which the kingdom recovered its independence. On the death of Henry the Second, Richard Cœur de Lion, his successor, then intent upon collecting money for his expedition to the Holy Land, invited the king of Scotland to his court, and upon William's engagement to pay to him the sum of ten thousand merks, agreed to restore his kingdom to its independence, reserving the homage formerly due by the Scottish kings for the lands which they held in England. The instrument by which this transaction was completed, declares, that Richard had delivered up to William king of Scots, his castles of Roxburgh and Berwick, had granted to him an acquittance of all obligations which had been extorted from him by Henry the Second, in consequence of his captivity, and had ordained the boundaries of the two kingdoms to be re-established as they existed at the date of William's imprisonment. The Scottish king was at the same time put in possession of all his fees in the earldom of Huntingdon; and all the charters of homage done to Henry the Second by the Scottish barons were delivered up, and declared to be cancelled for ever. We are to ascribe it to the wise regulations of this treaty, and the fidelity with which they were observed on both sides by its authors and their successors, that for a century after its date, there occurred no national quarrel or hostilities between the two countries. The remaining portion of the reign of William demands little notice. During the latter years of it, the succession of John to his brother Richard the First threatened to dissolve the pacific relations between the two countries; but war was happily averted, and the Scottish monarch reserved his energies for the pacification of his own realm, disturbed by a rebellion in the northern counties. In 1214, the king died at Stirling, after a reign of forty-eight years, the longest, as already stated, in Scottish history. His name of William the Lion was probably owing to the circumstance, that, before his time, none of the Scottish kings had assumed a coat armorial. The Lion rampant first appears upon his shield.

Alexander II. A.D. 1214

William was succeeded by his son Alexander, a youth of seventeen, to whom the Scottish barons had sworn homage in 1201, and who was one of the wisest of our kings, whether we regard the justice of his administration, the seasonable severity with which he subdued all internal commotions in his kingdom, the firmness exhibited in his maintenance of the rights of the church, or the wisdom, forbearance, and vigour which marked his policy towards England. His reign was one of constant action, and full of incident. It commenced with his joining the English barons who resisted the tyranny of John. This conduct drew down upon him and his kingdom a sentence of excommunication (1216); but the papal terrors appear to have been little dreaded at this time; and in 1218, Honorius not only abrogated the sentence pronounced by his legate, but confirmed the liberties of the Scottish church.

Alexander II. marries the Princess Joanna of England.

On the accession of Henry the Third to the English throne, Alexander, who was occupied with quelling the repeated insurrections in the northern parts of his dominions, showed every disposition to cultivate amity with England; and his marriage to the princess Joanna, sister of Henry, had a favourable effect in strengthening the ties between the two monarchs.

Increase in the power of the nobles.

War with England, A.D. 1244.

One of the striking features which mark the reign of this monarch, is the gradual increase that is to be observed in the power of the nobles, and the corresponding decrease in the authority of the crown; but if this had injurious effects upon the general prosperity of the kingdom, and distracted it by internal private feuds, it encouraged a feeling of independence, and fostered that warlike spirit, which proved the best safeguards against the encroachments of their more powerful neighbours. This was strikingly shown on the occurrence of a rupture between England and Scotland in 1244. Some time before this, Alexander had claimed from Henry, in right of inheritance, the counties of Northumberland, Cumberland, and Westmoreland; and although the English king did not grant him his full demand, he admitted its justice, by transferring to him an equivalent in certain lands, which he accepted in full of all claims. For these lands the Scottish king did homage; and both monarchs remained on friendly terms for some years, when jealousies suddenly arose, and Henry, alleging that homage had been unjustly withheld, led an army against Scotland. Under these threatening circumstances, the Scottish king, although he had recently experienced the resistance of his nobles to his personal requests, found himself strongly supported by the same barons against the meditated attack of England. They raised in a short time an army of a hundred thousand foot, and a thousand horse, and this demonstration of the national strength had happily the effect of restoring peace without bloodshed. It is worthy of notice, that when a papal legate visited Scotland under this reign, and held a provincial council in the capital, the king manifested the same jealousy of such a proceeding as had been exhibited by his predecessors. He seemed afraid lest the admission of a papal messenger, whose message regarded England alone, should be deemed derogatory to the independence of the Scottish church; and although, at the request of the nobility of both countries, he consented to his coming into the kingdom, he declined a personal meeting, and stipulated that this permission should not be drawn into a precedent.

Death of Alexander II. A.D. 1249.

Accession of Alexander III.

Having engaged in a maritime expedition against Angus of Argyle, one of those petty island chiefs, whose dubious allegiance, in those remote times, oscillated between Norway and Scotland, Alexander had conducted his fleet as far as the Sound of Mull, when he was seized with a fever, and died in a small island there named Kerraray, in the 35th year of his reign. He was succeeded by his son, Alexander the Third, a boy in his eighth year; and the kingdom, which had enjoyed under his father's wise and vigorous administration, an uncommon degree of prosperity, became immediately exposed to the many evils of a minority. Two parties divided the nobility; the one led by Walter Comyn, earl of Menteith, the other by Durward the high Justiciar; and Henry the Third secretly wrote to the Pope, requesting him to interdict the coronation of the young king. Scotland, he said, was a fee of England, Alexander his vassal, and his permission as superior had not been obtained. The Pope appears to have rejected his demand with promptitude, as derogatory to the rights of a sovereign Prince; and the ceremony of the coronation was performed at the abbey of Scone, the coronation-oath being read first in Latin, and afterwards in Norman-French.

Alexander soon afterwards, in fulfilment of a former treaty, Alexander III. marries the Princess Margaret of England.

espoused Margaret, the youthful daughter of Henry, at York, and exhibited a spirit and intelligence superior to his years, in refusing to pay homage for his kingdom of Scotland. "I came," said he to the artful monarch who made the proposal; "I came into England on a joyful and pacific errand, not to answer to an arduous question, which belongs to the states of my kingdom." He at the same time made no objection to take the oath of fealty for the lands which he held in England.

Intrigues of Henry III. with Scotland.

Defeated in this attempt to overreach a minor sovereign, Henry commenced a series of intrigues with the Scottish nobles, with the object of obtaining an entire control over the affairs of the sister kingdom; and the country was divided and distracted by two factions, the one acting under English influence, and the other more honestly contending for the freedom of their prince and the independent administration of the government. These scenes of civil faction and foreign interference continued till the monarch, having arrived at manhood, and developing a character of much energy and judgment, took the reins into his own hand, and compelled his nobility to respect the laws and support his measures.

Haco, king of Norway, defeated at Largs. A.D. 1263.

Scarcely had this happy change occurred, when the kingdom, which had already suffered from the vicinity of the fleets of Norway, was threatened with invasion by Haco, one of its most warlike princes. The dispute which led to this menace originated in a circumstance already noticed; the precarious homage paid by the petty piratical chiefs of the Western Isles, who, as circumstances pressed on the one side or the other, acknowledged a feudal dependence on Scotland or on Norway. To support them in their independence on Alexander, Haco made a descent on the western coast of Scotland with a mighty fleet, but sustained a signal defeat at Largs, and on his return with the shattered remains of his ships, sickened and died at Orkney. The results of this victory were highly favourable to Scotland. It fixed the chiefs of the Western Isles in their allegiance, secured to Alexander the homage of the king of Man, and convinced Norway that Scotland was not to be so easily subdued or overawed as its piratical princes had anticipated.

Death of Alexander III. A.D. 1285.

The remainder of this reign was prosperous, as far as the circumstances of the kingdom are considered, but unfortunate for the monarch, who found himself suddenly deprived by death of all his children. His eldest son, Alexander, died soon after his marriage, and his only daughter Margaret, the wife of Eric, king of Norway, was cut off in childbed, leaving an infant daughter, Margaret, commonly called the Maiden of Norway, the heiress of the Scottish throne. These calamities induced the king, who was a widower, to make a second marriage. Having selected Ioleta de Coney, daughter of the Count de Dreux, the nuptials were celebrated at Jedburgh; and the nation, under a wise monarch still in the prime of life, flourishing at home and at peace abroad, looked forward to a long season of prosperity, when all its hopes were overcast in a moment. Alexander, when riding in a dark night, on the brink of a dangerous rocky ledge near Kinghorn, was precipitated from the top to the bottom, and killed on the spot.

Death of the Maiden of Norway.

The death of the king was deeply lamented, and not without cause, for he left the kingdom in most difficult circumstances, exposed to the ambition and attack of Edward the First, one of the ablest princes who had ever reigned in England, and its happiness at home dependant upon the precarious life of an infant. To fill the cup of Scotland's calamity, this child, Margaret, the Maiden of Norway, when on her passage from that country to take possession of her throne, sickened and died in Orkney; and on her death arose that celebrated competition for the Scottish crown, which threatened to plunge the kingdom into all the miseries of civil war.

A.D. 1285. Design of Edward I.

The moment was favourable to the designs of Edward the First, who determined to make himself master of Scotland. While in that country the various competitors collected their forces and prepared to support their claims, the English monarch having given orders for assembling the strength of his kingdom by a certain day, invited the nobility and clergy of Scotland to meet him at Norham, for the purpose of deliberating upon the succession to the crown. It has been made a subject of dispute, whether Edward was invited by the Scottish people to be umpire in the contest for the crown, or whether he proposed himself as judge, and the subject is involved in some obscurity. It is by no means improbable, that English intrigue and a regard to their own interest, had induced some of the competitors, if not to invite, at least most readily to accept the mediation of the English monarch; but it is equally true, and the point is of far greater importance, that there is no evidence to prove that there was any invitation of this kind, either by the people of Scotland, or even by a majority of its nobles and clergy. Be this as it may, the competitors for the crown, with a large proportion of the nobility and clergy of Scotland, accepted the mediation of Edward, and met this monarch at Norham, (May 1291).

Edward acts as umpire. A.D. 1291.

Claims of Bruce and Balliol.

Of these claimants for the crown the two principal were John Balliol and Robert Bruce. It was quite apparent that the question lay between them, the rights of the other competitors being evidently inferior to theirs. The title of these two chiefs arose out of the circumstance, that on the death of all descendants of Alexander the Third, the crown reverted to the descendants of David, earl of Huntingdon, brother of king William the Lion. This David left three daughters, Margaret, the eldest, who married Alan, lord of Galloway; Isabella, the second, who married Robert Bruce, father to the competitor Robert Bruce, lord of Annandale; and Ada, the third daughter, who married John de Hastings. It was evident, therefore, that the question lay between Balliol and Bruce. Balliol pleaded that he was entitled to the crown as the descendant of the eldest daughter, being great-grandson to David, earl of Huntingdon. Bruce admitted that he sprung from the second daughter, but contended that, being grandson of the earl of Huntingdon, and therefore a degree nearer, his claim was superior.

Conduct of Edward I.

Edward's scheme against the independence of Scotland was now ripe for execution; and announcing his determination to give a just decision, he, to the dismay of many present, required the Scottish barons to swear fealty to him as their Lord Paramount. It was in this character alone, he said, that he was entitled to give, and as such alone that he would pronounce, a judgment. The scene which now ensued was a humiliating one. The right of Edward was admitted; and Bruce, Balliol, the remaining competitors, the barons and the clergy, set their hands to an instrument, in which they acknowledged that the English king was feudal superior of Scotland. There can be little doubt that they knew this claim of Edward to be untenable upon any ground of truth or justice, but they saw it ready to be enforced by a determined prince at the head of the whole strength of his dominions, and they did not dare to resist it. Edward, accordingly, having received their oaths of homage, proceeded to investigate the contending claims, and awarded the crown to John Balliol.

He invades Scotland.

It was probably part of the plan of the English monarch to quarrel with his vassal king. It is at least certain, that he availed himself of the earliest appearance of spirit and resistance in this unfortunate prince to summon him, in terms of reproach and indignity, to his court in England, and at last goaded him and his people into what he termed rebellion. In the war which ensued, Edward found it an easy matter to overrun a kingdom unprepared to resist so formidable an enemy. The town of Berwick was carried by storm;

Edward's success.

Dunbar, the key of the borders, surrendered; Balliol was taken prisoner and sent to the Tower; while the English prince concluded what he deemed the conquest of Scotland, by removing from Scone to Westminster the sacred stone upon which the long line of its kings had been crowned and anointed. But at this sad moment Scotland, which in vain looked for a deliverer amongst its feudal nobles, found one in a man of far inferior rank.

Rise of Wallace.

William Wallace was the son of Sir Malcolm Wallace, who held the estate of Ellerslie, near Paisley. Having been outlawed by the English for an alleged murder, committed on one by whom he had been grievously injured, he fled into the fastnesses of his country, and assembling round him a small band of followers, who were weary of their servitude, commenced that kind of predatory warfare, which led from one success to another, till he saw himself at the head of a formidable force. With this he boldly descended into the low country, and after having defeated the English in the sanguinary battle of Stirling, was soon after chosen Governor of Scotland. This title he only accepted as acting in the name of John Balliol, whom he had always acknowledged as his hereditary king. Into the exploits and career of this great man it is impossible, within our limits, to enter; but making every allowance for the passionate admiration of his countrymen, and regarding him as reflected in the cold glass of history, rather than invested with the brilliant hues of romance, there will still be found all that constitutes a heroic character, if the accomplishment of the greatest results with the most confined means, an entire devotion to his country, a contempt of power for its own sake, unextinguishable hatred of oppression, and a personal courage which nothing could shake for a moment, were ever entitled to such an epithet.

Battle of Falkirk. A.D. 1298.

It was however impossible for Wallace, with all his great qualities, to reconcile the Scottish nobles to his envied elevation, or to compose the feuds and jealousies which divided and weakened their efforts. Edward, who had been absent in Flanders when his officers were defeated at Stirling, hurried back to England, and once more invading Scotland at the head of an immense army, encountered and defeated Wallace in the battle of Falkirk. The result of this victory was the temporary subjugation of a country, whose allegiance expired the moment its invaders retired. Wallace voluntarily resigned the office of Governor, Robert Bruce and John Comyn were chosen Guardians, and for five years the war was continued with various success; but Edward, who in this interval had thrice invaded the kingdom, by these unceasing efforts and superior numerical strength, at last subdued the spirit, and appeared to have completed the conquest of this devoted people. The Guardians submitted and were pardoned; sentence of outlawry was pronounced against Simon Fraser and the few followers of Wallace who still held out; and at last this great chief himself was betrayed into the hands of the conqueror, and executed at London. It was at this crisis, which seemed to seal for ever the fate and liberty of the Scottish people, that a deliverer arose in the person of Robert Bruce.

Wallace executed.

Section V.

A. D. 1306 to 1436.

Reign of Robert Bruce.

Nothing could be more extraordinary, or apparently more unpropitious to the cause of freedom, than the circumstances which led to this great result. Robert Bruce, earl of Carrick, and grandson of the competitor for the crown, had acted a dubious and interested part during the years that Wallace, and the few patriotic barons who adhered to him, made their stand for the independence of their country. He inherited, with vast landed estates, the right to the crown possessed by his grandfather; but, had he urged his claim, it might have been at the risk of the forfeiture of these possessions, which made him one of the most powerful barons in Scotland; and, although, in his early career, we can detect occasional outbreaks of the patriotic feeling, he preserved his allegiance to Edward the First, and appears to have been treated with confidence by that monarch.

Reign of Bruce. A.D. 1306.

Murder of Comyn.

The injuries inflicted on the country seem at last to have aroused both Bruce and Comyn, and they formed a secret agreement to rise against the English. But Comyn's heart failed him. He betrayed the purpose to Edward, and meeting Bruce, who had been made aware of his treachery, in the church of the Grey friars at Dumfries, that proud baron reviled him as an informer, and stabbed him to the heart on the steps of the high altar. He was instantly proclaimed a traitor by Edward, excommunicated as a sacreligious murderer by the Pope, a price set upon his head; and from the first and most influential noble in the kingdom, he felt that he must either assert his right to the crown, and trust to his sword for its defence, or be content to sink into the condition of an outlaw and a fugitive. His decision was instantly taken. He rode with his little band to Scone, and was there solemnly crowned; but being aware of the advance of an English army, he hastily concentrated his forces, and after ravaging Galloway, marched against Perth, then in possession of Edward.

Bruce proclaims himself king. A.D. 1306.

He is at first unfortunate.

But the early portion of Bruce's career was disastrous; and those military talents, which afterwards conducted him through a course of unexampled victory, were nursed amid incessant defeat and hardship. He was put to flight at Methven, his small army dispersed, and he himself driven an almost solitary wanderer through Lennox and Kintyre, to seek an asylum in Rachrin, a little island on the northern coast of Ireland. Here he remained during the winter, unaware of the execution of his faithful followers, who had fallen into the hands of Edward; of the imprisonment of his queen and daughter, and the extraordinary severity with which the English monarch seemed determined to rivet the fetters upon his native country.

Bruce defeats the English at Loudon Hill. A.D. 1307

In the spring he passed over from Rachrin to Arran, accompanied by his brother Edward Bruce, Sir James Douglas, and about three hundred men. His own castle of Turnberry, on the coast of Carrick, was then occupied by Lord Percy, an officer of Edward. Bruce attacked it, put the English garrison to the sword, and, after a variety of minor enterprises, in which, although often repulsed, he and his followers gained experience and confidence, he ventured, although at the head of only six hundred spearmen, to meet the earl of Pembroke, with three thousand cavalry, at Loudon Hill, (May 1307). The result of this conflict, owing to the admirable dispositions of Bruce, was the entire defeat of the English; and from this point, the crisis of his fortune, to the hour when the liberty of his country was for ever secured on the field of Bannockburn, the career of this extraordinary man presented an almost continued series of success.

Bruce's wise policy.

It was perhaps fortunate for Scotland that he was opposed, not by Edward the First, who had died when on his march to Scotland, (1307), but by his son, Edward the Second, a prince of far inferior talent; yet the military resources of England were so formidable, and the barons who wielded them such experienced leaders, that Bruce, who had to struggle against domestic enemies, as well as foreign invasion, may well be praised for the admirable judgment with which he wielded the strength of his little kingdom. It was his policy to avoid a general battle, and to starve and distress the formidable armies which England repeatedly sent against him, by wasting the country, retiring slowly before his enemies into the woods and fastnesses, and when they were compelled by famine or the season to retreat, by hanging on their rear, and cutting them off in detail Convinced that, from the

Robert Bruce. Scottish infantry.

poverty of Scotland, it was in vain to attempt to rival the mounted chivalry of England, he turned his whole attention to the formation and discipline of his infantry. They were armed with a spear eighteen feet in length, a sword and battle-axe at their girdle, a short cut-and-thrust dagger, a steel bonnet, and a back and breast-piece buckled over a tough leather jerkin. They were trained to form sometimes in squares, sometimes in circles, more or less deep, according to the nature of the ground and of the service. Such was the main army of Bruce, his pikemen; but after he had restored peace and security to his kingdom, and began in his turn to act upon the offensive, he often employed the only kind of cavalry which Scotland could raise, the border prickers, who, lightly armed, mounted on hardy little horses, and carrying as their provisions a bag of meal slung at their saddle-bow, darted upon the richest districts of England, or stripped them of their wealth, and scoured like a whirlwind across the border, ere the force of the country could be raised in its defence.

Battle of Bannockburn. A.D. 1314.

To pursue the details of his obstinate contest with England, is impossible. It was during the first years a war of defence, in which Bruce struggled for existence. This secured, it became aggressive; but his efforts were confined to the recovery of his dominions out of the hands of those Scottish barons who had embraced the service of the enemy, or his castles from the English governors to whom they had been entrusted. At last, when Edward the Second, at the head of an army a hundred thousand strong, composed of the flower of his kingdom, and led by his most experienced officers, had penetrated into the country, Bruce found himself driven from his favourite maxim, and compelled to hazard a battle. On the field of Bannockburn, near Stirling, thirty thousand Scottish foot, and five hundred horse, led by the king in person, and under him commanded by Douglas, Randolph, and the Steward of Scotland, encountered and entirely defeated the formidable array of England. Edward fled from the field to Dunbar, and the broken remains of his army, in dispersed bodies, made their retreat in much disorder into England, (June 24, 1314).

In this memorable victory it may be said, without exaggeration, that a lesson in the history of liberty was taught, not only to Scotland, but to the world; to every people who have felt the misery of servitude, or tasted the sweets of freedom. It proved that a country may be, as Scotland was under Edward the First, brought by oppression and cruelty to the very brink of despair; its cities sacked, its fields laid waste, till famine was the consequence; its best leaders executed or imprisoned, its hearths left desolate, its very offerings of praise proscribed, and its refuge in religion attempted to be cut off; but that, till exterminated, a free-born people cannot be said to be subdued.

Effects of the victory at Bannockburn.

The immediate effects of this great victory upon the spirit of the respective countries, were not less remarkable. It convinced the Scots, that, with a good heart and skilful leaders, their squares of infantry, with their long pikes, were a match for the English horse, however superior in arms and numbers; it taught the king, that what he had most to dread was the discharge of the English bowmen; and admonished him, that, however complete had been the defeat, however glorious the consequences of the victory, his favourite military maxim, to avoid a general battle, was still his best and safest course. It affords a striking view of the character of this great man, that his success at Bannockburn led neither to presumption, nor, much as he had suffered, and deeply as he had been injured in his tenderest relations, to a cruel retaliation. On the contrary, it was followed up by Bruce with an immediate proposal for peace; but he would consent to treat only on the footing of an independent king, and the offer was rejected.

Rober Bruce A.D. 14- 1328.

From 1314 to 1328, an interval of nearly fourteen years, the war was continued with almost uninterrupted success on the part of the Scots; while a series of reverses were endured by England, which are chiefly to be ascribed to the pusillanimous character of the monarch, and the great military ability not only of Bruce, but of the officers whom he had trained, Sir James Douglas, Randolph earl of Moray, the young steward of Scotland, and many others. It may convey some idea of Bruce's incessant occupation in the field, when it is mentioned, that during this interval, England was twelve times invaded, either by the king in person, or by his officers, its border counties were exposed to ravages, and on frequent occasions the fires which marked the Scottish march were seen burning beside the gates of York; nor were the Scottish king's proposals for a peace accepted, till the English districts, which were compelled to purchase safety by the payment of a heavy tribute, threatened in their misery, to throw themselves into the arms of Scotland. At last, on the first of March 1328, an English parliament assembled at York. Bruce was acknowledged king of Scotland, Scotland itself recognised as a free and independent kingdom, and peace established, after a sanguinary war of twenty years.

The w conclu A.D. 28.

Death Bruce. A.D. 1 9.

This great consummation was not long survived by him to whom, under God, the result was chiefly due. The king, whose constitution had been broken by the fatigues and exposure of his early life, began to droop soon after he saw the liberty of his country permanently established; and he died at Cardross on the 7th of June 1329.

David Regen of Rando.

The death of Bruce was a severe trial to Scotland. His only son David, who succeeded him, was a boy of six years old; and while the nation was thus exposed to all the evils of a long minority, Edward the Third, one of England's most warlike monarchs, was just commencing his career, which soon developed uncommon talents, and great ambition. Randolph indeed, who was chosen Regent, and the good Sir James Douglas, with other veteran officers, still remained; but Douglas was slain in Spain, whither he had proceeded on his way to Jerusalem with his master's heart; and the earl of Moray only survived the death of Bruce for three years. To add to these calamities, the monarchs who successively filled the Scottish throne, and on whose personal character, in these rude times, much of the success and vigour of the government depended, were little similar to their great predecessor. From the death of Bruce till the reign of James the First, the first prince who in any measure was worthy of a comparison with him, a period of nearly a century elapsed,[1] in which the sceptre passed into the hands of three princes, David the Second, Robert the Second, (the first sovereign of the house of Stewart, being the son of the Steward of Scotland, by Marjory, Bruce's only daughter,) and, lastly, Robert the Third. Contemporary with these Scottish princes were Edward the Third, Richard the Second, Henry the Fourth, and Henry the Fifth, all, with one exception in Richard, wise, warlike, and fortunate monarchs. The odds, therefore, were infinitely against Scotland, a country far inferior in its population and resources to England, and torn by domestic feuds; and yet against reiterated attacks it maintained the contest for its liberty. Unable to descend into minute detail, we take a summary of the larger portion of this calamitous interval of Scottish history, from another work. "A period of sixty-four years elapsed between the death of Robert Bruce and the birth of James the First, during which time, although torn by anarchy and domestic faction, the country maintained a remarkable struggle for its liberty. It

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[1] We date not from the birth of James, but his return from captivity in England. It may be proper to mention, that the authorities for this sketch, from Alexander the Third to the reign of Mary, are the same as those followed by Mr. Tytler, in his History of Scotland, now in the course of publication.

David II.

was in this period, eight times invaded by a foreign force; it was betrayed and deserted by David the Second, the unworthy son and successor of Bruce; it saw, on many occasions, the most powerful of its nobles enlisted under the banner of its enemies; it had to struggle against the military genius and political talents of Edward the Third, and Henry the Fourth and Fifth; and yet, with limited resources, and divided councils, so tenaciously did the people cling to their liberty, that, though sore oppressed, they were never conquered. Amid almost constant war, and its dreadful accompaniments, famine and the pestilence, they still preserved their freedom, preferring the prospect of living in a country reduced by repeated invasion to a solitude or a desert, or even the last alternative of being totally exterminated, to the most flattering offers of being united to England, when coupled with the condition that they should renounce their national independence."[1] We have above alluded to the degeneracy of David the Second, whose long reign of forty-two years was divided into a minority, the greater part of which was passed in France; a captivity in England, the result of his calamitous defeat in the battle of Durham; and a train of subsequent reverses all occasioned by his headstrong character and devotion to his selfish pleasures. But the darkest stain upon David, was his intrigues with Edward the Third, in which he hesitated not to sacrifice the independence of the country, to swear homage to the English prince for his kingdom of Scotland, and even to propose to his parliament, that the order of succession solemnly settled by his heroic father, should be altered in favour of an English prince. It is needless to say that so degrading a proposal was indignantly repelled, and that the death of the prince who had offered the insult was regarded as a national deliverance.

1371.

Robert II. the first of the house of Stewart. Robert III. an indolent prince.

In Robert the Second, who succeeded him as the first of the house of Stewart, and his son, Robert the Third, the nation, though still exposed to the repeated attacks of England, experienced a short breathing time, owing to the death of Edward the Third, and the incapacity of Richard the Second; but neither of these Scottish princes possessed the vigour or the talents requisite to wield the sceptre with success, in the midst of the difficulties by which they were surrounded. The second Robert came to the crown when age had chilled his vigour; and his son and successor, Robert the Third, was of too indolent and gentle a character to hold his part against a fierce feudal nobility, led by his brothers, the Earls of Fife and Buchan, the first a man of great ambition, the second a monster of crime, who gave himself up to every species of lust and rapine, and has been traditionally remembered as "the Wolf of Badenoch."

James I. A long minority. 405.

All this led to great disorder. The king, unwilling to burden himself with the cares of government, devolved the administration upon his son, the duke of Rothsay, a young man of violent passions, though of considerable ability, who had made himself particularly obnoxious to his uncle, the earl of Fife. This led to a fatal collision. Fife, whose authority was increased by his being made duke of Albany, proved too strong for the young prince. His father, the king, was persuaded that the excesses of his son required restraint, and the unhappy youth was hurried to Falkland, and shut up in a dungeon, where he was intrusted to the care of two ruffians, who starved him to death. It was at first reported that he had been cut off by a dysentery; but the horrible tale of his sufferings soon after transpired. "A poor woman in passing through the palace garden, had been attracted by his groans, and had found means to support him by thin cakes which she slid into the grated window of his prison, and it is said by her own milk, conveyed through a reed; but she was detected, and put to death by his keepers; and after fifteen days, the body of the miserable captive was found in a state too shocking to be described. In the extremities of hunger, he had gnawed and torn his own flesh."[2] Robert, depressed by this calamity, and incapable of exertion, committed the whole cares of the government to the duke of Albany; and the power of that daring man was increased by another event which completely broke the spirit of the king, and was probably the cause of his death. This was the seizure by the English of his eldest son James, then a youth in his fifteenth year, and on his passage to France. The consequences were very fatal to the country. The prince was carried to the Tower; the father did not long survive the captivity of the son; and on his death, which took place in 1406, his brother, the duke of Albany, succeeded to the prize which had long been the object of his ambition, the undisputed regency of the kingdom.

James I.

Regency of the Duke of Albany.

The young king, James the First, was a captive, and Henry the Fourth knew too well the value of the prize to part with him. For nineteen years he was detained in England; and, during this long interval, Albany became the uncontrolled governor of Scotland. It has been suspected that the intrigues of this able and unprincipled man with the English monarch, had led to the seizure of the young king. That they prolonged the period of his captivity, there can be no doubt.

He cultivates peace with England.

It was clearly the best policy of the regent to cultivate peace with England, and to conciliate Henry the Fourth, as this prince could at any time put a termination to his authority, by restoring James to his kingdom; and the same desire to retain the power which he had so nefariously usurped, induced Albany to cultivate the friendship, and overlook the crimes and excesses of the great feudal barons. All this led to dreadful confusion in Scotland, which, although freed for a time from the incessant invasions of its more powerful neighbour, was torn by private war, whilst the lives and property of its people were exposed to the attack of every unprincipled feudal baron who sheltered himself under the protection of the regent.

A.D. 1424.

James I. returns to his country. A.D. 1424.

This miserable state of things was at length terminated by the return of James to his dominions; a prince whose character presented a striking contrast to that of his father and grandfather. During the nineteen years in which he had been unjustifiably detained in that country, he enjoyed advantages which almost repaid him for his captivity. Henry the Fourth, a prince who well understood the art of government, had made it his generous care that James should receive an excellent education; and he had the advantage of being instructed in war, by accompanying his victorious successor, Henry the Fifth, to France. On his return to his own dominions, he was in the prime and the vigour of manhood. His character, formed in the school of adversity, was one of great power. He found his kingdom a scene of lawless excess and rapine; a condition to which it had been reduced from the want of a firm hand to restrain oppression and enforce the laws. Since the death of Bruce the power of the aristocracy had been on the increase, while that of the crown had proportionally lost ground, and fallen into contempt. His object, as can be clearly discerned through the history of his brief reign, was to restore the kingly authority, to rescue the commons from oppression and plunder, to give security to property, encouragement to the industry and pacific arts of his people, and to compel his barons to renounce their ideas of individual independence, and become good subjects.

Character of James I.

James's principles of government.

James's extreme severity to the house of Albany.

The regency of Albany, his uncle, and of his son Murdoch, who had succeeded him, was naturally and justly regarded by James as little else than a long usurpation. He was mortified that Albany, against whom, as the murderer of his brother, he entertained the deepest resentment, should have escaped his merited punishment; and the royal

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[1] Life of James the First, pp. 203, 204, in Lives of Scottish Worthies.

[2] Lives of Scottish Worthies, vol. ii. p. 242.

Execution of Duke Murdoch, and the Earls of Athole and Lennox.

vengeance fell with a proportionably heavier force upon Murdoch, his son and successor; nor is it possible to deny that James's retribution was cruel and excessive. Murdoch, the duke of Albany, his two sons, the earl of Athole, and Alexander Stewart, with his father-in-law, the earl of Lennox, a venerable nobleman, eighty years of age, were tried, condemned, and executed. James, the duke's youngest son, having escaped, collected a band of freebooters, and after sacking and plundering Dunbarton, took refuge in Ireland; but five of his men fell into the king's hands, and were torn in pieces by wild horses. So horrid a punishment, and the exterminating severity exhibited to all connected with the house of Albany, can admit of no justification; and there is every reason to believe, that the early and miserable death of the monarch, is to be traced to the deep feelings of revenge with which some of his nobles from that moment regarded him. Neither is it possible to believe that the king in this instance carried along with him the feelings of the people. Yet looking at the state of things in Scotland, it is easy to understand his object. It was his intention to exhibit to a nobility, long accustomed to regard the laws with contempt, and the royal authority as a name of empty menace, a memorable example of stern and inflexible justice, to convince them that a great change had already taken place in the executive part of the government; to furnish also a warning to the people, of the punishment which awaited those who imagined that fidelity to the commands of their feudal lord was paramount to the ties which bound them to obey the laws of their country.

State of Scotland in relation to England and the continent.

Having given this severe and sanguinary lesson, the next efforts of the monarch were addressed to the internal administration of his kingdom. From without he had nothing to dread; he was at peace with England, and his marriage with Jane Beaufort, the niece of Cardinal Beaufort, had, from her near relationship to the English monarch, strengthened the ties between the two countries. France was the ancient ally of Scotland; and the Netherlands profited too much from the Scottish trade not to be anxious to preserve the most friendly relations. The king could therefore direct his undivided attention to his affairs at home. His great principle, and it was one worthy of so wise a prince, seems to have been a determination to govern the country through the medium of his parliament. Of these convocations of the national legislature, which had been rarely held under the regencies of the two Albanys, no less than thirteen occurred during his brief reign, which, dating from his return in 1424, lasted only thirteen years. It is to him that Scotland owes the first clear recognition of the principle of representation by the election of the commissaries for shires; it was by him that one of the greatest improvements was introduced into the administration of justice, by the institution of a court of law known by the name of the SESSION. Nor was this all. Previously to his time, the laws and the acts of parliament had been published in Latin, and the great majority of the inferior judges to whom their execution was entrusted, were unable to understand them. To remedy this grievance, the king commanded the acts of parliament to be drawn up in the spoken language of the land; an improvement so important, that it forms an era in our legislation. Other points of almost equal interest occupied his attention. By his personal presence in the Highlands, and by the military force which he brought along with him, when he visited those remote districts of his dominions, he introduced laws and order where there had formerly been little else than feudal licence and contempt for all authority. Although he cultivated the arts of peace, he did not forget that its surest preservative was an attention to the military strength of his country. *Weapon-shawings*, or military musters, were held periodically; and having witnessed, when resident in England, and in the war of Henry the Fifth with France, the great superiority of the English over the Scottish archers, he made it his earnest care that his subjects should cultivate this warlike accomplishment. In many of the acts of the various parliaments of this monarch, we can also trace an attention to the encouragement of agriculture, to the interests of foreign trade and domestic manufactures, to the state of his shipping and navy, to the prices of labour, and the melioration of the condition of the labourers of the soil, which clearly demonstrates the high and important objects that occupied the king's mind, although the means he employed were not exactly those which should have suggested themselves to the experience of a more advanced age. Amid these severer duties, James gave an example to his rude barons of the cultivation of intellectual accomplishments. He was himself a poet; and the king's book, or KING'S QUAIR, composed during his captivity in England, is still read by many with delight and enthusiasm. He was a reformer of the language of his country; he composed pieces of music, and sang and accompanied himself on various instruments. It is probable, however, that these employments were rather the solace of his tedious confinement in England, than objects of serious pursuit after his return.

The Session.

Acts of Parliament in the Scottish tongue.

Weapon-shawings.

James a scholar a a poet.

James a sassinate

Feb. 20 1436.

Having so zealously devoted himself to the best interests of his kingdom, James had the satisfaction to see his measures attended with success, and all seemed secure and prosperous, when he suddenly became the victim of a dark conspiracy. Under circumstances of extreme ferocity he was assassinated in the monastery of the Blackfriars at Perth, by Sir Robert Graham, the earl of Athole, and some accomplices who had been dependants of the house of Albany. The court was then at Perth, and James had taken up his residence in the Dominican monastery beside the town. The king was betrayed by his chamberlain, who facilitated the entrance of the conspirators, by removing or damaging the locks of the royal apartments. When the alarm was given, it is said that a lady who waited on the queen, named Catherine Douglas, thrust her arm into the staple of the door, and thus, before it was broken, heroically afforded a brief interval in which the king contrived to conceal himself in a small vaulted chamber, where for some time he evaded discovery. The conspirators, under the idea that he had escaped, had dispersed themselves through the palace, and the unfortunate monarch might have been safe, if he had not prematurely attempted to leave his concealment. The noise which he made recalled one of the ruffians, who shouted to his companions; and springing down into the vault, they threw themselves upon their defenceless victim and murdered him, after a desperate resistance. Although considerable obscurity hangs over the ramifications of the plot which ended thus fatally to the king, there exists no doubt that it owed its origin to indignation at the fate of Albany, and those deep feelings of feudal revenge which had been long cherished by the friends of that unhappy house; affording a terrible lesson to princes of the reaction which may take place, when justice forgets her calmer mood, and pushes her punishments beyond example into revenge.

James a boy of years o A.D. 1

Punish- ment o murder

The death of James the First was a severe calamity to the country, exposing it for the third time since the death of Bruce to all the evils of a long minority. His eldest son, who succeeded to the throne by the title of James the Second, was a boy only six years old; and although the character of the queen-mother was marked by considerable talent and vigour, these qualities were feeble substitutes for the masculine wisdom, the determined courage, and the unwearied care of the husband whom she had lost. Her first duty was the arrest and punishment of his murderers; and this she executed with speedy and immitigable severity. But the death of the king once more gave a licence, and offered to the feudal nobles an opportunity of recovering their power of which they were not slow to avail themselves.

Graham, the principal murderer of the late monarch, in the midst of the cruel tortures which preceded his death, had avowed that the day was at hand when the Scottish nobles would venerate his memory for having rid them of a tyrant; and these proud and powerful barons, when they remembered the magnitude of James's plans, and the stern and sometimes unjust severity with which he carried them into execution, could not but feel that now was the time to recover the privileges which they had lost, and to provide some strong and permanent barrier against all future encroachments of the crown.

General observations.

This observation is the key to the history of the country, not only during the reign of this monarch, but for the next century. It unfortunately happened, that with the exception of James the Fourth, who on his accession was a youth of seventeen, Scotland was visited by a series of minorities in James the Second, James the Third, James the Fifth, and Mary, which occupied the long interval between 1436 and 1560; and during this period of more than a century, the extraordinary increase in the power of the nobles, the diminished respect for the crown, and its proportionate weakness against attack and encroachment, are too prominent features to escape notice. We see events, the same in character, and merely varied in name and minor incidents, occurring during the whole time: a monarch of greater or of less energy, emerging from his minority, and making an effort to recover the power which he had lost; a band of turbulent and selfish nobles leagued against him, and only detached from their brethren, and persuaded to act with the crown, by an appeal to their interest and their fears. These remarks were strikingly exemplified in the scenes which took place during the minority of James the Second.

Minority of ames II.

Immediately after his coronation, a struggle commenced for the possession of the chief power in the government. In a parliament held at Edinburgh, the queen-mother was entrusted with the custody of the young king, while Archibald earl of Douglas and duke of Touraine, was appointed lieutenant-general of the kingdom, a title probably including all the powers of a military governor. In civil matters the chief authority seems to have fallen into the hands of the chancellor Crichton, who had the command of Edinburgh Castle, in which the queen-mother, with the young prince, had taken refuge soon after the murder of her husband. This princess, however, soon found that Crichton turned the possession of the royal person into an engine for his own advancement, and refused to her that frequent intercourse with her son which she had expected, and to which she was entitled.

Having combined therefore with Sir Alexander Livingston, a baron who had been in favour with the late king, she contrived, by stratagem, to possess herself of the person of the young king, whom she shut up in a large wardrobe chest, and carried as her luggage to Leith, from whence she hastened to Stirling Castle, which had been assigned to her as a jointure-house.

eadful e of tland.

The kingdom was now divided between three factions, that of the queen and Livingston, who possessed the person of the king, Sir Alexander Crichton the chancellor, and thirdly, the earl of Douglas, whose immense estates in Scotland, and his foreign wealth and influence as duke of Touraine, rendered him by far the most formidable baron in the country. From this moment to the period when James, having attained majority, began to act for himself, an interval of thirteen years, the history of the nation presents little else than one uniform scene of civil anarchy and of unpunished crime. "The young monarch beheld his kingdom converted into a stage on which his nobles contended for the chief power; whilst his subjects were cruelly oppressed, and he himself handed about, a passive puppet, from the failing grasp of one declining faction, into the more iron tutelage of a more successful party in the state." In this melancholy drama the chief parts were played by Crichton and Livingston, who, deeming it for their interest to crush the overgrown power of the house of Douglas, inveigled the young earl and his brother into the Castle of Edinburgh, brought suddenly against them a charge of treason, and put them to instant death.

A.D.1449. James II. humbles the house of Douglas.

It was fortunate for the country, that when thus torn by domestic factions, its foreign relations were of a pacific character, England, France, and the Netherlands, being all animated with the most friendly dispositions, while the young king, as he advanced from boyhood into maturer years, developed a character of prudence, vigour, and intelligence, which appeared destined to restore a better state of things to his kingdom. Having married the daughter of the duke of Gueldres, he assumed the government, and selected as his principal councillor, Kennedy, bishop of St. Andrews, a prelate of great wisdom and integrity, whose rank as head of the church, invested him with an authority to which the people, amid the general corruption, looked with much reverence and affection. It was probably by his advice, that James, whose passions were naturally violent, and who viewed with indignation the arrogance of the earl of Douglas, engaged in a systematic plan for the reduction of his overgrown power. Without attempting at once, and by any arbitrary exertion of strength, to deprive this potent chief of his high offices, a measure which might have been followed by extreme commotion, he gradually withdrew from him his countenance and employment; surrounded himself by able and energetic councillors, whom he promoted to the principal places of trust; and thus weakened the authority of the proud baron, rather by the formidable counterpoise which he raised against it, than by any act of open aggression. This conduct was attended with the best results. The earl of Douglas, finding his consequence decreasing, and his power on the wane, retired for a while from Scotland, and respect for the character of the monarch increased with the feeling of security derived from an improved administration of the government. During the absence of the chief, James had time to reduce the minor barons who were his dependants, to attach his own friends more powerfully to his interest, and to concentrate a strength, which, on Douglas's return from Italy, convinced him that he must consent to play a second part to his prince. The result was what might easily have been anticipated. A collision took place between this haughty potentate and the young sovereign whose commands he had so often defied. Douglas, naturally rash and fearless, had consented, under a safeconduct bearing the royal signature, to visit James in the Castle of Edinburgh. After the royal feast, the king remonstrated with his guest; disclosed to him the proofs he possessed of his combinations against the government; reproached him for the frequent murders of his subjects committed by his order; and condescended to intreat him to forsake such dangerous courses, assuring him of his pardon and favour. Douglas, instead of embracing the offer, replied to it with haughtiness and insolence; and James, losing all command of himself, and braved to his face, drew his dagger and stabbed him to the heart. Falling at his feet, he was instantly despatched by the nobles, who, hearing the commotion, rushed into the apartment.

A.D.1451

Murder of the Earl of Douglas by James II.

A.D.1452. Defeat of the ninth Earl of Douglas by James II.

This atrocious murder was followed by a struggle between the royal party and the friends and vassals of the unfortunate baron, in which the king was completely successful. Sir James Douglas, who succeeded his brother in the earldom, attempted to brave the monarch, renouncing his allegiance, and throwing himself into the arms of England; but his projects against his country were defeated. He was equally unfortunate in his alliance with the Lord of the Isles, whose naval force he directed against the west of Scotland; and at length, in a fruitless effort to regain his lost power by invading the Merse along with the earl of Northumberland, he was totally routed by the earl of Angus, and driven a landless fugitive into England.

A.D.1460.
Death of James II. at Roxburgh.

The remainder of this reign was employed by the king in an endeavour to complete the work which he had begun; by strengthening the power of the crown, and giving security to the persons and property of his subjects; by attaching to his party the great and influential body of the clergy, carrying into effect various parliamentary enactments for the defence of the borders against the attacks of England, and cultivating the warlike character of his people. Amid these kingly cares, he unwisely suffered himself to be entangled by the contests between the Yorkists and Lancastrians; and having espoused the party of Henry the Sixth, levied an army, and met his death by the bursting of one of his own guns at the siege of Roxburgh. He was succeeded by his son James the Third, a boy in his eighth year.

James III.
A.D.1461.

The death of a sovereign thus cut off in the prime of his manhood and usefulness, leaving an infant successor, would have been a deep calamity at all times, but it was especially so at this moment. James the Second had with uncommon vigour and judgment reduced the overgrown power of his nobles; but he died before his plans were matured, leaving the nation at war with England, the seeds of civil disunion lurking in his kingdom and ready to spring up, and the more northern parts of the realm held by fierce chiefs, who were disposed, on the slightest provocation, to throw off their allegiance. With these island lords, Edward the Fourth entered into a strict alliance; and the banished Douglases, now become English subjects, agreed to assist him in a confederacy, the object of which was nothing less than the conquest and partition of Scotland. It was to be expected that the favour shewn by that country to the expatriated monarch Henry the Sixth, should have deeply incensed his rival; but the facility with which he purchased his instruments, and found them in the ranks of the Scottish nobles, who became the vassals of England, is a mortifying fact.

Energy of the queen-mother.
State of the kingdom.
Death of Mary of Gueldres.
A.D.1463.

From these general remarks it is easy to anticipate the history of this reign, and the scenes which it presented. Into their minuter details it is impossible to enter. For a while the energy of the queen-mother supported the government. On the news of the death of her husband, instead of giving herself up to unavailing grief, she repaired with all speed to the camp before Roxburgh, carrying with her her infant son, now king; him she presented to the nobles, and urged them for him and his father's sake to press forward the siege. She was obeyed, and Roxburgh was taken; but fatal disputes soon succeeded to this success, and it required all the vigour of the queen, with her chief minister, Bishop Kennedy, a man of high character and talent, to struggle against the difficulties which surrounded them. In the northern parts of the kingdom all was unsettled; and the earl of Ross espousing the cause of Edward the Fourth, proclaimed himself king of the Hebrides, while the earl of Angus, on whom, after the fall of the house of Douglas, a large share of their power had devolved, undertook to support the party of Henry the Sixth, contrary to the wishes of the queen and Bishop Kennedy. At this crisis, the young sovereign lost his mother Mary of Gueldres; and, after a few years, Bishop Kennedy followed her to the grave; events which deprived the government of its best, or rather of its only support. Yet amid all these complicated dangers, it is remarkable, that for fifteen years, the interval occupied by the minority of this prince, the affairs of the country were prosperous.

Rise of the house of Boyd.

On the death of Bishop Kennedy, the chief power in the government had fallen into the hands of William Lord Boyd, the high Justiciar, a baron hitherto little known, but whose power rose, in a few years, to a height which almost rivalled that of the once formidable Douglases. He became governor of the king's person; filled every office with his dependants; married his eldest son, who was created earl of Arran, to the king's sister; and acquired so much influence over the young king, rather, it would seem, by terror than by love, that he appeared completely subservient to his wishes. The decay of this family was as sudden as its rise. A marriage had been negociated between the king and Margaret princess of Denmark, and scarcely was it concluded, when a faction of the nobles, at the head of whom was the monarch himself, suddenly attacked the Boyds, arraigned them of high treason, seized and confiscated their large estates, and brought to the scaffold their principal leader. A divorce was instituted against the earl of Arran and his wife, the princess Mary, sister to the king; and she was compelled to give her hand to Lord Hamilton, a favourite of the young monarch. It was through this marriage that the family of Hamilton, which now rose into great power upon the ruin of the Boyds, became, in the subsequent reign of Mary, the nearest heirs to the crown.

Rise of t
house of
Hamilton
A.D.147

James II
attains ma
jority.
State of the kingdom.

James had now attained majority, and in assuming the full administration of the government, he found his kingdom more opulent, more secure, and more powerful, than could have been anticipated from the struggles of his minority. The important isles of Orkney and Zetland had been acquired with the daughter of Denmark; the rich town of Berwick, and the border fortress of Roxburgh, had been occupied by the Scots; the earldom of Ross had been annexed to the crown; the independence and liberty of the Scottish Church established by the erection of St. Andrews into an archbishopric; and, lastly, a marriage treaty with England, by which the youngest daughter of Edward the Fourth was betrothed to the king's eldest son, seemed to promise security and peace in this formidable quarter. If such had already been the success of this reign, it seemed not unreasonable to look forward to still greater prosperity in after years; and yet the history of the country, from the moment when the monarch attained his majority, presents a melancholy contrast to this beginning. This reverse we are inclined to ascribe partly to the personal qualities of the king, partly to some changes in the power and dispositions of the great body of the feudal nobles, which are discernible at this period, not in Scotland only, but in all the feudal kingdoms of Europe.

Characte
of James
III.

Some of our historians have represented James the Third as a compound of indolence, caprice, and imbecility; but their opinion seems rash and unfounded. His character was different from that of the age in which he lived, and in some respects it was far beyond it. The times were rude, warlike, and unintellectual. The king was fond of repose, and addicted to a seclusion in which he might devote himself to pursuits which bespoke a refined and cultivated mind: a passion for mathematics, and the study of judicial astrology, a taste for architecture, a love for the science and practice of music, and a generous disposition to patronize the professors of literature and philosophy, rather than to surround himself with a crowd of fierce retainers, were the prominent features in the mind of this unfortunate prince; tastes which have been reprobated by contemporary historians, but which, if duly regulated, were rather praiseworthy than the contrary. Unfortunately, however, this due regulation was wanting. James had the weakness, not only to patronize, but to confer feudal rank, and distinctions, hitherto appropriated to the nobles, upon the professors of his favourite studies. Architects, musicians, painters, and astrologers, were admitted to the familiar converse of the sovereign, while the highest nobles found a cold reception or a positive denial of access. Is it any subject of surprise, that a fierce nobility should have been disgusted with such conduct, and that the king's warlike brothers, the earls of Albany and Mar, should have been regarded as the chief support of the state?

James III.

General remarks on the feudal nobility of Europe.

But in studying the history of this reign, we shall detect other causes of the sanguinary scenes in which it concluded. Not only were the feudal nobility of Scotland induced by the neglect and favouritism of the king to long for a change, but it is worthy of remark, that for some time previous to this period, the feudal nobility of Europe had been in a state of extraordinary commotion and tumult; and events had occurred which diminished in the eyes of the aristocracy and of the people the respect entertained for the throne. The revolution in England under Henry the Fourth, the subsequent history of that kingdom during the contest between the houses of York and Lancaster, the political struggles in France under Louis the Eleventh, the relative condition of the greater nobles in Germany and of the rights of the imperial crown under the emperor Sigismund, the dissensions which divided the Netherlands, and the civil factions which agitated the government in Spain, all combined to render resistance so common, and so lucrative in the eyes of the feudal nobility in Europe, that its frequency can be a subject of little wonder; and if, when we take into account the frequent communication between Scotland and the continent during the period of these commotions, we may easily imagine their effect upon the still ruder and more independent nobility of that country. We have been tempted to throw out these general observations, because the reign of James the Third is in one respect most remarkable. It is the era from which we may date the rise of a republican spirit, and the first propagation of those popular principles, of which the operation can be traced, in a greater or less degree, through the whole course of its subsequent history.

Contest of James III. with his brothers, Albany and Mar. A.D. 1479–1480.

To return from such remarks to the events of this reign, we find the king engaged in a contest with his two powerful brothers, Albany and Mar. To the first had been entrusted the wardenship of the east marches, the government of Berwick, and the castle of Dunbar, the principal key of the kingdom; and there seems no doubt that he had abused his high powers to an extent which bordered upon treason. Against Mar was brought a still more atrocious charge. He had plotted, it was said, to cause the king's death by magical arts; and being convicted by the evidence of his wizard accomplices, was imprisoned, and, according to one account, secretly executed. Another story ascribes his death to the consequences of a fever, for which having a vein opened, he in an excess of phrensy tore off his bandages and bled to death. Against Albany the king proceeded with unusual vigour. He attacked him in Dunbar, made himself master of the fortress, and would have seized his person, but the rebellious prince availed himself of the situation of the castle, which was open to the sea, and fled first to England, and afterwards to France.

War with England. A.D. 1480.

At this moment, Louis the Eleventh was at war with Edward the Fourth, and he unfortunately possessed such influence over the Scottish king, that he brought about a rupture between James and Edward. It was a step signally impolitic. Albany, the king's brother, returning from France, threw himself into the arms of England; the nobility were full of complaints against the government; the Lord of the Isles embraced the interests of Edward; and after a long interval of peace had softened the national animosity between the kingdoms, it was a miserable sight once more to witness the renewal of hostilities.

This contest led to some extraordinary scenes. Albany having openly avowed his purpose to dethrone his brother, assumed the title of Alexander king of Scotland, and entered into a treaty with Edward, by which he basely consented to sacrifice the independence and dismember some of the finest portions of the kingdom. To effect his designs, he had the address not only to secure the co-operation of the banished earl of Douglas, with the Lord of the Isles and his northern vassals, but he detached from James's service Angus, Gray, Huntly, Lennox, and many others of the leading nobility in Scotland. A conspiracy was formed against the monarch and his favourites; the conjuncture of his assembling his army, preparatory to his invasion of England, was deemed the most favourable moment for the execution of their purpose; and in the camp at Lauder its success was equally sudden and terrible. The nobles, led by Angus, seized Cochrane, James's favourite, who, from a mean station, had been promoted to high rank and enriched with the earldom of Mar; they then broke into the king's tent, made him prisoner, arrested the band of ignoble associates who shared his confidence, and proceeded to inflict summary vengeance on them all. Cochrane was hanged over the bridge of Lauder; Rogers, a musician, Hommel, Leonard, Preston and others, shared his fate; and the unfortunate monarch, having been conveyed to the capital, was shut up in the castle of Edinburgh. The result of this success was what might have been expected. Albany, who all along had acted from motives of personal ambition, having once possessed himself of the king's person, ruled the government at his will.

James III. A.D. 1482. Conspiracy against the king.

Base conduct of Albany.

But usurpation of the supreme power was not the full extent of his treachery. He attached Edward the Fourth to his service by the sacrifice of the national independence. In a secret treaty, the English prince engaged to assist Albany, who hitherto had only assumed the title of lieutenant-general of the kingdom, in placing the crown on his own head; and as the base price of this assistance, the new king and his nobles agreed to withdraw their oaths from king James, and to live under the sole allegiance of the king of England. It may give us some idea of the low estate to which the nobles of Scotland had fallen, when we mention, that not only the earl of Douglas, now banished and living in England, but the earls of Angus, Buchan, Athole, and many others, were willing parties to this wanton sacrifice of their country.

A.D. 1482.

Party against Albany.

The plot, however, was defeated, and happily a party yet remained among the nobles, who, though their vengeance had been directed against the king's favourites, were friends to the crown and to the country. They had joined Albany with the object of sacrificing Cochrane and his associates, but had been kept in ignorance of his ultimate intentions; and the moment these became apparent, they united with the king and overwhelmed the opposite faction. And here, in the manner in which Albany was treated, is to be found the cause of all the subsequent misfortunes of the king. His brother deserved punishment, and ought to have met with no pity. He had been guilty of open and repeated treasons, had levied war against his prince; and imprisoned his royal person, leagued himself with his enemies, sold the independence of his country, and assumed the title of king. His guilt and ambition had seduced from their allegiance a large party of the nobles; and if ever there was a time in which a great example was to be made, that time was now come. Yet, instead of this wholesome severity, the duke of Albany was treated with a lenity for which it is impossible to account. On acknowledging his manifold treasons, and laying down his office of lieutenant-general, he not only received a full pardon, but was permitted to retain not only his vast estates, but his wardenship of the marches, and was simply interdicted from coming within six miles of the court, or continuing his illegal combination with Angus, Athole, and Buchan.

Impolitic lenity to Albany. A.D. 1482.

A.D. 1483. Renewed rebellion of Albany.

Whether we are to ascribe this misplaced mercy to the king's attachment to his brother, or to a suspicion that he was not strong enough to inflict a more exemplary punishment, it is difficult to decide; but the result demonstrated what has been so often taught, the folly of a misplaced lenity. In a few weeks Albany was again in rebellion. At his invitation, an English army invaded Scotland; Dunbar, the most important castle in the kingdom, as the key of the eastern borders, was delivered up by this base person to the enemy, while he himself fled into England, and organized with Edward the Fourth the plan of a more formidable invasion. At this crisis occurred the death of the English monarch, and the seizure of the crown by Richard the Third; events which gave James an interval of rest, in which he acted with unusual firmness and energy. He assembled a parliament at Edinburgh, in which the sentence of forfeiture was pronounced against the duke of Albany and all his adherents; he entered into an intimate alliance with Charles the Eighth of France, and he concluded a truce with Richard the Third, who was too much occupied with his own complicated affairs, to have leisure or inclination to continue the war with Scotland. Thus strengthened, the king found it no difficult matter to resist the last effort of Albany and Douglas, who having once more invaded Scotland at the head of a small force, were completely defeated at Lochmaben; an event followed not long after by the death of Douglas, in the abbey of Lindores, where he had been confined, and of Albany, who was slain in a tournament in France.

Final defeat of Albany.
A.D.1483.

The Scottish nobles renew their intrigues against James.

It might have been expected that James, who was thus delivered from his most powerful enemies, would have been permitted to reign in peace. But he was destined to be unfortunate; and, although his nobles had refused to alter the succession in favour of his ambitious brother, they soon after appear to have entered into intrigues with England for the purpose of placing the crown on the head of his son, the prince of Scotland, who was then a youth in his sixteenth year. Much obscurity hangs over the origin of this conspiracy. Advances seem first to have been made by the faction of the prince to Richard the Third, who, although he was animated by an anxious desire to remain at peace with Scotland, did not scruple to hold out secret encouragement to James's enemies. To what extent such secret negociations proceeded, it is not easy to discover; but after the death of Richard they were renewed, and his successor, Henry the Seventh, showed as little scruple as his predecessor in encouraging the malcontents.

Causes of the conspiracy against the king.

Five years had now elapsed since the death of Cochrane the king's favourite, and the dreadful scenes exhibited in the camp at Lauder. Since that time a change appears to have taken place in James's character. His devotion to study and retirement had given way to a sense of duty; he had exhibited not only capacity for government, but unwonted resolution in the attack and discomfiture of his enemies; and, although the impolitic lenity with which he had treated Albany was rather a weakness than a virtue, it was believed that he was now convinced of his error, and had resolved that the laws against treason should no longer slumber or be despised. These reflections filled the barons who had been conspirators at Lauder with the greatest alarm. They were well aware that a sentence of treason hung over their heads. They knew themselves guilty of aggravated offences; they had imprisoned the king, usurped the government, and without regular trial or conviction, had put his favourites and councillors to death. As long as the chief power had remained in their own hands, they felt tolerably secure, but circumstances had once more restored the king to his wonted authority; and the dread of the retaliation which might be inflicted, with the certainty that, at all events, their power would be abridged, appears once more to have driven them into rebellion. Such at least seems to be the most probable way of accounting for the rise of that conspiracy in which this unfortunate prince lost his crown and his life. The worst feature in the story is the unworthy part acted in it by his son, afterwards James the Fourth, over whom the malcontent barons gained a fatal influence, and who, seduced by the prospect of a crown, lent himself a tool to the dethronement of his father. When once organized, the plot proceeded to its maturity, and thence hurried on to its catastrophe with an appalling rapidity.

A.D.14
Collisi
between
the two
parties.

The two parties of the king and the conspirators first tried their mutual strength in a Parliament. It was proposed by the popular faction that an amicable adjustment of all disputes should take place between themselves and the sovereign, and that such barons as were still obnoxious to a charge of treason, should receive a full pardon. To this the party of the king peremptorily refused their consent. James, aware of the unworthy conduct of his son, the heir apparent, created his second son duke of Ormond, and seemed to point him out as his successor. He at the same time rewarded the principal barons who had espoused his interest, and took decisive measures, by the appointment of vigorous officers, to have the laws against treason severely administered. These steps convinced his opponents that their proceedings had been discovered; and without giving the monarch time to assemble an army, or even take measures for his personal defence, they threw off the mask, broke out into open rebellion, declared that James the Third, by his crimes and oppressions, had forfeited all title to the throne, and proclaimed his son, by the title of James the Fourth.

Even now, had not the king suffered himself to be misled by his paternal feelings, the conflict might have concluded in his favour; for it is evident that a large class of the nobility, and the whole body of the people, were against these nefarious proceedings. So strong was this feeling, that James, who, on the advance of the rebels to the capital, had taken refuge in the northern part of his kingdom, soon found himself at the head of a formidable army, and advanced instantly against the insurgents, whom he found stationed at Blackness, near Linlithgow.

A.D.14
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It was now the time for action, the time for a determined execution of those laws which late years had seen so constantly treated with contempt. But whether the affectionate heart of the monarch sickened at the sight of his subjects in mortal array against each other, or some symptoms of disaffection breaking out in his own force rendered him apprehensive of their fidelity, James not only consented to an accommodation, but offered terms to the prince and his associates, which were culpably lenient. He permitted the son who had usurped his kingly name and prerogative, and the subjects who had defied the authority of the crown and the laws, to negociate with arms in their hands on a footing of equality. On the part of the misguided prince, now no longer a boy, no petition for forgiveness, no expression of penitence was suffered to escape. In the pacification at Blackness, the youth spoke throughout, not as a son conscious that he had offended, but as a sovereign transacting a treaty with his equal. The treaty, in truth, was a triumph to the discontented nobles. The prince and his friends who had encouraged him to resistance, agreed to become obedient subjects on receiving the king's forgiveness, while the monarch not only consented that their lives, honours, and estates, should be preserved, but that the household of the heir apparent should be maintained, and his friends and adherents supported with due dignity. It required little penetration to foresee that the tranquillity which was established on such a foundation could not long subsist. It was a confession of weakness pronounced at a time when firmness at least, if not severity, was the only guide to the permanent settlement of the convulsions which agitated the kingdom.

Treaty o
Blacknes

Renewed
rebellion
the princ
and his
party.

The consequences which any person of ordinary judgment might have anticipated, were not long of occurring. James retired to his capital, his army was dismissed, the northern barons, whose valour had saved his crown, were permitted to return to their estates, and James, anticipating a continuance of tranquillity, proceeded to reward his friends and re-organize his court, when he received intelligence that his son the prince, with the same fierce barons who had so lately sworn allegiance, were again in arms, and in more formidable numbers than before. In this emergency, indeed, the king acted with courage and promptitude; but having disbanded the strongest division of his army, which consisted of his northern barons and their vassals, the force which he mustered was much inferior to that of his opponents. It was therefore determined to await in the capital the arrival of the northern barons; but unfortunately this resolution was abandoned, and the monarch with inferior numbers, attacked the insurgents, who were commanded by the prince his son, at Sauchy Burn, within a mile of Bannockburn. The consequences proved most calamitous. The royal forces, after an obstinate struggle, gave way to their opponents; and James, flying from the field, was murdered by an unknown hand, at a little hamlet called Miltown, a few miles distant from the field of battle. He perished in the prime of life, and it is said his youthful successor was seized with overwhelming remorse on being informed of the miserable fate of his father. However this may be, he was immediately proclaimed king, and the homage of his barons, the early possession of a sceptre, and the lustre of a court, soon stifled his repentant feelings.

Defeat and death of James III. at Sauchy. A.D.1488.

James IV. proclaimed king.

Character of James III.

The character of James the Third has been represented by Boyce, Buchanan, and those writers who have been contented to follow their authority, as a compound of weakness, wilfulness, and crime; a character contradicted by the history of his reign. It must indeed be admitted, that James's indulgent treatment of his rebellious subjects, and of the prince his son, partook of weakness, although there are few father's hearts in which he will not find an advocate; but in other respects the best refutation of the ideal pictures of Buchanan is to be found in the real history of the reign. James's misfortunes are, in truth, to be attributed more to the extraordinary circumstances of the times in which he lived, than to any flagrant vices or defects in the monarch himself. At this period, in almost every kingdom in Europe with which Scotland was connected, the power of the great feudal nobles, and that of the sovereign, had been arrayed in jealous hostility against each other. The time appeared to have arrived when both parties seemed convinced that they were on the confines of a great change; that the power of the throne must either sink under the superior strength of the greater nobles, or the independence and tyranny of these feudal tyrants receive a blow from which it would not be easy for them to recover. In the different countries of Europe indeed, the result was not uniform, but in all the same elements of faction were seen arrayed against each other. Thus, in France, the struggle under Louis the Eleventh had terminated in favour of the crown; yet the lesson to be derived from it was not lost upon the Scottish nobility, who were in constant communication with this country. In Flanders and the states of Holland, they had before them the spectacle of an independent prince deposed and imprisoned by his son; and in Germany the reign of Frederic the Third, who was contemporary with James the Third of Scotland, presented one constant scene of struggle between the emperor and his nobility, in which this capricious potentate was uniformly defeated.

General observations.

There is yet one other observation to be made upon this remarkable revolution, by which, for the first time in Scottish history, a king was solemnly deposed by a faction of his own subjects. Although the barons who led the successful faction represented themselves as the friends of liberty, driven to a resistance of royal oppression, the middle classes and the body of the people took no share in the struggle. Many individuals belonging to these classes, who were feudal vassals of the great lords, must no doubt have been compelled to serve under them; but as far as they were represented by the commissaries of burghs who sat in Parliament, they appear in this struggle to have joined the party of the sovereign and the clergy, by whom, during this reign, frequent efforts were made to introduce a more effectual administration of justice, and a greater respect for property and the rights of individuals.

Laws, mingled with alternate threats and exhortations, are to be found upon these subjects in the records of each successive Parliament of this reign; but the offenders continued refractory, and these offenders were the very men, whose offices, if conscientiously administered, ought to have secured the rights of the great body of the people. It was the nobles who were the justiciars, chancellors, chamberlains, sheriffs; and these, it was well known, were often the worst oppressors, partial and venal in their administration of justice, severe in exacting obedience, and opposed to every right which interfered with their own power. Their privileges as feudal nobles came repeatedly into direct collision with their duties as servants of the government, and they made no scruple to sacrifice the last to the preservation of the first; duty to privilege and self-interest. It is from this cause that we discern an honourable distinction between the clergy and the feudal nobles, in the struggle between the crown and the faction by which it was attacked. In this contest, wherever the greater offices in the government were in the hands of the clergy, it will be found that they generally supported the sovereign; when they were entrusted to the nobility they almost uniformly combined against him.

James IV. succeeds to the throne.

When James the Fourth succeeded to the throne left vacant by the murder of his father, he was in his seventeenth year; but his character at that early age had vigorously developed itself, and although it has sometimes been asserted, there is no reason to believe that the prince had been an unwilling assistant, or a passive tool in the hands of the conspirators. Their first care was to hold at Scone the ceremony of the coronation; their next to conclude a three years' truce with England, then under the government of Henry the Seventh; their third, to assemble a Parliament and provide for their own safety, by the forfeiture of their enemies and the rewards distributed to their friends.

Artful conduct of the nobles.

And here it is not unimportant to mark the course which they artfully pursued. If any party in the state were at this time liable to a charge of treason, it was evidently the friends of the young king, and not the barons who had continued faithful to his father; but the difference consisted in this, that the treason of the prince's party had been accompanied with success, whereas the resistance of the friends of his father had been overwhelmed, and himself dethroned and murdered. They who now were in possession of the supreme power, therefore boldly turned the tables, summoned their opponents on a charge of treason, and as the facts were notorious, pronounced sentence against them. They next voted their own acquittal in strong and significant terms; and considering under whose dictation the act was drawn up, it is difficult to read, without a smile, the compliments pronounced upon their treason, when they declare that their sovereign lord, and his *true* barons, who served with him in the field, were innocent of the late battle and pursuit, and had no blame in exciting the disturbances which had terminated so fatally.

A.D. 1489

The innocence of these barons was however far from being generally admitted; and the Parliament had scarcely risen, when Lennox, Huntly, Marischal, and other powerful chiefs, rose in arms to avenge the death of their king. Lord Forbes, who had joined them, marched through the country, bearing the bloody shirt of the unfortunate prince suspended from a spear; and had it not been for the promptitude with which their opponents met the enterprise, the movements of Lennox, who advanced upon Stirling, might have delivered the country from their domination. But this chief, betrayed by some of his followers, was surprised and completely routed by Lord Drummond at Fallamoss; Dunbarton, Lennox's strongest hold, surrendered, and the defeat added new strength to the young king and his friends.

Character of James IV.

Tranquillity being restored, James, as he approached manhood, exhibited signs of considerable ability, and energy in following up his purposes. Amid a love of pleasure, which had never been restrained by early discipline, and often hurried him into foolish and criminal excesses, he did not so far forget himself as to neglect his higher duties. He cultivated amicable relations with England, renewed the league with France, entered into a commercial alliance with Denmark, and in a Parliament held in the capital, directed his earnest endeavours to the establishment of good order, and the administration of equal justice throughout the kingdom. Happily the character of Henry the Seventh, his caution, sagacity, command of temper, and earnest desire for peace, were well calculated to check the ardour and impetuosity of the Scottish prince; and for twenty years, with the exception of a brief effort made by James in favour of Perkin Warbeck, the country enjoyed the blessing of repose.

Twenty years' peace.

Occupations of the king.

This interval was wisely occupied by the monarch in reducing the northern portion of his dominions to obedience, and in an attempt, by the frequent convocation of his parliament, to promulgate useful laws, and, which proved a more difficult task, enforce their observance. It was evident, that as the king grew older, he became convinced of the fatal errors of his early years, and upbraided himself for having lent himself to a selfish and unprincipled faction, who, unless he consulted their wishes and gratified their ambition, might be disposed to treat him as they had treated his father. Aware that they were too powerful to be quelled, he prudently adopted a safer course, by gradually recalling to confidence and power the friends and ministers of his father. Among these, one of the ablest was Andrew Wood of Largo. This remarkable man, whose genius for naval adventure was combined with a powerful intellect in civil affairs, rose by degrees to be one of James's most confidential servants, and appears to have been almost exclusively trusted in his financial concerns. We find in him many qualities apparently inconsistent, when judged by modern notions. He was originally nothing more than an enterprising merchant; but at this time all merchant ships were armed, and generally acted on an emergency as ships of war. Wood, therefore, in the course of a life devoted to mercantile and commercial adventure, had become a skilful naval commander; and in the commencement of this reign, when the English privateers infested the narrow seas and attacked the Scottish shipping, had signalised himself by the capture of five vessels, and the subsequent defeat of a second squadron, commanded by Stephen Bull a London merchant. These successes endeared him to the king, who had a passion for naval enterprise, and lost no opportunity of encouraging such a taste in his nobles. The advice of such a councillor as Wood, was of essential service to James. His travels in different countries had enlarged his mind, and made him ready to adopt their improvements in various points in which Scotland was behind her neighbours. He had been an affectionate servant of the late king; and to his advice we are perhaps to trace the coldness and severity with which James now began to treat some of the leaders in the late rebellion. Yet, while the monarch endeavoured to keep their power in check, he showed his prudence in abstaining from such severe measures as might have driven them into open opposition; and combining firmness with gentleness, he contrived to reconcile the opposite factions among his nobles, and to maintain his own authority over them all.

James IV. recalls his father's councillors.

Andrew Wood of Largo.

A.D.1489.

State of the Highlan

In the midst of these cares, the state of the Highlands occupied his special attention, and the principles of his policy were certainly wise and salutary. He endeavoured by every means in his power to attach to his interests the principal chiefs of these remote districts; he contrived, through them, to overawe and subdue the petty island princes who affected independence; he carried into their territories, which had been hitherto too exclusively governed by their own capricious and often tyrannical institutions, a more regular and rapid administration of civil and criminal justice, making them obedient to the same laws which regulated his lowland dominions; and lastly, he repeatedly visited the Highlands in person. In 1490, on two different occasions, the king rode from Perth across the "Mount," a term applied to the chain of mountains which extends from the Mearns to the head of Loch Rannoch, accompanied by his chief lords and councillors. In 1493, he twice penetrated into the Highlands, and in the succeeding year thrice visited the isles.

A.D.14

A.D.14

James's voyage the Hig lands in 1494.

One of these voyages, undertaken in 1494, during the spring months, was conducted with great state. He was accompanied by his chief ministers, his household, and a considerable fleet, many of the vessels composing which were fitted out by the nobles at their own expense. The pomp of the armament was well calculated to impress upon such wild districts an idea of the wealth and military power of the prince; while the rapidity of his progress, the success with which he punished all who braved his power, his generosity to those who sued for mercy, his familiarity with the lower classes of his subjects, and his own gay manners, increased his popularity, and confirmed the ties of allegiance. On arriving in this voyage at Tarbert in Kentire, James repaired the fort originally built there by Bruce, established an emporium for his shipping, transported thither his artillery, and by such wise and energetic precautions, ensured peace to districts which formerly had derided the royal vengeance. The chiefs, aware that the king could carry hostilities at a short warning into the heart of their territories, submitted to a force which it would have been vain to resist. One only, the Lord of the Isles, had the folly to defy the royal vengeance, and soon repented his temerity. He was summoned to take his trial for treason, pronounced guilty, stripped of his almost regal power, and his lands and possessions forfeited to the crown.

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Perkin Warbeck in Scotland. A.D.14

We must now advert for a moment to a singular episode in the history of the country. Perkin Warbeck, whose mysterious story still offers some field for historical scepticism, after his first unsuccessful attempt upon the English crown, took refuge in Scotland in the year 1495. There seems strong ground for suspecting that James, at the request of the duchess of Burgundy, had embraced the interests of this adventurer at a much earlier period than is generally suspected; but whether he really believed him to be the prince whose name he assumed, or whether he was induced to espouse his cause as a means of weakening England, is not easily discoverable. It is certain, however, that in 1494, the Scottish king had projected an invasion of England in favour of the duke of York, and that the plan miscarried by the treachery of Perkin's friends.

James invades En land wit Warbeck

On the arrival of the mysterious stranger at his court, James at once received him with royal honours, gave him in marriage a lady connected with the royal family,[1] collected an army, and, attended by Warbeck, invaded Northumberland. But the proceeding was rash and impolitic; and its author found, within a short time, that the cause of Perkin was unpopular in England, and the war unacceptable to his own subjects. So deep was the national antipathy between the two nations, that the English no sooner saw the claimant of the crown invading their country at the head of a Scottish force, than they suddenly cooled in

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[1] Catherine Gordon, the daughter of the Earl of Huntly.

D.1497. rkin ves otland.

their enthusiasm; and the desolating fury with which James conducted hostilities, supported by a body of foreign mercenaries, completed their disgust. It was evident to the king that Henry the Seventh held his crown by a tenure too firm to be shaken by so feeble a hand as Perkin's; and having drawn back his army, he soon after concluded a truce with England, and refusing to deliver him to Henry, took measures for his quiet and amicable retreat from his dominions.

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These negotiations having been concluded, James had leisure to attend to his affairs at home. He was aware that the chief errors of his father's reign were to be traced to his neglect of the great body of his nobility. To reign without their cordial co-operation was impossible, as long as Scotland remained a feudal kingdom; and it was happy for this prince that the course of conduct which his own disposition prompted him to pursue, was the best calculated to render him a favourite with this influential body. Under the reign of his father the nobles had little intercourse with their prince. They lived in gloomy independence at a distance from court, resorted thither only on occasions of state or counsel; and when parliament was ended, or the emergency had passed away, they returned to their castles full of complaints against a system which made them strangers to their sovereign and ciphers in the government.

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All this was happily changed under the present monarch. Affable in his manners, a lover of magnificence, and a still greater lover of mirth and pleasure, the prince delighted to see himself encircled by a splendid nobility. He bestowed upon his highest barons those offices in his household which ensured their attendance upon his person; his court became a scene of perpetual amusement, in which his nobles laboured to surpass each other in extravagance and revelry; and while they impoverished themselves, they became more dependent upon the sovereign. In this manner the seclusion of their own castles became irksome to them; as their residence on their estates was less frequent, the ties which bound their vassals to their service were loosened; and the consequences proved in every way favourable to the royal authority.

e of navy.

James now turned his principal attention to his navy. It is well known that at this moment the maritime enterprises of the Portuguese, and the discoveries of Columbus, had created a wonderful sensation throughout Europe. Even the cautious and calculating spirit of Henry the Seventh had caught fire at the triumphs of naval enterprise; and an expedition which sailed from England under the command of John Cabot, a Venetian merchant, and his son Sebastian, was rewarded by the discovery of North America. These successes roused the adventurous spirit of the Scottish king, and as Scotland had hitherto been deficient in any thing approaching to a navy, he became eager to supply the want, and maintain his place with other continental kingdoms. With this view, he paid great attention to his fisheries, and to foreign commerce, the best nurseries of seamen; and those enterprising merchants and hardy mariners who had hitherto speculated solely on their own capital, found themselves encouraged by the king and the government..

T king en r- ag his fi ies, hi vy, an is co erce.

In a former parliament, complaints had been made of the want of boats to be employed in the fisheries, and of the wealth lost to the country from the few ships to be found in its sea-ports. It was now provided, that vessels of twenty tons and upwards, should be built in all the principal seaports, and that all stout vagrants found in these districts should be impressed, and compelled to learn the trade of mariners. Among his merchants and private traders were many men of ability, whom the king treated with favour. He exhorted them to extend their voyages, to arm their trading ships, to import artillery, and to build ships of force at home. Nor was this all. He studied the subject of his navy, and made himself personally familiar with its details; he practised gunnery, embarked in little experimental voyages, conversed with his mariners, and visited familiarly at the houses of his merchants and sea officers, by whom his fame was carried to foreign countries. All this was useful. The best foreign artizans being sure of a generous reception, flocked to Scotland from France, Italy, and the Low Countries; and if the king's credulity sometimes encouraged impostors, his enthusiasm also collected round him men of real knowledge and experience.

University of Aberdeen founded A.D. 1494.

While we advert to these laudable exertions of the king, the labours of an enlightened prelate for the dissemination of useful learning, ought not to be passed over. Scotland, at this period, possessed only two universities, St. Andrews, founded in the beginning of the fifteenth century, and Glasgow, founded in 1453. To these Elphinstone, bishop of Aberdeen, now added a third. The papal bull was issued in 1494, but the buildings of King's College were not completed till about the year 1500. It supported professors of divinity, of the civil and canon law, of medicine, and of classical literature, in which its first principal, Hector Boece or Boyce, was no contemptible proficient. Soon after this, James married the princess Margaret of England, daughter of Henry the Seventh; a wise and politic alliance, although in the marriage treaty the diplomatic skill and penurious habits of her father seemed to have gained a victory over the Scottish commissioners.

Marriage of the king, A.D. 1502.

Northern rebellion, A.D. 1505, 1506.

From the public rejoicings that followed his nuptials, the king was called to repress a rebellion in the north, which appears to have been excited by an imprudent alteration in the policy hitherto pursued in these quarters. This had led to a confederation of the Highland chiefs, who determined to reinstate in his insular sovereignty the grandson of the last lord of the Isles; and so deep was the discontent, that it required the utmost efforts of the prince to restore these remote districts to tranquillity. In this he at last succeeded, divided them into new sheriffdoms, repaired and garrisoned the castles in the hands of the crown, and sent Wood and Barton, two of his best officers, with a small squadron to co-operate with Arran, his lieutenant-general, in reducing the insurgent chiefs. Having adopted these measures, which were soon followed by the complete re-establishment of tranquillity, James, at the head of a considerable force, visited the border districts, and, assisted by Lord Dacre, the English warden, compelled the Armstrongs, Jardines, and other powerful septs, to forsake their habits of plunder, and respect the laws. He then proceeded by negotiations to strengthen his pacific relations with France, and the Netherlands; while he prudently resisted the solicitations of Pope Julius the Second, who endeavoured to detach him from his alliance with Louis, and to induce him to join the emperor and the Venetians in their attempt to check the successes of the French in Italy.

A.D. 1509 Henry VIII. succeeds to the English throne.

Not long after this, occurred the death of Henry the Seventh, an event unfavourable to Scotland. The proud, capricious, and tyrannical character of his son and successor Henry the Eighth, rendered him little qualified to respect or preserve the pacific relations with that country, which had been wisely cultivated by his father; and it soon appeared that the Scottish prince, a spirited monarch, jealous of his own dignity, and little accustomed to dictation, was not disposed to submit to it from his brother-in-law.

Quarrel between James IV. and Henry.

Matters proceeded smoothly for some time; but when Henry the Eighth engaged in war with France, the ancient ally of Scotland, James at once warmly espoused the party of Louis, and although against the best interests of his kingdom, suffered himself to be drawn into the quarrel. The history of the war is well known. Julius the Second having, in conjunction with Ferdinand of Spain, gained all he wished, by the league of Cambray, became alarmed at the progress of the French in Italy, and to check their arms, prevailed upon Henry the Eighth, whose imagination had lately been dazzled by dreams of Edward the Third and Henry the Fifth, to invade France. Louis, on the other hand, negotiated with James the Fourth, and to embarrass the king of England, induced him to declare war against Henry the Eighth. It was a fatal resolution; but the Scottish prince was beloved by his people, and so popular with the great body of his nobles, that his appeal to arms was answered by the muster of one of the most numerous and best equipped armies, and one of the most formidable fleets ever fitted out by the country.

The Scot. fleet dispersed

The fleet amounted to twenty-three sail, of which thirteen were large ships, the rest small armed craft. Of this armament the destination was Ireland, but its command was entrusted to the earl of Arran, an officer of no experience in naval affairs; and the result was its total dispersion and discomfiture. The land army, on the other hand, which was led by the king in person, amounted to a force little short of a hundred thousand strong, with which James invaded England, and after some slight successes, encamped in a strong position on the hill or rising ground of Floddon, one of the last and lowest eminences which detach themselves from the range of the Cheviots. It was a strong position, impregnable on each flank, and in front defended by the Till, a deep and sluggish stream, which is tributary to the Tweed.

Defeat of the Scottish army at Floddon, 9th Sept. A.D. 1513.

Henry the Eighth, before passing with his army into France, had entrusted the defence of his kingdom to the earl of Surrey, a brave and experienced officer, who lost no time in collecting a force with which, although it did not amount to half the number of the Scots, he did not hesitate to march against the king. But what he wanted in numbers, Surrey supplied by military experience and coolness; while James, blind, obstinate, and attending only to the dictates of his personal courage, threw away his advantages both of numbers and position. The result was one of the most calamitous defeats ever experienced before or since by Scotland. Surrey was permitted by the king to cross the Till in the face of his army. Contrary to the remonstrances of his veteran officers, he would suffer no one to attack him; although the moment was so favourable that, if Angus, Lindsay, and Huntly had been allowed to charge with their men, nothing less than a miracle could have saved the English earl. To the entreaties of Borthwick, the master of his artillery, he was equally obstinate. Had the guns been brought to bear upon the enemy when crossing the bridge of the Till, they must either have been beaten back or thrown into such disorder as would have exposed them to immediate rout; but this too the king would not suffer. With amazing folly he renounced the use of his artillery, that arm of war which, with so great care and expense, he had strengthened or rather created, at the very moment it became serviceable, and might have saved himself and his army. What James's motive was in this, unless the indulgence of some idle chivalrous punctilio, it is impossible to discover; but its consequences were grievous. Surrey completed his arrangements, passed the ford and the bridge, marshalled his army at leisure, and placing his entire line between James and his country, advanced by an easy ascent upon the rear of the Scottish army. Upon this the king set fire to the huts and temporary booths of his encampment, and descended the hill with the object of preoccupying an eminence on which the village of Branksome is built. His army was divided into five battles, some of which had assumed the form of squares, some of wedges, all being drawn up in a line about a bow-shot distance from each other. The enemy were divided into two battles, each of which had two wings. The English van was led by lord Thomas and lord Edmund Howard, Surrey himself commanded the centre of the host, Sir Edward Stanley and lord Dacre the rear and the reserve. On the side of the Scots, Huntly and Hume led the advance, the king the centre, and the earls of Lennox and Argyll the rear. The battle commenced at four in the afternoon, and after an obstinate contest, which continued till nightfall, concluded in the total defeat of the Scots. Among the slain was the king himself, who, surrounded by a circle of his nobles, had fought with desperate courage, besides thirteen earls, and fifteen lords and chiefs of clans. The loss of common soldiers was estimated at ten thousand men. Of the gentry it is impossible to say how many were slain. Scarcely a family of note could say that they had not lost one or more relatives, while some had to lament the death of all their sons. Whether we regard this miserable slaughter of the sovereign with the flower of his nobility and country, or look to the long and sickening train of national calamities which it entailed upon the kingdom, it is not too much to pronounce the battle of Floddon the greatest national misfortune ever endured by Scotland.

Charac
of Jame
IV.

The character of the unfortunate monarch who thus perished in the prime of life, for James had not completed his forty-second year, was marked by very contradictory qualities. Although devoted to his pleasures, wilful, and impetuous, he was energetic and indefatigable in the administration of justice, a patron of all the useful arts, and laudably zealous for the introduction of law and order into the remotest parts of his dominions. The commerce and the agriculture of the country, the means of increasing the national security, the navy, the fisheries, the manufactures, were all subjects of interest to him; and his genuine kindness of heart, and accessibility to the lowest classes of his subjects, rendered him deservedly beloved. Yet he plunged needlessly into all the miseries of war, and his thirst for individual honour, and an obstinate adherence to his own judgment, led to the sacrifice of his army and his life, and once more exposed the kingdom to the complicated evils of a minority.

Coronat
of Jame
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A.D. 1

The news of defeat always flies rapidly, and the full extent of the national calamity soon became known in the capital, which was seized with the utmost sorrow and terror. The magistrates, with the forces of the borough, had joined the king's army, and many of them shared his fate; but the merchants, to whom their powers had been deputed, acted with much firmness and spirit. They armed the townsmen, published a proclamation, enjoining the women who were seen waiting in the streets to cease their lamentations, and repair to the churches, where they might pray for their lords and husbands, and took all the necessary precautions to defend the city in the event of any immediate attack. Soon afterwards the welcome intelligence arrived that Surrey, having suffered severely in the battle, had disbanded his host, and a breathing interval was allowed. The infant king was crowned at Scone, the castle of Stirling appointed as his residence, the government of it entrusted to lord Borthwick, and the archbishop of Glasgow, with the earls of Huntly and Angus, selected to be the councillors of the queen-mother, till a parliament should assemble. At the same time suspicions seem to have arisen that too much influence in the government ought not to be given to this princess, whose near connection with England might subject her to foreign influence; and a secret message was dispatched to France inviting the duke of Albany, the next heir to the throne, to repair to Scotland and assume the office of regent.

The D
of Alba
invited
from
France.

State of
Scotland

It was necessary, in the mean time, to consider the best schemes for the restoration of tranquillity and the preservation of order under the shock which a defeat so terrible had given to the country; and the prospect which presented itself, on taking a general view of the condition of the kingdom, was discouraging. The dignified clergy, a class of men who were undoubtedly the ablest and the best educated in Scotland, from whose ranks the state had been accustomed to look for its wisest councillors, were divided into factions among themselves occasioned by the vacant benefices. The archbishop of St. Andrews, the prelates of Caithness and the Isles, and other ecclesiastical dignitaries, had fallen in the field of Floddon; and the intrigues of the various claimants for these high prizes distracted the church and the council. There were evils also to be dreaded from the character and youth of the queen-mother. Margaret had been married at fourteen, and was now only twenty-four. Her talents were excellent, as we know from the testimony of such able judges as Surrey, Dacre, and Wolsey; but in some points she too nearly resembled her brother Henry the Eighth. She was hasty in her resentment, headstrong, and often ready to sacrifice her calmer judgment to her passion or her pleasure; and in her thirst for power or personal gratification she sometimes cared as little for the purity of the means by which these objects were accomplished.

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Soon after the death of the late king this princess gave birth to a son, who was named Alexander, and created duke of Ross; and in a parliament, which met after her recovery, she was confirmed in the office of regent, and entrusted with the custody of the young king and his brother.

At this moment the most powerful nobles in Scotland were the earls of Angus, Home, Huntly, and Crawford. Angus wielded the whole strength of the house of Douglas; Home was chamberlain, and commanded the eastern borders; while Huntly and Crawford ruled the northern districts. The earl of Arran, in the mean time, arrived from France along with the Sieur de la Bastie, who had been a favourite of the late king, and brought a message from the duke of Albany. Arran was nearly related to the royal family, and entitled, by his high birth, and the office of Lord High Admiral which he held, to act a leading part in the government; but his talents were of an inferior order, and unable to compete with the trying circumstances in which the country was placed.

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Scarcely had the queen recovered from her confinement when she married the earl of Angus, a nobleman of great accomplishments and personal attractions, but, in the words of lord Dacre, "childish, young, and attended by no wise councillors." Had the princess entered into a second marriage after due consultation had been held with the council assigned to her by parliament, and after a decent interval, no one could have blamed her. She was yet in the bloom of her best years, and from her youth, as well as her high rank and the important duties entrusted to her, she required the protection of a husband; but the precipitation with which she hurried into the match with Angus was scarcely decorous, and certainly unwise, nor was it long before she bitterly repented her choice.

coun- ivided fac- s.

The first effects of this unfortunate step was to increase the bitterness of the pre-existing feuds amongst the nobles. Home and Angus marshalled themselves and their vassals against each other; Arran, assisted by Lennox and Glencairn, aspired to the regency; Beaton, archbishop of Glasgow, an intriguing prelate, supported the interests of Albany and the French faction; while Huntly, lord Drummond, and the earl Marischal gave their influence to Angus and the queen, who courted Henry the Eighth, and took the name of the English party. At this unfortunate crisis the country received a new blow in the death of Elphinstone, who had been nominated archbishop of St. Andrews. For the vacant primacy there were three competitors; Gawin Douglas, uncle to the earl of Angus, Hepburn, prior of St. Andrews, and Forman, bishop of Moray, respectively nominated by the queen, the chapter, and the pope. These ambitious ecclesiastics scrupled not to muster their armed vassals, and to vindicate their claims by an appeal to the sword, an indecent spectacle, which could not fail to lower the church in the eyes of the people.

It was under this deplorable state of things that Henry the Eighth carried to perfection a base system already begun by his father, that of keeping in pay a number of spies and pensioned supporters. He bribed the Scottish nobles, entertained a constant correspondence with the queen his sister, and even went so far as to propose her flight with the young king and his brother to the English court. It may give us some idea of the loose principles of some of the leading men, that Angus and his uncle, Gawin Douglas, who ranks higher as a poet than a politician, did not hesitate to give their countenance to a plan which amounted to nothing short of treason.

Arrival of the Duke of Albany. A.D. 1515. His character.

In the midst of these scenes the duke of Albany arrived from France, and assumed the regency; but unfortunately his determined predilection for the French interests was as unacceptable to many of the wisest and best men in the country, as the queen and Angus's devotion to England. At this moment Scotland required an upright and vigorous governor, animated by a sincere love of his country, and who could hold the balance with judgment between contending parties. But Albany was ignorant of the constitution, of the language, and of the manners of the country. His family also made him an object of suspicion, his father having traitorously attempted to seize the crown. He was the son of a French mother, had married a French woman, and having his chief estates in France, constantly styled the French king his master; nor does it appear that either his talents or his temper were calculated to counterbalance such disadvantages.

Albany assumes the government.

On his assumption of the government the effects of all this were soon perceived. The queen refused to give up the custody of the infant monarch; Home, the chamberlain, threw himself into the arms of England; Angus, guided solely by selfishness and the ambition of becoming chief ruler, deserted his wife, the queen. France, instead of assisting her ancient ally to defeat the intrigues of Henry the Eighth, which were carried on by his able minister lord Dacre, first betrayed strong symptoms of a change of policy, and at length refused to renew the alliance with Scotland; and although Albany, amid these difficulties, acted with considerable spirit and ability, it was impossible for him to compose the jarring elements, or restore tranquillity and order to the country.

He returns to France.

Dissatisfied and dispirited, he retired for a few years to France, and returned to Scotland only to find the dangers which threatened the kingdom more imminent, and the task of encountering them more difficult. In his absence De la Bastie, the person who enjoyed his chief confidence, and to whom he had entrusted the offices of warden of the marches and deputy governor, was murdered by the Homes in the most savage manner. The Highlands and Isles, long deprived of regular government, were torn by various factions, and exhibited scenes of the wildest excesses. And Angus, whose feudal power was far too great for a subject, had acted in open defiance of the laws, and domineered in the most tyrannical manner over all who dared to oppose his commands. The arrival of Albany compelled this chief to fly from the capital, and the regent exerted himself with the utmost vigour to put down the despotism of the Douglases.

Albany's return. A D. 1521

He was forthwith reconciled to the queen, received from her the keys of the castle of Edinburgh, and with them the custody of the young king; he assembled a parliament, summoned the Douglases to answer a charge of treason, and, although thwarted in his administration by the intrigues of lord Dacre and the treachery and venality of the Scottish nobles, he compelled Angus, his principal enemy, to leave the kingdom.

State of the kingdom.

It would be difficult, and if easy, uninstructive, to enter into the history of this period, when the country was torn by contending factions, and exposed to all the miseries incident to a feudal minority. Albany's worst enemies were lord Dacre and the Anglo-Scotican party which he kept in his pay. It was his policy to throw distrust and suspicion upon every measure of the regent and the queen; to represent the regent as avaricious and tyrannical, to accuse him of a design to seize the crown, and to insinuate that the king's life was not safe in his custody. All of these tales are to be found in his correspondence with his master, Henry the Eighth, and there can be little doubt that the greater portion of them were false, and the whole grossly exaggerated. So at least we must judge from the conduct of the Scottish Parliament, which treated a message, soon afterwards sent by Henry the Eighth, and founded upon these idle accusations, with a calm and resolute denial. This monarch, acting upon the impulse of the moment, and thwarted by the politic measures of the Regent, had dispatched a herald, who conveyed a severe reprimand to the queen, and, at the same time, insisted that the Scottish nobles should instantly dismiss Albany. Their reply to this haughty communication was spirited and dignified. They derided the fears expressed for the life of the young king, declaring that Albany was a faithful servant of the country, and had been invited by themselves to assume the regency. "Here it is our pleasure," said they, "that he shall remain, nor shall he be permitted or enjoined to depart at the request of your grace, or any other sovereign prince. And as to the threat of hostilities, (thus they concluded their answer), if, because we assert our own rights, we should happen to be invaded, what may we do but trust that God will espouse our just quarrel, and demean ourselves, as our ancestors have done before us, who, in ancient times, were constrained to fight for the conservation of this realm, and that with good success and honour?"

A.D. 1522.

War with England. A.D. 1522.

This answer was followed, on the part of Henry, by an immediate declaration of war. The earl of Shrewsbury, at the head of the force of the northern counties, invaded Scotland on the side of the Merse and Teviotdale; an English fleet ravaged and laid waste the coasts of the Frith of Forth; and Albany the Regent retaliated by breaking into England at the head of a large army. He was driven to this solely by a desire to vindicate the national honour; for he seems to have been conscious of the disadvantages which attended a war with England, and he knew that the majority of the nobles were animated by the same feelings. Under these circumstances he wisely determined to follow Bruce's principles as to war with this country, to avoid any protracted invasion, not to hazard a general battle, and while he showed a determination to maintain the independence of the country, and to resist any foreign dictation, to evince at the same time his readiness to conclude an honourable peace.

The same disposition being evinced by lord Dacre, the minister to whom Henry entrusted the management of Scottish affairs, a truce was concluded; but Albany, on disbanding his army and resuming his civil duties, found himself surrounded with difficulties. Nothing indeed could be more complicated or irksome, than the various contending interests which he had to understand and reconcile. His engagements with France prompted him to continue the war with England; his better judgment admonished him to remain at peace. Amid the universal corruption and selfishness which infected the body of the nobles, many of whom were in the pay of England, he looked in vain for any one to whom he could give confidence, or entrust with the execution of his designs, while the queen-mother, with whom he had hitherto acted, betrayed him, and corresponded with Dacre.

Albany's second visit to France.

The impossibility of overcoming these intricate evils without a more powerful military force than he could at present bring into the field, induced the Regent once more to pass into France, for the purpose of holding a conference with Francis the First, on the best method of reducing the English faction. A council of regency was appointed, consisting of Huntly, Arran, Argyll, and Gonzolles, a French knight, in whom Albany placed great confidence; and after an absence of some months, during which the war again broke out with great fury, he revisited Scotland, bringing with him a fleet of eighty-seven small vessels, in which he had embarked a fine body of six thousand foreign troops.

He returns to Scotland.

War wit Englan A.D. 1

With this strong reinforcement he hoped to gain a preponderating influence over the nobility, and to decide the contest with England; but he was miserably disappointed. The presence of foreign troops, always unacceptable to a people jealous of their rights, was particularly so to the Scots, who were poor, and had to support the foreigners at a great expense. This rendered the war unpopular with the great body of the nation; the queen-dowager was devoted to England; and the nobles, although prepared to assemble an army for the defence of the borders, were opposed to any invasion of England upon a great scale, or to a war of continued aggression. As many of these barons, however, were at that moment receiving pensions from France, the payment of which any too decided demonstration might have interrupted, they artfully concealed their repugnance. An army of forty thousand men mustered on the Borough-moor beside Edinburgh, and Albany, taking the command in person, advanced to the borders; but on arriving at Melrose the mask was dropped, the leaders showed symptoms of insubordination, the soldiers catching the infection, murmured against the foreign mercenaries, and discontent gathering strength, at last broke out in an open refusal to advance. No entreaties or threats of the Regent could overcome this resolution; and after a short season, news arrived that the earl of Surrey, having assembled an army, was advancing against them. The intelligence of his speedy approach strengthened the Scottish nobles in their determination not to risk a battle. So completely had the majority of them been corrupted by the money and intrigues of Dacre and the queen-dowager, that Albany did not venture to place them in the front, but formed his advance of the French auxiliaries and his artillery, the single portion of this army which had acted with spirit. To have attempted to fight Surrey with these alone, would have been the extremity of rashness, to have awaited the advance of the English earl with an army which refused to proceed against the enemy, might have rendered defeat inevitable. In these critical circumstances, Albany, who has been unjustly attacked by some ill-informed writers, adopted the only alternative which was safe or honourable. He disbanded the Scottish portion of his army, and he himself retreated with his French auxiliaries and his artillery to Eccles, from which, after a short season, he returned to the capital, and here he assembled the parliament.

Albany retreats.

A Parliament assembled.

Its proceedings, as might have been anticipated, were distracted and impeded by mutual accusations and complaints. The Regent could not conceal his animosity to those leaders who had so recently deserted him almost in the presence of the enemy. The nobles recriminated; they blamed him for squandering the public treasure, and notwithstanding the inclement season of the year, insisted on his dismissing the foreign troops, whose residence had become burdensome. All this was calculated to disgust and mortify the governor; and he requested permission to retire once more to France, for the purpose of holding a conference with Francis the First, and inducing him to grant him further assistance against the designs of England. His request was complied with, on the condition that if he did not return to Scotland within a limited period, the league with France, and his own regency, should be considered as at an end. In the mean season, the custody of the king's person was entrusted to the lords Cassillis, Fleming, Borthwick, and Erskine, while the chief management of affairs was committed to a council, composed of the chancellor, the bishop of Aberdeen, and the earls of Huntly and Argyll. Having made these arrangements, the duke of Albany quitted the kingdom, convinced, in all probability, of the impossibility of reconciling the various factions and interests by which it was torn in pieces. Although he gave hopes that his absence

Albany leaves Scotland. A.D. 152

should not exceed three months, there is strong reason for believing that when he embarked it was with the resolution, which he fulfilled, of never returning to Scotland.

Revolution in the government.

On the departure of Albany, it soon became apparent that a secret understanding had for some time been maintained between two of the most powerful factions in the country, and that his leaving the kingdom was the signal for the breaking out of an important revolution. The chief actors were the earl of Arran and the queen-mother, and there is ample evidence that their proceedings were agreeable to England. The young king was now in his thirteenth year, and his mother and Arran, having gained to their interest the peers to whom his person had been entrusted, carried him from Stirling to Edinburgh, proceeded to the Palace of Holyrood, declared in a council that he had assumed the government, and issued proclamations in his name. The peers of Margaret's party then tendered their allegiance, abjured their engagements lately made with Albany, declared his regency at an end, and promised to maintain henceforth the authority of their sovereign.

Angus returns from France. His base conduct.

It was the evident object of the queen and Arran to obtain, by this revolution, the entire command of the government. The measure was remonstrated against, in the strongest manner, by the bishops of St. Andrews and Aberdeen. They represented the utter folly of conferring the supreme power on a boy of twelve years old, and they stated, with truth, that Albany was still the Regent; but Margaret, supported by her brother Henry the Eighth, who hoped, through her, to govern Scotland, proved too strong for these prelates, and for a while her schemes succeeded. It was, however, only for a short season. Jealousies arose between her and Arran, who, from his near relationship to the crown, aspired to the chief power. The queen, whose love for Angus, her husband, had long since turned into hatred, fixed her affections on Henry Stewart, a son of lord Evandale, raised him to the office of treasurer, and could she obtain a divorce, determined to marry him; and Henry the Eighth, who began to find her demands too importunate, and her obedience problematical, recalled the earl of Angus from France, with the design of making him an instrument in his projects for the reduction of Scotland. This baron appears to have increased in experience and talent for intrigue, by his residence in that country, but not in public principle; and his first step was to sell himself to Henry in a secret treaty, by which he engaged to support the English interests in Scotland. In return, he and his brother, Sir George Douglas, hoped, by Henry's aid, to place themselves at the head of the government, and to be restored to the vast estates and power which they had lost.

The arrival of Angus in his native country, was the signal for immediate hostilities between him and the queen-mother, his wife, who had raised Henry Stewart to the office of chancellor, and detested her husband, in proportion to the progress of her avowed and indecent attachment to this favourite. Hitherto she and her supporters, Arran, Lennox, and the master of Kilmaurs, had been supported by pensions from the English court, and in return, had favoured the views of Henry the Eighth; but the principles of this venal association were of course capricious and selfish, and the arrival of Angus, who now wielded the power of the Douglases, threatened to break it to pieces.

Miserable state of the country.

The country, indeed, presented a miserable spectacle; a minor sovereign deserted by those who owed him allegiance and support, while his kingdom was left a prey to the rapacity of interested councillors, and exposed to the attacks of a powerful neighbour, whose object was to reduce it to the condition of a dependant province. In such circumstances it is certainly a matter of wonder that it retained its liberty.

Three factions struggled for the pre-eminence, and tore the country in pieces. The first was that of Albany, the late regent, which was supported by French influence, and conducted by the chancellor Beaton; the second had for its leaders the earl of Arran and the queen-regent, who held the king's person, and possessed the chief executive power; at the head of the third were the earl of Angus and his able brother George Douglas, who were wedded to the interests of the English government. It is impossible, within our limits, and it would be uninstructive, to enter into a detail of the continued plots and intrigues which constitute the sickening history of this period. It soon became apparent that the party of the queen-mother was the weakest. Arran, a capricious man, deserted her; her private conduct rendered her disreputable in the eyes of the people; and soon afterwards a coalition between Beaton the chancellor and Angus, carried the whole power of Albany's party to a union with the house of Douglas. Margaret sunk under this, and consented to a negotiation. She resigned the custody of her son to a council of peers nominated by parliament, and, stripped of her power, consented to a reconciliation with Angus, her husband, in whom, along with the chancellor Beaton, the chief power in the government now centered. A feeble effort indeed was made by Arran to destroy the influence of the united factions; but the armed force with which he advanced to Linlithgow was dispersed by the prompt attack of Douglas, and the address of this politic baron soon afterwards prevailed on Arran to join his party.

Angus obtains possession of the king's person.

The earl of Angus had now gained a complete triumph over his enemies. He possessed the person of the young king, he was assisted by the talents and experience of the chancellor Beaton, he had witnessed the gradual decay of the faction of Albany and the French monarch, and he had been joined by Arran, who, although personally a weak man, from his high birth and great estates possessed much power. His first step was wise and temperate. A pacification for three years was concluded with England; and it was hoped that this might be followed by a marriage between the young king and Henry's daughter, the princess Mary a measure which, if guarded so as to preserve the independence of Scotland, might have been attended with the happiest results.

Decay of French influence in Scotland.

The country, so long distracted by border war and internal anarchy, might now, under a judicious administration, have looked forward to something like tranquillity. Had Angus been reconciled to the queen, his wife; had he been contented with his recovery of greater power than he had lost, and been willing to administer the government with justice and moderation; there was every reason to hope for the maintenance of peace, security, and good order. The French party in Scotland had completely sunk. Dr. Magnus, Henry's English minister, who, during his residence in Scotland, had been an object of great jealousy to the people, was recalled; and lord Dacre, whose money and intrigues for so many years had corrupted the Scottish nobles, and introduced disunion and treachery into all their councils, was removed by death from the scenes of his mischievous activity. All these things were favourable; and the well affected, who sighed for the blessings of peace and good government, anticipated a period of repose.

Marriage of the queen-mother to Lord Methven.

It was a vain expectation, destroyed by the precipitate folly of the queen-mother, and the grasping ambition of Angus. That powerful baron had hitherto aimed at one great object, which he now deemed himself on the very point of attaining: to accomplish a reconciliation with his wife, the queen-mother, and, possessing her estates, with the custody of the young king's person, to engross the whole power of the government. At this crisis Margaret, so far from becoming less hostile to Angus, gave herself up more inconsiderately than before, to her passion for Henry Stewart, and procuring a divorce from a husband whom she hated, espoused her paramour with a precipitation which disgusted the people.

Angus's intrigues. The secret council annulled.

This imprudent step determined Angus to change his ground, and a dread of some counter revolution threw him upon new and more violent courses. By a successful stroke of policy, he procured the passing of an act of Parliament which annulled the authority of the secret council, the only power which stood between him and absolute dominion. At the same moment, the parliament declared that the minority of the young king was at an end, and that having completed his fourteenth year, he was to be considered as an independent sovereign. While the youthful monarch thus nominally assumed the government, that provision which entrusted the keeping of the royal person to certain peers in rotation, remained in force; and as Angus had artfully summoned the parliament at that precise time, when it belonged to himself and the archbishop of Glasgow to assume their periodical guardianship of the king, the consequence of this state manœuvre was to place the whole power of the government in their hands.

The king's minority declared at an end.

A new secret council was nominated, composed solely of the creatures of Angus; the great seal was soon after taken from Beaton, the young king was watched with the utmost jealousy, and compelled to give his consent to every thing proposed to him by his new masters. An act of parliament was passed, granting a remission to the heads and followers of this all-powerful faction for the crimes, robberies, or treasons, committed by them during the last nineteen years; every office of trust or emolument in the kingdom was disposed of to the one or other of its supporters, and the ancient tyranny of the house of Douglas once more attained a degree of strength which rivalled, or rather usurped the royal power. At this unhappy period, as has been observed in another work, "the borders became the scene of tumult and confusion, and the insolence of the numerous vassals of this great family was intolerable; murders, spoliations, and crimes of varied enormity, were committed with impunity. The arm of the law, paralysed by the power of an unprincipled faction, neglected to arrest the guilty; the sources of justice were corrupted; the highest and most sacred ecclesiastical dignities became the prey of daring intruders, or were sold to the highest bidder; and the young king, carried about through the country by Angus, apparently in great state, but merely a puppet in the hands of his masters, sighed in vain over a captivity to which there appeared no prospect of a termination."[1] An attempt indeed was made for his deliverance, first by the laird of Buccleugh, one of the most powerful of the border barons, and afterwards by the earl of Lennox, who deserted the party of the Douglases, and to whom the young monarch was much attached. But Buccleugh was routed with considerable loss, and Lennox defeated and slain.

Miserable state of the country.

Angus courts Henry VIII. General remarks.

These unsuccessful attempts only strengthened the power of Angus. He entered into a more strict alliance with Henry the Eighth, obtained the friendship and support of Beaton, the archbishop of St. Andrews, and unchecked by any opposition, ruled all things at his will. Nothing indeed could be more miserable than the picture presented by the country; a monarch in captivity, a nobility in thraldom, a people groaning under the most complicated oppressions, yet with their hands tied, and compelled by the miserable system under which they lived to serve their oppressors. It may be asked, what was the secret history of this enormous power, this degraded and implicit obedience? The answer is to be found in the fact, that the Douglases were masters of the royal person; they could compel the king to affix his signature to any deeds or letters which their tyranny or their caprice might dictate. Angus, the supreme lord of all this misrule, was chancellor, and the great seal at his command; his uncle, Douglas of Kilspindy, was treasurer, and commanded the whole revenues of the country; the law, with all its terrible feudal processes of treason and forfeiture, could be wielded by them at pleasure. So long as the king remained in their hands, this powerful machinery was all theirs; the moment he escaped, the system broke to pieces, and their power was at an end.

The ki
escape

Of all this James, who had now entered his seventeenth year, was perfectly aware; and as every hour of his captivity made the Douglases more hateful to him, his mind became intently occupied with projects for his escape. Nor was it long ere he effected it. With an address superior to his years, the king had either succeeded in lulling the suspicions of his keepers, or a continuance of unchecked power had made them careless. James was at Falkland. Angus, Douglas his brother, and Archibald his uncle, were absent on their private affairs; only Douglas of Pathhead, the captain of the royal guard, remained. The young monarch called for the park-keeper, and, as had been his wont, proposed to hunt next morning. Therefore, says a graphic old chronicler,[2] he "caused him to warn all the whole tenants and gentlemen thereabouts who had the speediest dogs, that they would come to Falkland wood on the morn, to meet him at seven hours, for he was determined he would slay a fat buck or two for his pleasure; and to that effect caused warn the cooks and stewards to make his supper ready, that he might go to his bed the sooner, and to have his *desjeune* (breakfast) ready by four o'clock, and commanded James Douglas of Pathhead to pass the sooner to his bed, and caused bring his collation, and drank to James Douglas, saying to him, that he should have good hunting on the morrow, bidding him be early astir. Then the king went to his bed; and James Douglas, seeing the king in his bed, wist that all things had been sure enough, and passed in like manner to his bed. When the watch was set," continues Pitscottie, "and all things in quietness, the king called on a yeoman of the stable, and desired him bring one of his suits of apparel, hose, cloak, coat, and bonnet, and putting them on, stept forth as a yeoman of the stable, and was unperceived of the watches, till he had passed to the stables, and caused saddle a horse for himself, and one led, and took two servants with him, namely, Jocky Hart, a yeoman of the stable, and another secret chamber boy, and leapt on horse, and spurred hastily his journey to Stirling, and won there by the breaking of the day, over the bridge, which he caused to be closed behind him, that none without licence might win that passage. After this he passed to the castle, and was received there by the captain, who was very glad of his coming, and prepared the castle with all things needful. Then he caused shut the gates, and let down the portcullis, and put the king in his bed to sleep, because he had ridden all that night."

Despair
the Dou
glases.

Having thus regained his liberty, James's first act was to summon a council, and issue a proclamation, interdicting Angus and the Douglases from all approach within six miles of the court, under pain of treason. Nor did they venture to disobey it. On discovering the flight of the king, Angus, Archibald, and Sir George, had hastily assembled a few followers, thrown themselves on horseback, and were riding to Stirling, when they were met by the herald, who read the act, and commanded them in the king's name to halt. For a moment they hesitated, but it was only for a moment. Their sovereign was free; the weapons which but a day before they had wielded with such irresistible force, were now ready to be employed against themselves. A single step forward, and they were guilty of treason, their property and their lives at the mercy of the crown. All this rose rapidly and fearfully before them; and aware how vain it would be at such a moment to meet the power of their enemies, they retreated to Linlithgow.

The monarch, who now took the government into his own

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[1] Tytler's History of Scotland, vol. v. p. 201.

[2] Lindsay of Pitscottie, pp. 218, 219.

Scotland.
James V.
A.D. 1528.

James V. assumes the government.
His character.

hands, had not completed his seventeenth year; but he had been nursed in the school of difficulty, and his character had acquired a consistency and vigour far superior to his age. This was the more to his credit, because the Douglases had neglected his education; and while they gave him no opportunities of cultivating the qualities which might have made him a blessing to his people, permitted him to indulge in that love of pleasure and tendency to dissipation which was incident to his temperament and time of life. Happily his character, although it did not escape the pollution of such a base system, survived it; and, with some great faults, the king possessed at the same time not a few of the highest qualities which became a wise and good prince. Strict and scrupulously just, unwearied in his application to business, earnest in his endeavours to remove the complicated burdens which, under the tyranny of the late oligarchy, had oppressed the people; generous, though somewhat warm in his temper, easy of access, a stranger to pride, and fond, almost to a fault, of mingling familiarly with all classes of his subjects; he soon rendered himself, young as he was, an object of respect to his nobles, and of affection to his people.

Principles of James's government.

The principles which regulated his future government sprung naturally from the circumstances of his early life. The sternest resentment against Angus and the house of Douglas, was combined with a determination to assert and regain the rights of the crown, and to abridge the power of an aristocracy, which had grown intolerable during a long minority. Towards his uncle, Henry the Eighth, it was impossible that his feelings could be any other than those of resentment and suspicion. It was by this prince that there had been introduced into Scotland an organised system of corruption, of which his able and unscrupulous minister, lord Dacre, had been the author. Many Scottish nobles had become the pensioned agents of the English government; paid informers swarmed in the court and through the country. All idea of conquering Scotland by force of arms had been long since abandoned; but a more insidious expedient was adopted, by which the English king, maintaining the Douglases in their usurped dominion, received in return their homage and fidelity, and administered the government at his pleasure.

James's great objects, which we can trace through the whole remaining period of his reign, were to put an end to this system of foreign dictation; to restore its ancient and constitutional prerogatives to the crown; to bridle the exorbitant power of the great nobles, raising up as a check upon them the large and influential body of his clergy; to encourage the mercantile and commercial classes of his people; and to facilitate the administration of the laws, and insure equal justice to the lowest orders of the community.

Proceed-
ngs against
he House
f Douglas.

For the accomplishment of such ends, it was first necessary to exhibit a wholesome example of retributive justice upon those who had been the greatest delinquents. It was declared treason for any person to hold intercourse with Angus, and every Douglas was commanded to leave the capital on pain of death. Angus himself was commanded to remain beyond the waters of the Spey, and required to deliver his brother Sir George Douglas, and his uncle Archibald, as hostages, for his answering to his summons of treason. Having haughtily disobeyed these orders, a parliament assembled. He was proclaimed a traitor, and his lands nominally divided among those nobles to whom James owed his late success. It was easier, however, to promulgate than to execute such decrees against so powerful a baron; nor was it till after repeated attacks upon Tantallon, some of them led by the king in person, that the arch-offender was reduced, and compelled to seek an asylum in England.

Scotland.
James V.
A.D. 1528.

State of the borders.

James next directed his attention to the state of the borders; and in an expedition which was long remembered for the vigour, dispatch, and severity of the royal vengeance, inflicted punishment upon the greatest offenders, among whom was the noted freebooter, Johnnie Armstrong, and reduced the district into a state of tranquillity. Scarcely was this accomplished, when the Orkneys were threatened to be torn from the crown by the rebellion of the earl of Caithness; and the Isles became the scene of a fierce struggle between the earl of Argyll and Alexander of Isla, one of the most powerful chiefs of that remote region. The judgment and energy of the monarch were shewn in the speedy re-establishment of peace in both quarters; and the people, aware that the sceptre was once more in a firm hand, readily and gratefully co-operated with their sovereign in all his labours.

Foreign politics.
A.D. 1529–1530.

England and France were now at peace, and Henry the Eighth and Francis the First united in a strict alliance, which had for its object to bridle the increasing power of the emperor Charles the Fifth. Under these circumstances, Henry proposed a matrimonial alliance with Scotland, and the design was encouraged by France; while the emperor, jealous of the power which so near a connexion with James might give to his enemies, offered in marriage to the young prince his sister, the queen of Hungary, or his niece, the daughter of Christiern, king of Denmark, with Norway as her dowry.

James promotes his clergy.

For the present, however, all these offers were declined, and the monarch appeared wholly engrossed with the prosecution of his various plans for the melioration of his kingdom. Finding himself thwarted by the nobles, he was compelled to adopt decided measures, and to promote the clergy to those offices which had been filled by temporal barons. Argyll was thrown into prison, the earl of Crawford stripped of a large part of his estates; the determination that no Douglas should ever bear sway in Scotland became a more stern and obstinate principle than before; and while the archbishop of Glasgow, the abbot of Holyrood, and the bishop of Dunkeld, were principally consulted in affairs of state, many of the nobles who had hitherto enjoyed the royal confidence saw themselves treated with coldness and distrust.

Commercial treaty with the Netherlands.
A.D. 1532.

It was at this time, that the king carried into effect two important measures, the one affecting the commercial interests of his kingdom, the other of still higher moment, as an endeavour to secure to all classes of his subjects an equal and speedy administration of justice. A commercial treaty between Scotland and the Netherlands had been concluded by James the First, for the period of one hundred years. It was now approaching its termination, and an embassy was dispatched to Brussels, which renewed the league for another century. His second measure was the institution of the College of Justice, a court consisting of fourteen judges, one half selected from the spiritual, the other from the temporal estate, of which the idea is commonly believed to have been suggested by the parliament of Paris. The principal design of this new judicature was to put an end to the delay and partiality arising out of the barons' courts; in other words, to remove the means of oppression out of the hands of the aristocracy; but as it was provided, that the king might at his pleasure send three or four members of his council to give their votes, it was evident that the subject was freed from one grievance, only to be exposed to the hazard of another, whenever his rights might happen to come in collision with the crown.

Institution of the College of Justice.

The Douglases sell themselves to England.

During these transactions, the Douglases and their adherents were driven upon violent and discreditable courses, in proportion as their prospect of reconciliation to the king became more hopeless and remote. The earl of Bothwell, also a powerful border baron, whose excesses James had severely punished, entered into a traitorous alliance with Henry the Eighth, in which he engaged, if properly supported, to dethrone his sovereign, and to "crown the English king in the town of Edinburgh within a brief time;"

while the earl of Angus did not hesitate, in the extremity of his resentment, to sell himself to England; and in an original writing which yet remains, engaged to "make unto Henry the oath of allegiance, to recognise him as supreme lord of Scotland, as his prince and sovereign."[1]

War with England. A.D. 1532. Henry VIII. and the Douglases invade the country.

In consequence of these base engagements, war was once more kindled on the borders, and carried on by the Douglases and Henry's captains with such desolating fury, that James was compelled to call out the whole body of the fighting men in the country. These he divided into four armies, to each of which in rotation the defence of the marches was entrusted. The measure effectually checked the power of the English, and there was little prospect of Bothwell fulfilling his threat, of crowning Henry in the capital; but peace seemed more distant than ever, and nothing could be more deplorable than the picture presented by the country. The flames of villages and granges, the destruction of the fruits, and the cessation of the labour of the husbandman, the stoppage put to the enterprise of the merchant, the increase among the people of the spirit of national antipathy, the corruption of the nobles by the money of England, the loss among such pensioned adventurers of all affection for the sovereign, and the decay of the healthy feelings of national independence; all these lamentable consequences sprung out of the continuance of the war, and made the king desirous of securing peace, even if it should be at some sacrifice.

Peace with England.

This he at length accomplished. James agreed that the Douglases, by which was meant Angus, his brother George, and his uncle Archibald, should remain unmolested in England, supported by Henry as his subjects, on condition that Edrington castle, the only spot which they held in Scotland, should be surrendered, and reparation made for any expedition which they or the English king might hereafter conduct against Scotland. On these conditions a pacification was concluded, for the period of the lives of Henry and James, and a year after the death of him who first deceased; and soon after its ratification, the young monarch, whose firmness and talent in the management of his government made him an object of respect to the European princes, received the Garter from England, the order of St. Michael from France, and the Golden Fleece from the emperor.[2]

James was now in his twenty-second year, and his marriage was earnestly desired by the country; but he had hitherto shewn little inclination to gratify the wishes of his people. With all his good qualities, he unhappily inherited from his father an extreme devotedness to pleasure, which had been rather encouraged than restrained by the Douglases; and his passions getting the better of his prudence and principle, sought their gratification in low intrigues, carried on in disguise, and in pursuit of which he not unfrequently exposed his life to the attacks and revenge of his rivals. It was now full time that he should renounce these disreputable excesses; and having evaded an offer made by the Spanish ambassador, of the hand of the princess Mary of Portugal, and declined a similar proposal of Henry the Eighth, who pointed to his daughter the princess Mary, he dispatched an embassy to France, for the purpose of concluding a matrimonial alliance with that crown.

The Reformation.

It now becomes necessary to attend to a great subject, (the rise of the Reformation in Scotland,) the principles of which had been for some time silently making their progress among the people, but which from this period exercised a marked and increasing influence over the history of the government and of the country. It was now nearly six years since Patrick Hamilton, abbot of Ferne, the friend and disciple of Luther and Melanchthon, having renounced the errors of the Roman Catholic church, and embraced the doctrines of these leading reformers, had been delated of heresy, and condemned to the flames. The cruel sentence was carried into effect at St. Andrews in 1528, under the minority of James, and while the supreme power was in the hands of the earl of Angus. On taking the government into his own hand, James, although decidedly inimical to the principles of Angus in all other things, unhappily followed his determination to persecute those whom he esteemed the enemies of the truth. David Straiton and Norman Gourlay, who were disciples of the reformation, were tried for heresy, condemned, and brought to the stake, on the 27th of August 1534; and the intolerant and cruel conduct of the king compelled some who had embraced the same opinions to fly for safety to England.

The Pope sends a messenger to James

About this time Henry the Eighth exerted himself to the utmost to prevail upon the Scottish king to imitate his own conduct, and shake off the yoke of Rome. He endeavoured to open his eyes to the tyranny of the pope's usurpations, sent to him the treatise entitled the "Doctrine of a Christian Man," and dispatched Dr. Barlow and Lord William Howard to request a conference with his royal nephew at York; but the remembrance of the injuries he had sustained, resentment for Henry's intrigues with his discontented subjects, and an attachment to the faith of his fathers, indisposed James to listen to these overtures; and when Paul the Third deputed his legate Campeggio to visit Scotland, the embassy found it no difficult matter to confirm the Scottish monarch in his attachment to the Catholic church. At the same time he addressed him by the title of which Henry had proved himself unworthy, Defender of the Faith, and presented to him a cap and sword which had been consecrated by the pope upon the feast of the nativity.

A parliament. A.D. 1535 Luther's Works proscribed.

A parliament which assembled about this time, made two provisions which deserve attention. The importation of the works of Luther, which had been proscribed by a former act, was again strictly forbidden; any discussion of his opinions, unless for the purpose of proving their falsehood, was prohibited; and all persons who possessed any treatises of the reformer, were enjoined, under the penalty of confiscation and imprisonment, to deliver them up to the ordinary within forty days. The second act, which is well worthy of notice, related to the boroughs, in this dark age the best nurseries of industry and freedom. Hitherto feudal barons had been elected to the offices of magistrates and superintendents over the privileges of these corporations; an unwise practice, by which the provosts, aldermen, or bailies, instead of being industrious citizens, interested in the protection of trade, and the security of property, were little else than idle and factious tyrants, who consumed the substance and invaded the corporate privileges of the burgesses. A law was now made, that no person should be elected to fill any office in the magistracy of the borough, but such as themselves were honest and substantial burgesses, and although not immediately or strictly carried into effect, the enactment evinced the dawning of a better spirit.

The king visits France. A.D. 1536.

War still continued between Francis the First and the emperor, a circumstance which induced the French king to continue an amicable correspondence with England; and being aware that Henry the Eighth was intent upon accomplishing a marriage with Scotland, Francis did not care to disgust this passionate monarch by any very speedy attention to James's desires to unite himself to a French princess. To obviate this, the Scottish king himself took a voyage to France, and landing at Dieppe, proceeded from thence in disguise to the palace of the duke of Vendôme. Here, being received only as a noble stranger, he saw, for the first time, but did not approve of his affianced bride, Marie de Bourbon, the duke's daughter, and transferred his affections to Madeleine, the youngest daughter of the French king, to

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[1] MS. British Museum, Calig. B. I. 128.

[2] Diurnal of Occurrents in Scotland, p. 19.

Scotland.

ames V.
A.D.1536.
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he king.

whom he was soon after married in the church of Notre Dame. In the circumstances in which Scotland was then placed, the church of Rome was inclined to consider this union as one of great importance; and it has been noted that seven cardinals surrounded the altar. Nor were these anticipations disappointed. James remained for nine months in France, and having returned to his own kingdom, it was soon evident that some great changes were on the eve of taking place.

Rupture
etween
Francis I.
nd Henry
VIII.

Francis the First, although still nominally at peace with Henry, had become alienated from him by the violent and dictatorial tone which he assumed. The pope, who considered his own existence as involved in the contest with England, had neglected no method by which he might first terminate the disputes between the emperor and the French king, and then unite them in a coalition against Henry, as the common enemy. We have already noticed the success of the court of Rome in flattering the vanity of James; and it appears that, in 1537, these intrigues were so far successful, that a pacification was concluded between Francis and the emperor. From this moment the cordiality between France and England was completely at an end, while every argument which could have weight in a young and ardent mind was addressed to James, to induce him to join the projected league against Henry.

Iission of
ir Ralph
adler to
cotland.

Nor had the conduct of Henry, during James's absence in France, been calculated to allay those resentful feelings which already existed between them. He had sent into Scotland Sir Ralph Sadler, a crafty and able diplomatist, for the express purpose of completing the system of secret intelligence introduced, as we have seen, with pernicious success by lord Dacre. This minister was instructed to gain an influence over the nobility, to attach the queen-mother to his interest, to sound the inclinations of the body of the people on the subject of peace or war, an adoption of the reformed opinions, or an adherence to the ancient faith. The Douglases were still maintained with high favour in England. Their power, although nominally extinct, was far from being destroyed; their spies penetrated into every quarter, and had even followed the young king to France, whence they gave information of his most private motions; finally, those feudal covenants, termed bonds of manrent, still bound to their interest many of the most potent of the nobles, whom the vigour of the king's government had disgusted or estranged.

From this description we may gather the state of parties at the return of James to his dominions after his marriage. On the one hand was seen Henry the Eighth, the head of the protestant reformation in England, supported in Scotland not only by the still formidable power and unceasing intrigues of the Douglases, but by a large proportion of the nobles, and the talents of his sister, the queen-mother. On the other hand stood the king of Scotland, assisted by the united talent, zeal, and wealth of the Roman Catholic clergy, the loyalty of some of the most potent peers, the co-operation of France, the approval of the emperor, the affection of the great body of his people, upon whose minds the doctrines of Luther had not yet made any very general impression, and the cordial support of the papal court. The course of events, into which we cannot enter minutely, but which we shall touch in their principal consequences, illustrated strikingly these opposing interests.

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ge.

In the mean time, scarcely had the rejoicings ceased for James's return to his dominions with his youthful queen, when it was apparent that she was sinking under a consumption, which in a short time carried her to the grave. Although depressed by this calamity, the king did not permit it to divert his mind from that system of policy on which he had resolved to act; and an embassy to France, was entrusted to David Beaton, afterwards the celebrated cardinal, who requested for his master the hand of Mary of Guise, the widow of the duke of Longueville, and sister to the cardinal of Lorraine. To this second union, the court of France joyfully assented and the marriage took place at St. Andrews, within a year after the death of the former queen. At this moment the life of the king was twice endangered by conspiracy; and although much obscurity hangs over the subject, both plots were probably connected with the intrigues of the house of Douglas. At the head of the first was the master of Forbes, a brother-in-law of Angus. The chief actor in the second was the lady Glammis, his sister, who, only two days after the execution of Forbes, was accused of an attempt to poison her sovereign, found guilty and condemned to be burned; a dreadful sentence, the execution of which she bore with the hereditary courage of her house.

Scotland.

James V.
A.D.1537.

An event now happened, which drew after it important consequences. James Beaton, archbishop of St Andrews, died, and was succeeded in the primacy by his nephew, cardinal Beaton; a man far his uncle's superior in talent, and still more devotedly attached to the interests of the Roman Catholic church. It was to him, as we have seen, that James had committed the negotiation for his second marriage; and so great appears to have been the influence which he acquired over the royal mind, that the king henceforth selected him as his principal adviser.

Cardinal
Beaton.
Persecution of the
reformers.
A.D.1539.

Beaton's accession to additional power was marked by a renewed persecution of the reformers; and it is worthy of observation, that most of the converts to the reformed faith belonged to the order of the inferior clergy. Keillor, Forret, Simson, and Beveridge, were arraigned before an ecclesiastical tribunal, and soon afterwards Kennedy and Russell, out of which number three, Kennedy, Forret, and Russell, suffered at the stake with great meekness and courage. There can be little doubt that such inhuman executions operated in favour, rather than against the progress of the reformation.

Another
mission of
Sadler into
Scotland.

The coalition between Francis the First and the emperor was now completed under the auspices of the papal court; and Henry the Eighth, aware of the great efforts made to induce James to join the league against him, dispatched Sir Ralph Sadler into Scotland. The object of this able negotiator was to rouse James's jealousy against the increasing power of the clergy, to prevail upon him to throw off his allegiance to the pope, to imitate his example by suppressing the monasteries, and to urge him to maintain the peace with England. To the last request the Scottish king replied, that if Henry's conduct was pacific, nothing should induce him to join any hostile league against him; but he assured Sadler that he found his clergy his most loyal and useful subjects; and although he would be anxious to see a reformation in the general morals of this body, he did not exactly see how that could best be effected by renouncing the authority of his holy father the pope, the terrestrial head of the church, and thus setting an example of rebellion and confusion.

The king's
voyage to
the north.

James had for some time meditated an important enterprise, which he now executed; a voyage to the most northern parts of his dominions conducted by himself, and on a scale such as had not been attempted by any of his predecessors. His fleet consisted of twelve ships, fully armed and provisioned. He was attended by Beaton, and the earls of Huntly, Arran, and Angus; and these barons bringing with them their armed vassals, formed a force which, united to the royal suite and attendants, was equal to a little army. Lindsay, a skilful hydrographer, accompanied the expedition, and his maps and charts, the first rude essays in this science ever attempted in Scotland, are preserved at the present day.[1] The king first coasted Fife, Angus, and

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[1] In the Harleian Collection, British Museum.

Buchan; he next visited Caithness, crossed the Pentland frith to the Orkneys, doubled Cape Wrath, steered for the Lewis, crossed over to Skye, circumnavigated Mull, swept along the shores of Argyle, and passing Kintyre, inspected Arran and Bute, whence he sailed up the Clyde to Dunbarton, where he concluded his labours.

The effects of this royal progress were salutary and decisive. The force with which James was accompanied secured a prompt submission to his commands, and inspired these remote districts with a wholesome dread of the royal name. Some of the fiercer and more independent chiefs, who affected a show of resistance, were seized and confined in irons on board the fleet; others, more gently treated, were yet compelled to accompany the monarch as hostages for the pacific behaviour of their followers; and all were convinced that any attempt to brave the power of the crown, must for the present be vain and ruinous.

Conspiracy against the king's life.

This exhibition of increasing energy in the king only exposed him the more to the jealousy of those nobles whose power had been nourished by long intervals of license, and who now clearly perceived, that unless they were prepared to resign their rights, a struggle between them and their sovereign could hardly be averted. A proof of this was shown on James's return to court from his northern voyage, when a conspiracy against his life was detected, the third which had occurred within no very long period. Like the rest it is involved in obscurity; but the proof was considered as sufficient, and its author, Sir James Hamilton, commonly called the bastard of Arran, was tried, convicted and executed. It is said that the king was thrown into a state of great despondency and gloom by the discovery of this plot; that it opened his eyes to the manifold dangers which surrounded a prince at variance with his nobles; and that he began to feel that he was engaged in a contest in which they might prove too strong for him.

A parliament. James's decided measures.

Whatever credit we may attach to these reports, the conduct of James gave decided proofs that he was determined to continue the struggle; and in a Parliament which soon afterwards assembled in the capital, he strengthened his own hands by annexing to the crown the whole of the Hebrides, by which we are to understand the isles north and south of the two Kintyres. But this was not all. To these new acquisitions were added the Orkney and Zetland isles, many extensive lordships, Jedburgh forest, and the demesnes of Angus, Glammis, Liddaldale, and Evandale.

In the want of contemporary evidence, it is difficult to decide upon the strict justice of this sweeping measure. It is possible that, by rigidly investigating the history of former rebellions, and present treasons, James may have persuaded himself that he was entitled to the forfeiture of all these large estates and principalities; but in such circumstances it had been the practice of former monarchs to parcel out the forfeited lands among his nobles who had preserved their loyalty; and in the measure now adopted, of annexing the whole to the crown, the aristocracy saw little else than their own intended ruin. It was in vain that the measure was followed by the publication of a general act of amnesty for all former treasons. The earl of Angus, Sir George Douglas, and the whole of their adherents were excepted; and men observed that while the king's generosity was vague and capricious, his aversion to those who had once injured him, was stern and immutable.

The king's conduct regarding the Reformation.

It is not easy to discover James's exact opinions regarding the progress of the reformed doctrines, which now began to create great alarm in the Roman Catholic clergy. On the one hand he seems to have become convinced of the necessity for a reform in the church, and to have looked with a severe eye upon the idleness, corruption, and ignorance of a large portion of the clergy. He encouraged Sir David Lindsay, whose satire upon the three estates contained a bitter attack upon the prelates; and being himself much involved in debt, there is reason to believe he regarded the overgrown possessions and extraordinary wealth of the clergy with certain longings to appropriate some portion of it towards the exigencies of the state. Yet, in the Parliament to which we have just alluded, it was made a capital offence to argue against the supreme authority, or the spiritual infallibility of the pope; the discussion of religious questions in private meetings was interdicted; a law was passed against the demolition of the shrines and images of saints; and it was evidently the opinion of the king that the reformation should be made by the church itself, within itself, and under the sanction of its head the pope.

Mutual an
mosity b
tween
James an
Henry
VIII.

Such seems to have been the feelings and the policy of the sovereign. Those of another influential body in the state, the clergy, are easily detected. To counteract the intrigues of Henry the Eighth, and to check any incipient feelings of favour towards the reformation, the great reliance of cardinal Beaton and the Roman Catholic party was in the prospect of a war with England. To accomplish this, they had unfortunately ample materials to work upon. Henry the Eighth was violent and dictatorial; James proud, and jealous of his independence. The English king had espoused the interests of the banished house of Douglas, and fomented discontent among the rest of the Scottish nobles. James was animated by an unrelenting animosity to the earl of Angus, the head of the house of Douglas, and to all who bore the name. Henry, instigated by the utmost hostility to the Roman see, eagerly desired that his royal nephew should imitate his example, suppress the religious houses, and proclaim his independence; but the instructions to his ambassador, Sadler, upon this subject, contained expressions so personally insolent to James, that if obeyed, his mission must have occasioned disgust rather than conciliation. The English king requested a personal interview at York; and James, after a promise to meet him, broke the appointment with Henry, who had proceeded to that city in expectation of his arrival.

James in
vain desi
peace.
Invasion
England.

At this crisis, the Scottish king evidently dreaded being prematurely hurried into war. He was in debt, he suspected the fidelity of his nobles, he was well aware that a feudal monarch at variance with his barons, the sinews of his strength, was likely to be dishonoured and defeated. He had lately lost his only children, Arthur and James, and he believed that Beaton's anxiety for war was dictated by selfish motives, and influenced by his intrigues with Rome. Under these circumstances, public policy and personal feeling alike made him dread any immediate hostilities with England, and he endeavoured by an embassy to avert the rupture; but Henry, from the moment of his disappointment at York, would listen to no message of conciliation. War was resolved on, the east and middle marches were put into a state of defence, Berwick inspected, musters raised in the north, and soon afterwards Sir James Bowes, with the force of the east marches, marched across the border. The banished Angus, his brother Sir George Douglas, and a large body of the retainers of the Douglases, had joined him; but they were encountered, and completely defeated by Huntly and Home.

The king
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lities.

This, however, was merely a preliminary outbreak; and as such border outrages had frequently occurred without drawing after them more serious consequences, James made a last effort to avert the storm, by sending commissioners first to York, and afterwards to meet the duke of Norfolk, who, at the head of an army of forty thousand men, had crossed the Tweed, and already given many of the granges and villages to the flames. It was in vain, however, to attempt negotiation; and aware that the crisis had arrived, the Scottish king commanded Huntly and Home, upon whose fidelity he had most reliance, to watch the progress of Norfolk, while he himself assembled the main force of his kingdom on the Borough-moor near Edinburgh.

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he nobles fuse to vade ngland.

With this army, which mustered thirty thousand strong, he advanced to Fala-moor, and when encamped there, received the welcome intelligence that Norfolk, compelled by the want of supplies and the severity of the winter, was in full retreat. It was now the time to retaliate, and James issued orders for an immediate invasion of England. But the nobles felt their own strength. They had long regarded the measures of the court with distrust, some even with indignation and a desire of revenge; they recalled to mind the proceedings of the monarch, the threatening attitude lately assumed by the crown towards the whole body of the aristocracy; and when commanded to cross the borders, they haughtily and unanimously refused. It was in vain that James, stung with such an indignity, threatened, remonstrated, and even entreated them, as they valued their own honour and his, to proceed against the English. The feeling of attachment to their prince, or revenge against the enemy seemed to be completely extinguished in a resolution to assert their power, and procure a redress of their grievances; and the sovereign was at last compelled to disband the army, and return outbraved and defeated to his capital.

e assem- es a se- nd army. he Scots tirely uted by e Eng- h. .D.1542.

There can be no doubt that so mortifying a reverse sunk deep into the heart of James, but his pride, and the natural vigour of his character supported him. Though deserted by the majority, he had still some powerful friends among the nobles, the clergy were unanimously in his favour, and it was resolved to make a second effort to re-assemhle the army for the invasion of England. Its success, though partial, once more gave a gleam of hope to the monarch. A force of ten thousand men was collected chiefly by the exertions of Lord Maxwell; with this it was resolved to break across the western marches, and the king took his station at Caerlaverock, where he eagerly awaited the result of the expedition. A distrust of his nobles, however, still haunted him; and secret orders were issued, that as soon as the army reached the river Esk, his favourite, Oliver Sinclair, should be intrusted with the chief command. Nothing could be more unwise than this resolution. It was received with murmurs of discontent; and when the new general exhibited himself to the camp, and a herald attempted to read the royal commission by which he was appointed, the whole army became agitated, disorderly, and almost mutinous. At this crisis, Dacre and Musgrave, two English officers, advanced to reconnoitre at the head of three hundred horse, and approaching near enough to perceive the condition of the Scots, boldly charged them. The effect of this surprise was instantaneous and fatal. Ten thousand Scots fled from three hundred English cavalry, with scarcely a momentary resistance. In the panic the greater number escaped, but a thousand prisoners were taken, and among them many of the leading nobles, Cassillis, Glencairn, Maxwell, Somerville, Gray, Oliphant, and Fleming.

he king es of a oken art.

This second calamity completely overwhelmed the king. He had eagerly awaited at Caerlaverock the first news from the army, and he anticipated a victory which should efface the late dishonour, and restore the feelings of cordiality between himself and his barons. In an instant the hope was blasted, and gave place to the most gloomy despondency. For their unheard-of conduct, James could find no solution but in the persuasion that his nobles had secretly conspired to betray him to England, and to sacrifice the independence of the kingdom to the gratification of their personal revenge. This idea preyed upon his mind. The feeling that his army had exposed themselves, their sovereign, and the Scottish name to contempt, took entire possession of him. He became the victim of a low fever, which had its seat in a wounded heart, and from a proud monarch, lately in the vigour of his strength and the prime of his age, he sunk into a state of silent melancholy. When in this hopeless condition, the news arrived that his queen had given birth to a daughter. He had already lost his two sons, and clung to the hope that his next might be a boy. But here too he was met by disappointment; and wandering back in thought to the time when the daughter of Bruce brought to his ancestor, the steward of Scotland, the dowry of the kingdom, he received the intelligence with the melancholy remark, "It cam wi' a lass, it will gang wi' a lass:" "It came by a girl, and will go with a girl." As he said this, a few of the most faithful of his nobles and councillors stood round his bed; and as they strove to comfort him, he stretched out his hand for them to kiss, and regarding them with great affection, closed his eyes, and placidly expired. He died in the thirty-fifth year of his age, and the twenty-ninth of his reign.

Mary, an infant eight days old, succeeds to the crown.

Somewhat more than two centuries and a half had elapsed since the death of Alexander the Third had left the country under circumstances of calamity and danger strikingly similar to those in which it now found itself in losing James the Fifth. Alexander had been bereft of all his sons, and the crown descended to an only grand-daughter, the Maiden of Norway. James had been visited by a like bereavement. His sons, Arthur and James, had been cut off, and his only daughter, Mary, an infant eight days old, was now queen. On the death of Alexander, the kingdom saw itself exposed to the ambitious designs of Edward the First, who immediately conceived the project of marrying the queen of Scotland to his eldest son. On the death of James, Henry the Eighth, a monarch far inferior in talent to Edward, but equally ambitious, and, where the rights of others were concerned, still more unscrupulous, at once embraced the design of marrying his son the prince of Wales to the infant Mary. Edward, when disappointed of his first object by the death of the infant queen, resorted to intrigue and force to accomplish his purpose; and Henry having been baffled in his ambition, not indeed by the death, but by the betrothment of Mary to the dauphin, resorted to the same weapons to effect his designs. One point of the parallel, and that the most mortifying of all, remains. In the days of Edward, Scotland was basely deserted by her leading nobility, and owed her liberty to the inherent love of freedom and the persevering courage of her people. It was the same under Henry the Eighth and Edward the Sixth. The lapse of two centuries and a half found the great majority of the Scottish nobles as selfish, wavering, and unprincipled as their ancestors in the days of Edward,—supported by the money of England, ready to sacrifice the independence of their country to their individual ambition; and if Scotland preserved her liberty as a separate kingdom, which, by the blessing of God, she did, the agents selected for her deliverance were the great body of her people, and the numerous and influential classes of the clergy. From these general remarks let us return to our historical sketch.

Intrigues of Henry with the prisoners taken at Solway Moss.

The rout at the Solway Moss, followed, as we have seen it, by the death of the king, gave an alarming advantage to Henry the Eighth. The earl of Angus, Sir George Douglas, and the numerous supporters of this house, still powerful though in banishment, had been long devoted to his interests, in the support of which they saw the only sure hope of their own restoration. To these were added the prisoners of highest rank who were taken in the late disgraceful flight. To them the English monarch now proposed an alternative, trying indeed, but in the choice of which no citizen of a free country ought to have hesitated. On the one hand, they were threatened with imprisonment in the Tower, to which they had been conducted immediately after their being taken. On the other, they were promised freedom, and a return to their native country, but coupled with extraordinary conditions. A bond was drawn up which they were required to sign. By it they acknowledged Henry as lord superior of the kingdom of Scotland; they promised to exert their influence to procure for him the government of the kingdom, and the resignation into his hands of all its fortresses; they engaged to have their infant queen delivered to his keeping; and they solemnly stipulated, that if the parliament of Scotland resisted such demands, they would employ their whole feudal strength to co-operate with England in completing the conquest of the country. To this engagement they were required to swear fidelity; and if they failed in accomplishing the wishes of the king, the penalty was to be their immediate return to their prisons in England. It must have been apparent to the Scottish prisoners that such an engagement virtually annihilated the existence of their country as a separate kingdom; and yet it is mortifying to add that it was embraced by the earls of Glencairn and Cassillis, with the lords Maxwell, Somerville, and Oliphant. These were among the chief prisoners taken in the rout of Solway Moss; the rest were of inferior rank, and remained in captivity, while Angus, Sir George Douglas, and the strength of their house, cordially co-operated with Henry.[1]

A.D. 1542.
State of parties in Scotland.

It was the policy of these lords on their return to Scotland, to conceal the full extent of their engagements, and to proceed with great caution. On their arrival they found the country divided into two factions. On the one side, was cardinal Beaton the chancellor, supported by the queen-mother Mary of Guise, the whole body of the clergy, the Roman Catholic nobility, and the interest of France. On the other stood the earl of Arran, nearest heir to the crown, a weak and indolent man, who leaned to the reformed opinions; all the nobles who had forsaken the ancient faith, the adherents of the house of Douglas, and many who, ignorant of the unjust and degrading demands of Henry, considered a marriage with England, under due safeguards, as a wise and politic step. As to the great body of the people, by which we must chiefly understand the middle and commercial classes, their feelings, as far as they can be detected, were somewhat discordant. Many favoured the reformation, and from hostility to the cardinal, gave a virtual support to Henry the Eighth and the English faction; but their feeling of national independence was so strong, that on the slightest assumption of superiority, it was ready to exhibit itself in determined hostility.

Arrival of the Douglases and the Solway prisoners.

Into the details of the struggles between these opposite factions, it belongs not to our plan to enter. We must touch only the great leading events; but these, even in their most general form, are full of interest. On the death of the king, Beaton produced a will which appointed him chief governor of the realm, and guardian to the infant queen; but the paper was thrown aside as a forged instrument; Arran, the nearest heir to the crown, was chosen governor; and the cardinal having contented himself with securing the interest and support of France, prepared for a determined struggle with his opponents. At this moment, the Douglases and the Solway prisoners arrived, of which party Sir George Douglas, brother to Angus, and father of the celebrated regent Morton, was the leader. Their first act was bold and successful. Beaton was arraigned of a treasonable correspondence with France, and hurried to prison; a parliament was summoned for the discussion of the proposed alliance with England; and as the governor, Arran, appeared to be completely under English influence, it was confidently expected that Henry's schemes of ambition were not far from their accomplishment. But they were defeated by his own violent and intolerant conduct. He insisted on having the cardinal delivered up to be imprisoned in England; he upbraided the Douglases for their delay to surrender the fortresses of the kingdom; and instead of being contented with the proceedings of the parliament, which agreed to the marriage between the Scottish queen and his son, he expressed the most violent resentment, because the estates insisted that their country should preserve its liberties as a separate and independent kingdom.

Imprisonment of Cardinal Beaton.

Beaton r gains his berty and places hi self in o position Henry VIII.

Amidst these collisions the secret treachery of the Douglases and the Solway lords began to transpire. Beaton nearly about the same time recovered his liberty, and after an ineffectual attempt to secure a matrimonial alliance with England on just and equal grounds, he placed himself and the great party of which he became the leader in determined hostility to Henry. A last effort, however, was made, and a Scottish embassy sought the English court. In a personal interview, the ambassadors explained to the king the conditions on which the country would agree to the marriage. To their astonishment, the monarch, overcome by passion, proclaimed himself lord paramount of Scotland, and insisted that the government of that kingdom, and the custody of its infant sovereign, belonged of right to him. This disclosure, which was made in a moment of passion, and against the earnest entreaties of the English faction, produced an instantaneous effect. It was received in Scotland, as had been predicted, with a universal burst of indignation. It gave the cardinal and the French party an immediate ascendancy; the governor, Arran, and his friends joined their ranks; and the people became so exasperated, that Sadler, the English ambassador, could not safely shew himself in the capital.

Treaty of marriage with Eng land.

To counteract all these effects, Sir George Douglas exerted himself with indefatigable activity. Henry was prevailed upon to renounce the most obnoxious part of his demands. Arran, with his characteristic caprice, deserted his new friends; and in a convention of the nobles, which was not attended by the opposite faction, the treaties of marriage and pacification with England were finally arranged. Yet although, as far as it was promulgated to the people, the negotiation now concluded, preserved entire the rights and liberties of Scotland, a paper has lately been discovered, drawn up at the same time, and entitled *a secret Device*, in which the earls of Angus and Glencairn, with lord Maxwell, Sir George Douglas, and the rest of their party, once more tied themselves to the service of the English king, and promised that, if he did not accomplish the full extent of his designs, he should at least have the dominion on this side the Forth.[2]

Treachery of the ear of Arran.

To fulfil this treaty, however, was found no easy matter. It was averred by the opposite faction, that it had been carried through by private influence, unsanctioned by the highest nobles, unauthorized by any parliament, contrary to the wishes of the people; and at this very crisis the cardinal obtained possession of the person of the infant queen, who had hitherto been strictly guarded by the governor and the Hamiltons. To balance this success, Arran, whose character had hitherto been only weak, became alarmed at the success of the cardinal; and, flattered by a proposal of the English king to make him sovereign of Scotland beyond the Forth, declared his readiness to co-operate with an English army for the entire subjugation of the country. In the mean time, he held a convention of the nobles in the abbey church of Holyrood, and in his character of governor of the realm, ratified the marriage treaty with England, unmindful of the protestations of Beaton and his party, that they were no parties to such a transaction, and would not hold themselves bound by a decision contrary to the opinion of the majority of the nobles and the wishes of the people.

Violence of the English king.

Henry the Eighth, enraged by this opposition, acted with his wonted impetuosity and want of principle. He intrigued against the life and liberty of the cardinal, but his plots to get possession of the prelate were unsuccessful; he seized the ships of the Scottish merchants which were in English ports, a measure which was deeply resented; and he assumed that tone of haughty defiance, which, when united to his hostile preparations, made it apparent that war could not be long averted. France now offered her assistance to her ancient ally. The earl of Arran, ever wavering and irresolute, once more threw his whole influence into Beaton's hands; and this minister, availing himself of an accession of strength, proceeded with a vigorous hand to suppress heresy, and to inculcate determined resistance to England.

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[1] Sadler's State Papers, vol. i. pp. 69, 81.

[2] Tytler's History of Scotland, vol. v. p. 339.

Mary.
A.D. 1543.

Henry en-
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ssassinate
Beaton.
nvasion by
Henry.

Henry, who was thoroughly unprincipled, and cared not what means he used to rid himself of his opponents, attempted to remove the cardinal, by hiring Brunston, Grange, Rothes, and some of the opposite faction, to seize or assassinate him; but he once more failed in this nefarious project, and, foiled and irritated, let loose his vengeance in the shape of a naval invasion. An English fleet of a hundred sail, under lord Lisle, high admiral, appeared suddenly in the Forth, and disembarked a force which plundered Leith, sacked Edinburgh, which had been deserted by its inhabitants, ravaged the adjoining country with merciless cruelty, and left upon land a considerable force, which, in its retreat, was as remorseless in its devastations as the fleet had been in its attack. Such was Henry's mode of wooing, of which it was well observed by lord Herbert, that he did too much for a suitor, and too little for a conqueror.

It might have been expected that the rival leaders and factions in the state, all of whom had suffered by this invasion, would have had their eyes opened to the necessity of saving the country, by uniting their strength; but in vain the cardinal strained every effort to effect so desirable a result. Mutual jealousies, feudal quarrels, renewed intrigues with England, private bonds or covenants among themselves, all co-operated to destroy any cordial union; and the earls of Lennox and Glencairn, two of the most powerful of the Scottish barons, seized this opportunity to sell themselves to Henry, and to conduct a hostile expedition into the heart of Scotland.

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uir.
D. 1544.

It was at this moment, when all was gloom and despondency, that the earl of Angus, who, with his brother, had been lately restored to his estates, and absolved in Parliament from the sentence of treason, encountered and totally defeated Sir Ralph Evre and Sir Brian Layton at Ancram Muir. These English leaders had procured from Henry a grant of all they could conquer in Teviotdale and the Merse, where Angus's estates chiefly lay; and penetrating at the head of five thousand men to Melrose, they not only ravaged that district, but plundered the abbey, and wantonly defaced the tombs of the house of Douglas; an insult which Angus revenged in the most signal manner, by attacking the English in their retreat, dispersing their force, with the slaughter of eight hundred men, leaving Evre and Layton dead on the field, and making a capture of one thousand prisoners.

This victory, although resulting not from patriotic principle, but personal revenge, had a good effect in restoring confidence to the people; and it was followed up by the resolution of Francis the First to equip a fleet for the invasion of England, and to assist Scotland by an auxiliary force. Beaton, encouraged by this expected aid, having concentrated his party, prevailed upon the majority of the nobles, in a convention held in the capital, to refuse every advance of the English monarch, and to declare the treaty of peace and marriage at an end; while Henry, enraged to the utmost pitch by this success, eagerly encouraged a second plot of the earls of Cassillis, Angus, and Glencairn, for the murder of the cardinal. The king, however, enjoined Sir Ralph Sadler to propose the assassination, as coming from himself, and the conspirators at this moment would not act without Henry's direct approval.[1]

Mary.
A.D. 1544.
Arrival of a
French
fleet.
A.D. 1545.
Hostilities
continued.

In the midst of these dark plots, a French fleet arrived in Scotland with three thousand men. This led to decisive measures. A Scottish army was assembled; but torn as usual by internal dissensions, and betrayed by the Douglases, who held a principal command, its operations were insignificant, and its retreat almost immediate. This was followed by a cruel invasion of the English, in which the earl of Hertford, at the head of an army, whose numbers rendered opposition fruitless, invaded Scotland, and after a desolating progress, sent word to his master, that for three hundred years there had not been such ravages committed. Seven monasteries and religious houses, sixteen castles and towns, five market towns, two hundred and forty-three villages, thirteen mills and three hospitals, were burned down during this atrocious expedition; and there still exists a characteristic letter, in which Henry, on receiving some French deserters into his service, enjoins them to show their attachment by some notable exploit, such as the "trapping or slaying the cardinal." He, at the same time, engaged the earl of Lennox, and Donald, lord of the Isles, to attack Scotland on the west coasts; and having heard that Beaton, his able and indefatigable enemy, meditated a visit to France for the purpose of subsidising a large auxiliary force for the continuance of the war, he determined to make a last effort to cut him off, and with this view, resumed with the laird of Brunston the plot for his assassination.

Conspiracy
to assassinate Beaton.
A.D. 1545.
Murder of
the Cardinal. June
1545.

Into the details of this remarkable conspiracy, and the various parties whom Henry contrived to bring together for the execution of his sanguinary purpose, we cannot here enter.[2] Fanaticism of the sternest kind, which had been worked up into action by the cardinal's cruel execution of George Wishart, commonly called the martyr, united itself to more mercenary motives with some of the conspirators, and with others, to the desire of private revenge; and on the morning of the 28th of May, a band of desperate men, who are now known to have been in the pay of England, and some of whom had been on former occasions urged by the English king to the commission of the murder, broke into the cardinal's apartments in the castle of St. Andrews, beat down the barricades with which the miserable man had attempted to defend the door, and putting him instantly to death, hung out his naked and mangled body over the window of his bed-chamber, in savage and brutal triumph. They then seized the castle, dismissed unharmed the household servants of the cardinal, sent off a messenger to the English court to inform Henry of their success; and being soon afterwards joined by John Knox, and a considerable band of his friends, who considered the death of Beaton as favourable to the reformation, they determined to defend the castle for Henry against any force which might be brought against them.

Death of
Henry
VIII.
Accession
of Edward
VI.
Measures
of the
Protector
Somerset.

These confident anticipations were, for a time, overthrown by the death of Henry the Eighth, an event soon followed by that of his rival Francis the First; but the accession of Edward the Sixth in England, and that of Henry the Second in France, did not materially alter the policy of either kingdom towards Scotland. In England, the protector Somerset, who was placed at the head of the government during the minority of his royal nephew, considered himself bound to enforce the observation of the marriage treaty between Edward and the young queen of Scots; while in France, Henry the Second, devoted to the cause of the Catholic church, and directed in his affairs by the Guises, foresaw at once the necessity of an intimate union with Mary of

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[1] Tytler's History of Scotland, vol. v. pp. 388, 389.

[2] The whole of the plot, as it is to be traced in authentic letters in the State Paper-Office, will be found detailed in Tytler's History of Scotland, vol. v. p. 387—391, and in an Appendix to that volume, entitled, "Historical Remarks on the Assassination of Cardinal Beaton."

Mary. A.D.1545.

Guise the queen-dowager, and the governor Arran; his policy being to arrest the spread of the reformed opinions, and to weaken England in the quarter to which Somerset looked for an easy triumph.

Arrival of a French fleet in Scotland.

For nine years after the assassination of Beaton, the earl of Arran continued at the head of the government; and during that period some events took place which drew after them important effects. The warlike preparations of Somerset induced the French government to anticipate his motions; and a French fleet of sixteen armed galleons having entered the Frith, bombarded and carried the castle of St. Andrews, in which the conspirators against Beaton, and Knox the Scottish reformer, had deemed themselves secure.

Knox called to the ministry. A.D.1546.

It was when shut up in St. Andrews, that this extraordinary man first assumed the office of a minister of the reformed religion; but having capitulated with the rest, he was embarked with his associates for France, and on his arrival there, kept a prisoner in chains on board the galleys. He remained on the continent till 1550, when he he returned not to Scotland, but to England, and became one of the chaplains to Edward the Sixth.

Somerset invades Scotland. Battle of Pinkey. A.D.1547.

Immediately after the siege of St. Andrews, the protector Somerset invaded Scotland at the head of an army of fourteen thousand strong, and supported by a fleet of thirty-four ships of war. He was met by Arran, the governor, at Musselburgh, or Pinkey-cleugh, within about six miles distance from the capital, where an army considerably more than double the number of the English had encamped in so strong a position on the banks of the Esk, that with proper military skill on their part, any attempt to dislodge them might have brought ruin on their assailants. The inexperience and folly of Arran, the governor, threw away this advantage. He mistook a movement of Somerset, in which the English leader meant to possess himself of an adjoining height, for an intention to communicate with his fleet and reimbark his army; and contrary to the remonstrances of his best officers, he gave orders for the whole army to strike their tents and cross the river on which he had encamped. The order was at first resisted, at last unwillingly and imperfectly obeyed; and in the midst of the confusion which ensued, the English attacked the Scottish divisions in detail, and after a sanguinary conflict, gained a complete victory. Fourteen thousand were slain in the battle and in the chase, while the English loss was comparatively trifling.

Since the fatal day of Floddon, Scotland had sustained no defeat in the least degree approaching to this at Pinkey, and had it been followed up by the Protector, the consequences must have been of the most serious kind, perhaps fatal to the liberty of the country. But happily Somerset, at the very moment of his victory, received accounts of a conspiracy which his enemies at the English court had organized against him; and impatient to confront them in person, his measures were hurried, confused, and ill-digested. After a brief stay in the capital, he commenced his retreat through Teviotdale, and the fleet at the same time weighed anchor and returned to England.

Mary sent to France, and betrothed to the Dauphin.

The consequences of the defeat at Pinkey, and the effects of a subsequent and cruel inroad into Annandale by Lord Wharton and the earl of Lennox, were to exasperate the feelings of national antipathy, and to throw the governor and the queen-mother more decidedly into the arms of France. A convention was held at Stirling, in which it was determined to request the immediate assistance of a French force, and to send Mary, the young queen of Scots, to be educated at the court of Henry the Second. Soon afterwards, the Sieur Montalembert, commonly called Monsieur d'Esse, one of the ablest officers in the service of that country, arrived in Scotland with six thousand men. In a parliament held at Haddington, the marriage of the French dauphin to the queen of Scots was finally determined; and the infant Mary, then in her sixth year, took her voyage to France, accompanied by lords Erskine and Livingston, her governors, and arrived in safety at the court of St. Germain, in August 1548.

Mary. A.D.154

War with England. Peace c cluded.

It belongs not to an historical sketch of this kind, to enter into the details of that sanguinary and obstinate war which now took place between England and the united strength of France and Scotland. The slaughter at Pinkey, the burning of their sea-ports and shipping, and the pitiless severity with which the repeated invasions of their country were accompanied, had at length animated the Scots with a common feeling of revenge, which gave to the contest a character of peculiar ferocity, and manifested itself in shocking excesses. Happily the struggle did not continue long. The peace of Boulogne, between France and England, led, in 1550, to a cessation of hostilities in Scotland, where for some time before, the tide of success had run in favour of the governor and his foreign auxiliaries; and thus, after a war which had lasted for seven years, dating it from the year 1543, when Henry the Eighth determined to enforce the observation of the treaty, the English saw themselves obliged to abandon the extravagant project of compelling the Scots into a matrimonial alliance.

Mary of Guise obtains the regency A.D.155

This war, for the accomplishment of the marriage, was not long afterwards followed by the still more important and eventful struggle for the establishment of the reformation, the history of which may properly be divided into the war of opinion, which extended from the arrival of Knox in Scotland in 1555, to the attack upon Perth in 1559; and the actual war between the Congregation and their opponents, which was comparatively of short duration, and concluded in the treaty of Edinburgh and the triumph of the party of the Congregation, in 1561. How difficult is it, in the narrow compass allowed us for this picture, to do justice even to its prominent outlines? The queen-dowager, Mary of Guise, a woman, by the confession of her enemies, of good judgment, and sincere and upright principles, succeeded in procuring the retirement of Arran and her own nomination to the regency, (April 1554). She was enabled to accomplish this chiefly by the influence of France, then high in Scotland; but she was assisted also by the leaders of the protestant party, whom she courted and attached to her interest. Her possession of the supreme power was soon followed by the death of Edward the Sixth and the accession of Mary, a princess, as is well known, sincerely devoted to the ancient faith; but these changes were not accompanied by any important political events. The queen-dowager, indeed, when she saw England and Spain engaged in Italy in a struggle with France and the pope, deemed it her duty to suport her country and attack England; but although the Scottish barons assembled an army, it was only to act on the defensive; they refused to cross the border, and the Regent, hitherto on the most amicable terms with the nobles, dismissed them with undissembled resentment.

Marriage of Mary t the Dauphin. A.D.1557. Accession of Queen Elizabeth. A.D.1558.

To make up for this disappointment, the marriage between the young queen of Scots and the dauphin was concluded with much solemnity at Notre Dame; and in a parliament held at Edinburgh, it was agreed that the youthful husband should bear the title of king of Scotland during the continuance of the marriage, that all letters in Scotland should run in the joint names of Francis and Mary, and that the arms of both kingdoms should be quartered in the great seal and the current coin of the realm. These transactions had not been long concluded, when Mary of England, broken-hearted by the loss of Calais and the neglect of Philip, sunk into the grave; and Elizabeth's accession to the throne was hailed with universal delight by the protestant party in Europe.

Progress o the Reformation in Scotland.

When the English queen placed herself at the head of the reformation, this great moral revolution had made no inconsiderable progress in Scotland. The return of Knox to his native country in 1555, and the influence which his ary and rancis. .D.1557.

fiery zeal and popular eloquence soon gained over the Congregation, determined them to make a formal separation from the Catholic Church; and although the reformer was once more compelled, probably by fears for his life, to retreat to Geneva, the danger appears soon to have passed, and the leaders of the Congregation, conscious of increasing strength, entered into that memorable bond or covenant, by which they engaged to establish the word of God, to maintain the gospel of Christ, to labour to have faithful ministers, and to execute judgment upon what they termed the superstitions and abominations of the ancient faith.

This bond was little less than an open declaration of war against the established religion; and lest it should be misunderstood, the lords of the Congregation at the same time passed a resolution, declaring, that in all parishes the common prayer, by which was meant the service book of Edward the Sixth, should be read in the churches by the curates, if qualified to perform this service, if not, by others in the parish who were qualified. It was resolved at the same time, that doctrine, preaching, and the interpretation of Scripture should be used privately, until it pleased God to move the prince to grant public preaching by faithful ministers.

rning of alter ill. D.1558.

The Roman Catholic clergy received such a denunciation of the national faith with alarm and indignation; and resorting once more to those weapons which had already so deeply injured their cause, they deemed it expedient to hold up an example which should strike terror into the new converts. Walter Mill, a priest who had embraced the reformation, was seized, tried, delivered over to the secular arm and burned at St. Andrews. The people, however, only execrated the cruelty of which he was the victim, and his last words were never forgotten. "I am now fourscore and two years old, and could not have lived long by the course of nature; but a hundred better shall rise out of the ashes of my bones, and I trust in God I am the last who shall suffer death in Scotland for this cause." A pathetic declaration, and happily prophetical.

mon- nce of Congre- on. D.1558.

Against this cruel execution, the lords of the Congregation, Glencairn, Argyll, Morton, Erskine of Dun, and others, presented a remonstrance to the queen-dowager. It was impossible, they said, that her Grace could be ignorant of the controversy which had arisen between them and the popish clergy, concerning the true religion and the right worshipping of God. They denounced the power which was claimed by these priests of dictating their creed under the penalty of fire and faggot, and declared, that although hitherto they had remained quiescent under such abuses, they now were persuaded, that they, "as part of that power which God had established in the land," were bound to defend their persecuted brethren. They proceeded still more boldly to state, that a reformation of abuses was necessary, not only in religion, but in the temporal government of the state; and after claiming for themselves the free right of assembling in public or private, hearing common prayers, and having the sacrament of the Lord's Supper administered in the vulgar tongue, they concluded by declaring that they were willing that the controversy between themselves and the Catholic priesthood should be determined by a reference to the New Testament, the writings of the fathers, and the laws of the emperor Justinian. This declaration was soon after followed by a supplication to parliament, in which they requested that all statutes by which churchmen were empowered to proceed against heretics, should be suspended until the controversies in religion were determined by a general council of the church.

P eed- in of the qu n- d ger.

This petition was received by the queen-regent with concealed dissatisfaction, by the great body of the Roman Catholic clergy with undisguised scorn and reprobation. It suited however the regent at this moment to dissemble. She required the aid of the protestant lords to carry her favourite measures in this parliament, the obtaining the crown-matrimonial and the title of king of Scots for the dauphin; and intreating the lords of the Congregation to withdraw their petition and articles for a season, she promised them her protection, and a favourable consideration of their demands. To this they agreed, but under a protestation which was publicly read in parliament. It proved by the manner in which it was worded that they knew their own strength; and, in the event of a refusal, were prepared to enforce their demand for liberty of conscience and a thorough reformation of the church.

Mary and Francis. A.D. 1558.

A.D. 1558. Progress of the Reformation in Scotland.

It was at this crisis, when the lords of the Congregation had taken their stand on the ground which they never afterwards deserted, and when the queen-regent, having obtained her wishes, considered herself independent of their support, that Elizabeth succeeded to the throne, and Knox, who soon after his first return had left Scotland, again arrived in his native country. Both events produced the most important effects. It was one of the great principles of Elizabeth's policy to increase her own security by weakening her neighbours; to accomplish which, she invariably fomented a secret faction which opposed itself to the existing government. We have already seen how lightly the feudal nobility of Scotland were accustomed to regard the power of the crown or the laws of the realm, if they interfered in any prominent manner with their personal freedom or privileges; and the history of the country, from the rebellion in the reign of James the Third, to the moment when they so recently refused to lead their forces against England, had exhibited little else than the total destruction of any balance between the fierce unbridled license of the aristocracy, and the decreasing influence of the crown and the laws.

Of those nobles who had been ready, without any feelings of shame, to renounce their allegiance to their country, and to be bought over by England, many had embraced the principles of the reformation. To men so long accustomed to make their personal interest the measure of their duty, and to think and act as they pleased, a revolution which contended for liberty of conscience and the license of private judgment, must have warmly recommended itself; and when they considered the history of the English reformation, and the appropriation of the church lands by Henry and Edward, they could not, we may believe, be totally dead to the lesson. The church of Rome in Scotland was comparatively as rich as her sister had been across the border; and if the reformation was to be as complete in their own country as in England, it was not difficult for these shrewd barons to persuade themselves that they might imitate, perhaps improve the example.

Influence acquired over the Congregation by Elizabeth.

Over an aristocracy of such a character, Elizabeth and her ministers at once perceived how easy it would be to acquire an influence. Her policy at home was to avoid war, and to enforce in every department of the state the most rigid economy. Her policy abroad, as already observed, was to give her neighbours full employment within their own realm, by secretly encouraging every faction which rose against the government. From the first moment of her accession, therefore, she favoured the leaders of the Congregation, directed their measures, supported them with money, and received from them in return a respect and deference superior to that which they paid to their own sovereign.

Influence of Knox. Change in the feelings of the people.

But if the effects of the accession of Elizabeth upon the body of the Scottish nobles, were important in reference to the reformation, the consequences of Knox's re-appearance were not less momentous upon the character of the people. Hitherto the healthy patriotic feeling, the resolution to defend their independence as a separate kingdom from foreign domination and attack, had existed almost exclusively in the middle and lower orders, the commercial classes, and the labourers of the soil. But among these, the principles of the reformation had taken a deep root. They had adopted

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them, not like many of the nobles, from interest, but from conviction; and upon their minds the popular eloquence of Knox, his fiery zeal, his denunciations of superstition, his sarcastic attacks upon the ignorance and the vices of his opponents, produced a powerful impression. Till this period they had been wont to regard France as their ancient ally, and England as their ancient enemy. But France was now held forth to them, in the discourses of their favourite preacher, as their bittcrest foe, because the enemy of their soul's health; while England was the land of gospel light, and its queen the princess to whom, as the bulwark of the truth, they ought to look with affection and admiration.

Such were the feelings of the Scottish nobles, and the great body of the people, with reference to the momentous struggle between the reformation and the Roman Catholic faith, which was now about to convulse the country. Had the queen-dowager continued to act with the same judgment and caution which had distinguished the commencement of her government, it is possible that the struggle might have been for a time averted; but at this moment the powerful princes of the house of Guise deemed it expedient to join the league which had been concluded between the pope, the king of Spain, and the emperor, for the destruction of the protestants, and the re-establishment of the catholic faith in Europe. They immediately communicated with their sister, the regent, in Scotland; and such was unfortunately their influence over her mind, that after a feeble resistance she joined the papal coalition.

A.D. 1558. Collision between the Catholics and the Protestants.

This fatal step was followed, as might have been expected, by an immediate collision between the two parties. In a convention of the clergy which was held at Edinburgh, in March 1559, the lords of the Congregation, in addition to the demands which they had already presented, insisted that bishops should not henceforward be elected without the consent of the gentlemen of the diocese, nor parish priests except by the votes of the parishioners. These proposals were met by the queen with a determined refusal. A proclamation was issued, commanding all persons to resort daily to mass and confession. It was declared that no language but the Latin could be used in public prayers, without violating the most sacred decrees of the church; and the protestant ministers who had acted in defiance of these injunctions, were summoned to appear at Stirling, and there answer to the accusations which should be brought against them.

They accordingly did appear; but it was with Knox at their head, and surrounded by crowds of their devoted followers, who were led by the principal barons of Angus and Mearns. On reaching Perth, however, it was judged expedient to attempt a measure of conciliation; and Erskine of Dun, a gentleman of ancient family, and grave experience, leaving his brethren, proceeded to the court at Stirling, where he was admitted to an interview with the regent. He assured her that their single demand was to be allowed to worship God according to their conscience, and to secure liberty for their preachers. She replied, that if he would prevail on the Congregation to disperse, their preachers should be unmolested, the summons discharged, and their grievances redressed.

Duplicity and severity of the queen-regent.

To this Erskine consented. He communicated the agreement to his brethren; the people were disbanded; and when the reformers looked for toleration and redress, the queen-dowager, with a perfidy which was as base as it was unwise, reiterated the summons, and on their failure to appear, denounced the ministers as rebels. Such conduct inflamed the resentment of the Congregation to the utmost degree; and Knox having seized the moment to deliver a stern and impassioned sermon against idolatry, the people were wrought up to a state of high excitement. Observing a priest about to celebrate mass, after the preacher had retired, they burst in upon the altar, tore down its ornaments, shivered the shrines and relics, and speedily demolished every monument which seemed to savour of idolatry. From that moment the fate of the Roman Catholic church in Scotland was decided. Having once broken through restraint, and found their own strength, the multitude rushed to the religious houses of the Black and Grey friars, and inflicted on them an equally summary vengeance. They then attacked the charter-house or Carthusian monastery, which experienced a similar fate; and the infection of tumult and destruction spreading throughuot the country, many excesses of the same kind were committed in the provincial towns. That Knox or his disciples directly advised such spoliation cannot be proved; that the principles which he laid down, and his stern denunciations of his opponents as idolators, led to these excesses, is certain.

The effects of such scenes on the queen-dowager, were to rouse her to instant activity, and to array the two parties in determined opposition to each other; for although some of the protestant leaders, disclaiming all intentions of rebellion, disapproved of the late violence, and still acted with the regent, their neutrality was so short-lived that it scarcely demands attention. It had the effect, however, of producing a momentary spirit of conciliation. The protestants presented an address to the queen, to the nobility, and to the Roman Catholic clergy. In the first they professed their loyalty, deprecated her injustice, and demanded liberty of conscience, and the right of hearing their own preachers. In the second they vindicated their conduct to their brethren of the Roman Catholic nobility from the charge of heresy and sedition, while they upbraided those who first espoused and now deserted their cause. The third epistle to the Roman Catholic clergy, whom they broadly stigmatized as the generation of antichrist, was a denunciation of war, composed in that spirit of coarse and abusive railing which unfortunately marks the style of the early reformers. Such accusations were little calculated to produce pacific feelings; but the queen-regent, who had assembled her army, finding it inferior in strength to the Congregation, proposed an armistice, which on certain conditions was accepted. The Congregation having bound themselves to each other in a new covenant, disbanded their forces, and for the second time, as they allege, were overreached by the treachery of the dowager, who, against a solemn stipulation, occupied Perth with a body of French soldiers, expelled the magistrates who favoured the reformation, and garrisoned the town with troops in the pay of France, though in reality Scots.

This unwise and unjustifiable duplicity had the worst effects. The lord James, afterwards the regent Murray, a young man of great talents and ambition, who had hitherto adhered to the regent, though professing reformed opinions, deserted her. Argyll, a powerful and influential nobleman, followed his example; and, faithful to their renewed covenant, the army of the Congregation assembled in strength at St. Andrews. Knox in the mean time, whose voice, Sadler, the English ambassador, compares in his letters to the sound of a thousand trumpets, set out on a preaching tour through the country. Directing his powerful and popular eloquence against the evils of superstition, and the misery of the thraldom which, by means of foreign mercenaries, the house of Guise were attempting to fix upon their country, he so powerfully excited the people, that they determined to take the reformation into their own hands, and levelled with the ground the monasteries of the Franciscan and Dominican orders. It was in vain that the regent exerted herself to check these popular outrages. The phrensy gained strength; the nobles and leaders of the Congregation felt proportionally encouraged, and advancing with their forces upon Perth, they opened a cannonade, and in a short time made themselves masters of the town. Stimulated to a high pitch of excitement by such success, the multitude, contrary to the entreaties of Knox, attacked and destroyed the abbey church and palace of Scone; after which, a portion of the army of the Congregation, under the lord James and Argyll, made a rapid march upon Stirling, which they occupied, hastened afterwards to Linlithgow, and having in both towns pulled down the altars, destroyed the shrines, and, as they said, purged the places of idolatry, they compelled the regent to make a rapid retreat to Dunbar, and entered the capital in triumph, in June 1559.

This last success, while it gave the highest courage to the party of the reformation, convinced the queen-regent that every hope to avoid a civil war must be abandoned, and that the crisis called for her most determined exertions. She instantly communicated her dangerous situation to France, and received in return a large reinforcement of French troops, whose discipline, skill, and equipment, being superior to the common feudal militia which the Congregation brought into the field, at once gave her a superiority. The reformers, on the other hand, threw themselves upon the protection of England; and Elizabeth, although she scrupled to send them either money or troops, encouraged them with general promises of approval, and, in case of extreme danger, with some hopes of support. In addition to this, her minister Cecil hinted in his letters the expediency of using their present power to "strip the Romish church of its pomp and wealth," and, as he termed it, "to apply good things to good uses;" while the terms in which the Congregation replied, seem to point to a more secret communication, in which this unscrupulous politician had advised the deposition of the regent, and a change of the government. It is certain that the necessity of such a measure had been for some time contemplated by the Congregation, but it was to be resorted to as the last extremity. In a letter from Kirkcaldy of Grange, one of their principal leaders, addressed to Sir Henry Percy, (1st of July 1559), and explanatory of their intentions, he declared that if the regent would consent to a reformation conformable to the pure word of God, cleanse the popish churches of all monuments of idolatry, suffer the book of common prayer published by Edward the Sixth to be read, and send away the French troops, they were ready to obey and serve her, and to annex the whole revenues of the abbeys to the crown.

For the queen-dowager to have agreed to this would have been equivalent to the giving up of the whole question, and would have been to establish protestantism on the ruins of what she esteemed the true church. She accordingly met the demands of the Congregation by a peremptory denial. In return they withdrew from her their allegiance, and in the name of their sovereign, whose authority they unscrupulously assumed, suspended her from the high office which she had abused.

The war now broke out with a violence proportioned to the exasperated feelings of either faction. The Congregation, at first intimidated by the superiority in the discipline of the French troops, began to dread a calamitous result; but they soon saw themselves strengthened by the arrival of an English fleet, while a land force under the duke of Norfolk advanced to Berwick, and after a negotiation with the reformed leaders, pushed forward into Scotland, and was joined at Preston by the army of the reformers.

It belongs not to this sketch to enter into details of hostilities, and happily for both countries the war was of brief duration. The queen-dowager, sinking under a broken constitution, died at Edinburgh, on the 10th of June 1560. The Congregation, disheartened by some reverses, and weakened by disunion among their principal leaders, felt no inclination to prolong the struggle; and Elizabeth having offered her services as a mediatrix between the two parties, a meeting of the English, French, and Scottish commissioners took place at Edinburgh, by whom a treaty of peace was concluded, having for its basis the withdrawal of the French troops from Scotland, and a recognition of the validity of the treaty of Berwick between Elizabeth and the party of the congregation. Into this last proviso the French commissioners sent over by the young queen of Scots and her husband the dauphin, were entrapped by the diplomatic skill of Sir William Cecil, one of the English commissioners, contrary to their express instructions; and its validity was never admitted by the Scottish queen; but in the mean time it greatly strengthened the hands of the Congregation. At the same moment the leaders of this party presented to the commissioners certain "articles" concerning religion; but Elizabeth had directed Cecil and Woolton to decline all discussion upon the subject; and the reformers, who looked to the convention of Estates for the settlement of the question, did not press the point.

Parliament at Edinburgh.
A.D.1560.

A parliament accordingly assembled at Edinburgh, on the 10th of July 1560. The lesser barons who had for some time suffered their rights of sitting in the convention of estates to fall into disuse, were mostly attached to the doctrines of the reformers, and looked with deep interest to the debates which were about to take place on the subject of religion. They accordingly met, claimed their right, and after some opposition, were allowed to take their place. This threw a preponderating weight into the party of the Congregation; and the "Confession of Faith," together with a "Book of Discipline," which embodied the great principles of a reformed church, and protested against the errors, abuses, and superstitions of the Roman Catholic faith, was submitted to Parliament. The Confession of Faith passed with little opposition. This remarkable paper, or rather treatise, professes to be a summary of Christian doctrine founded on the word of God; and although drawn up by Knox and his brethren in a very short space, embodied the result of much previous study and consultation. It is worthy of observation, that at this early period, the church of Scotland, in explaining the articles of its faith, approaches indefinitely near to the Apostles' creed, and the articles of Edward the Sixth; and that where it differs, it leans more to the side of catholicism than ultra-protestantism.

Confession of Faith.

Three acts followed the adoption of this Confession of Faith. The first abolished for ever in Scotland, the power and jurisdiction of the Pope; the second repealed all former statutes passed in favour of the Catholic church; the third inflicted the highest penalties upon any who thenceforward should dare to say or to hear mass.

Book of Discipline.

All this met with little opposition; but the Book of Discipline, by which the future government of the church was to be determined, gave rise to the keenest debates. "Some of the nobles and barons at once refused to sign it; others did sign, but eluded its injunctions; others mocked at its provisions, and called them devout imaginations."[1] The cause of this is attributed by Knox to its interfering with the privileges and property of many powerful barons who had already "griped the possessions of the church." It also discouraged other expectants, "who thought they would not lack their part of Christ's coat."[2] The first class, according to the same authority, had no remorse of conscience, nor intended to restore any thing of that which they had long stolen or reft. The second were no doubt afraid, that if the ministers were first provided for, little or nothing would be left for them.

Provisions of the Book of Discipline.

In considering its provisions it is material to notice, that it committed the election of ministers solely to the people, using, however, the precaution that the minister so chosen, before he was admitted to the holy office, should be examined and approved of by the ministers and elders, upon all points of controversy between the church of Rome and the

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[1] Tytler's History of Scotland, vol. vi. p. 219.

[2] Knox's History, p. 276.

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Mary and Francis. A.D.1560.

Congregation; after which he was to be considered an ordained minister, without any further solemnity, it being observed that although the apostles used the imposition of hands, it was intended to impart, and did impart miraculous powers, and "the miracle having ceased, the using the ceremony was judged henceforth unnecessary." The country was divided by it into ten dioceses, over which ten ministers, named Superintendents, were appointed, whose duty it was to be ambulatory preachers, and to inquire, in the course of their progress, into the lives of the clergy, the provision for the poor, and the proper instruction of youth. It is in this last clause that we meet with the first proposal of that admirable institution of parish schools, to which Scotland has since owed so much of her prosperity. Having thus established their reformation, the Parliament appointed an interim provisional government, confirmed the treaty of Berwick which had been entered into between Elizabeth and the Congregation, and proposed that as a basis of perpetual amity between England and Scotland, there should be a marriage between queen Elizabeth and the earl of Arran, heir apparent to the crown. In conclusion, they dispatched Sir James Sandilands of Calder to carry an account of their proceedings to their sovereigns in France, while Sir William Maitland of Lethington, with the earls of Morton and Glencairn, were sent on a similar mission to Elizabeth.

Mary's feelings towards the Congregation.

She refuses to ratify the treaty of Edinburgh. A.D.1560.

It was not to be expected that their youthful sovereign, educated in the bosom of the Roman Catholic church, and accustomed to look for direction and guidance to the advice of her uncles the Guises, could possibly ratify the extraordinary proceedings of this parliament. It had, by a few sweeping acts, abolished the national faith, confirmed the treaty which a faction of her subjects whom she had all along treated as rebels, had entered into with England; and by sending an embassy to Elizabeth, composed of men of higher rank and greater influence than Sandilands, who was deputed to wait upon their sovereign, it was intimated pretty significantly, that the Congregation were determined to treat the English princess with equal if not superior deference to that with which they regarded their own queen. She accordingly received the Scottish envoy with coldness, and peremptorily refused to ratify the treaty of Edinburgh.

Death of Francis the Second.

At this moment Mary had the misfortune to lose her husband, Francis the Second, the young king of France; an event which made it necessary for her to return to her own kingdom, and at once threw her from a condition of much contentment and prosperity into circumstances of extraordinary trial and embarrassment. She had been educated in the most brilliant and accomplished, but, it must be added, one of the most profligate courts in Europe. From her infancy, as queen of Scotland, and presumptive queen of France, she had been flattered and caressed; and as she was extremely beautiful, possessed of amiable manners, highly accomplished, generous, and kind-hearted, she had received from every class of her French subjects the unaffected homage of their admiration and regard. All was now to be changed; and on turning her eyes from France to her own country a melancholy contrast soon presented itself.

Parliament at Edinburgh. Character of the Lord James.

As soon as the king's death was known in Scotland, a parliament assembled at Edinburgh, of which the proceedings appear to have been overruled by the Congregation. It was resolved to invite their sovereign to return to her kingdom, and for this purpose to send the lord James to France, while the Roman Catholic party dispatched Lesley, afterwards the celebrated bishop of Ross, on the same errand. The lord James, afterwards the regent Murray, was the natural son of James the Fifth by lady Margaret Erskine, who afterwards married the laird of Lochleven. From his earliest years he had exhibited marks of an extraordinary ambition, and a genius for affairs of state. His apparently blunt and careless manner, disposed men to treat him with confidence, and enabled him, when he was least suspected, to carry on the most deep-laid and ambitious designs. At this moment he was regarded as the leader of the reformed party; and it is a remarkable proof of his talents, that, on his arrival in France, although at first suspected by Mary, he acquired an extraordinary influence over her character.

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It was the misfortune of the queen of Scots, who was now only eighteen, that she was surrounded by difficulties which would have required to meet them a matured experience, and the most attached and faithful councillors. Elizabeth, who saw her opportunity, and was determined not to lose it, dispatched the earl of Bedford to demand the confirmation of the treaty of Edinburgh; and when this was refused, she exhibited her resentment by declaring that Mary, who had at first intended to pass through England into her own realm, should receive no safeconduct; a circumstance which made her resolve to sail at once from Dieppe to Leith. But Elizabeth was at least an open opponent, and the young queen, aware of her enmity, could secure herself against it. Murray, on the other hand, to whom she too heedlessly gave her confidence, had already visited the English court on his passage to France, communicated his plans to Elizabeth, and received his instructions from Cecil, her prime minister. On his return from Paris he again passed through England, consulted with the English queen on the best methods of detaining Mary in France, and actually carried his double dealing so far as to devise means for intercepting her, should she persist in her determination and set sail. This she at last determined to do at all risks; and having had the good fortune to escape the English cruisers, which were directed to be on the look out, she arrived at Leith, and was received with the utmost enthusiasm by all classes of her subjects, (August 19, 1561).

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Difficu s of her u- ation.

These happy indications were of short duration; and when the young queen considered the state of parties in Scotland, the difficulties of her situation appeared complicated and disheartening. She was herself a conscientious Roman Catholic, warmly attached to France and the Guises her uncles. This of itself rendered her an object of suspicion and aversion to Knox, the great leader of the protestant clergy, and to the powerful nobles who had espoused the reformation. She had already peremptorily refused to sanction the proceedings of the Parliament, which had confirmed the treaty of Berwick, abolished the papal supremacy, and substituted the protestant doctrines and worship for the ancient faith. This drew upon her the enmity of England, and the English party in Scotland, led by Murray and Lethington; and as the influence of Knox and the preachers over their congregations was strong and universal, the feelings of the ministers were communicated to the great body of the people, and checked those sentiments of loyalty which manifested themselves upon her arrival. If, from such opponents, Mary turned to the body of her Roman Catholic nobles, among whom the most powerful and influential was the earl of Huntly, she found them animated indeed upon one great subject, by a community of sentiment; but then they, in common with all the nobles, had been so long accustomed to independence, and looked so constantly to the preservation and increase of their own power that, as a party, they were extremely difficult to manage. Lastly, looking to the great body of the Roman Catholic clergy, there was no one who, since the death of Beaton, had possessed that vigour of character and talent for state affairs, which were absolutely necessary in any minister to whom the queen should give her confidence, if we except Lesley, afterwards bishop of Ross.

Lord James made ief minist

It was necessary for her, however, to decide upon a line of policy; and after deliberate consideration, the queen determined to make the lord James her chief minister, and to secure the friendship and good offices of Elizabeth. In this

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D. 1563.

way she hoped to attach to herself the great body of her people, who were mostly protestants; and as from France, torn at this moment by civil and religious dissensions, she could expect little assistance, she deemed it the more necessary to preserve peace with England. Events of much interest now succeeded each other with a startling rapidity, and the history of Mary, in the brief circle of six years, presented an appalling tragedy, of which we can only give the outline.

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The first point on which the two queens came into collision was on the delicate subject of marriage. Mary's subjects wished her to marry, and she considered it wise and necessary that she should gratify their wishes. She was in the bloom of youth, extremely beautiful, and of manners so engaging and attractive, that few could see her without sentiments of admiration and regard. She was queen of Scotland, and, after Elizabeth, undoubted heir to the English throne; though this queen, from her morbid jealousy upon the subject of the succession, had never recognised her right. Mary's great object, at this moment, was to marry with her approbation, and to procure a declaration of her right of succession to the throne, failing Elizabeth's issue. She accordingly declared that she would regard her advice upon this subject as that of a mother, and consulted her sister of England with an openness and devotion which, if not perfectly prudent, appears to have been perfectly sincere.

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In return for this confidence, the conduct of the queen of England was marked by that insincerity, selfishness, and want of truth which too frequently characterised her policy. She was determined that, if Mary did marry, she should lower herself by the alliance; but she would have been still better pleased could she have so ordered matters that she should not marry at all; and, guided by this ungenerous object, Elizabeth commenced a system of intrigue, the sole object of which was mystification and delay, and in which she enjoyed the satisfaction, not only of deceiving Mary and her councillors, but of setting her own ministers at fault, and rendering it impossible for them to decipher her real intentions. In the course of these negotiations, after objecting to every foreign alliance, the English queen at last proposed her own favourite, Leicester, and held out as a bait to Mary, who justly deemed such an alliance beneath her rank, the promise that the issue, if any, of this marriage should succeed to the English throne. Nothing can be more certain than that she had no such intention; but the farce was so well acted, that not only Mary and the lord James, now earl of Murray, but Randolph, the English ambassador at the Scottish court, were deceived; and when at last the bubble broke, and it was discovered that, from first to last, Elizabeth had been playing her usual dark and double game under the mask of friendship, the indignation of the sufferers was roused, as might have been expected, to the highest pitch.

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An almost immediate and violent re-action took place. Mary had hitherto confided in Elizabeth, and consulted her upon the marriage. She now trusted her no longer, and determined, without delay, to follow her own inclination. Since her arrival in her dominions, she had favoured the protestants and rather repressed the Roman Catholics. She was now disposed to reverse the system. She had hitherto chosen Murray and Lethington as her chief ministers, had entrusted to the first almost regal power, loaded him with estates and honours, and placed him at the head of her nobility; and it was by Murray and Lethington's advice that she had shaped her policy towards England; but the road they marked out for her had led to insult, mortification, and defeat. Was it possible then, that she could continue to those two men, or to the protestant party, whom they represented, the confidence with which she had regarded them? or rather, was it not natural that, when she discovered their devotedness to Elizabeth, who had deceived and injured her, she should regard them with suspicion and distrust?

Mary.
A.D 1564.
Mary resolves to marry the Lord Darnley.
A.D. 1564
1565.

Under these circumstances, and when agitated by such feelings, Mary saw the lord Darnley, the eldest son of the earl of Lennox, who, with his father, had lately returned to Scotland. This young nobleman could boast of a royal descent, his grandmother being a sister of Henry the Eighth, and he himself, next to Mary, the nearest heir to the English throne. He was now in his twenty-first year, and had not yet discovered that weak intellect and propensity to low vices which betrayed themselves soon after his marriage. It was the misfortune of the Scottish queen that she acted under impulses. She had been deceived by Elizabeth, and she determined to shew her that she could choose for herself. Without giving herself time to study his disposition, and purposely abstaining from any previous communication of her intentions to England, she selected Darnley as her future husband, and dispatched Lethington to Elizabeth, not, as before, to ask her counsel, but to inform her of her resolution.

Elizabeth's opposition.

The consequences of this step were extraordinary. Darnley and his father were strongly suspected of being Roman Catholics. Murray and Lethington saw in this alliance little else than the demolition of their own power; the party of Knox and the kirk anticipated the restoration of the ancient religion; and Elizabeth not only declared herself hostile to the alliance, but bitterly accused the Scottish queen, insisted that Lennox and Darnley were English, not Scottish subjects, and sent them orders to repair instantly to her court. It was hardly to be expected that so ridiculous a command should be obeyed, and the opposition of England only rendered Mary more determined upon the marriage. A convention of her nobility was held at Stirling; it was numerously attended; the queen communicated to them her intention of marrying Darnley; the measure was approved without a dissentient voice; and although Murray, and the faction with whom he acted, attempted to instigate the people to opposition and rebellion, the endeavour was signally unsuccessful, and the queen carried her wishes into effect. She was married to Darnley in the chapel of Holyrood, on the 29th of July 1565.

Mary's marriage to Darnley
A.D. 1565.

The earl of Murray and the party of the kirk revolt, and are driven into England.
A.D. 1565.

Previously to the queen's marriage, Murray, Argyll, Lethington, and the party of the kirk had been encouraged by Elizabeth to rise against their sovereign; and had they received from the English queen the substantial assistance which she promised, the result might have led to the dethronement of her whom they represented as the oppressor of her nobility, and the bitter enemy of the truth. But their schemes were defeated by the energy and promptitude of the Scottish queen and the timid parsimony of her sister of England. It was in vain that Murray and his brother insurgents reminded Cecil of their desperate situation, and the necessity of speedy assistance both in money and in soldiers. Neither the one nor the other could be wrung from Elizabeth. They were proclaimed traitors, driven from one position to another by the queen of Scots, who herself headed the forces which she led against them, and were at last compelled to fly to England and throw themselves upon the protection of Elizabeth. To their dismay she disowned and repulsed them; upbraided Murray as a traitor to his royal mistress; and, although herself the encourager of their revolt, compelled them publicly to declare that she knew nothing of the matter. They were then dismissed from the queen's presence, and permitted to retire to Carlisle, where the earl of Bedford received secret instructions to supply their wants during their banishment.

While such was the course of events in England, Mary's satisfaction in the triumph over her rebels was grievously diminished by discovering that her husband was weak and profligate, the dupe of every artful companion whom he met, and unworthy of the confidence and affection with which she had treated him in the first ardour of her passion. To entrust him with any responsible share in the government was impossible; and Murray's friends who remained at court, and watched the increasing estrangement between the Queen and her husband, determined to turn it to their advantage.

Mary promotes Riccio.
Murder of Riccio.
A.D. 1565.

It was the misfortune of the Scottish queen that she had few or no servants whom she could trust. Her secretary, Maitland of Lethington, had betrayed her interests to Elizabeth, and was in disgrace, and, in the mean time, the queen had availed herself of the services of Riccio, her foreign secretary. This person had entered her service at first as a singer in her band, but afterwards, by his skill and fidelity, he raised himself to this confidential employment, much to the annoyance of the young king, who regarded him with peculiar aversion; and, incredible as it may appear Darnley having persuaded himself that he had stolen from him the affection of the young queen, resolved to assassinate him. Nor was it difficult, among a fierce and unscrupulous nobility, to find associates in his flagitious schemes. His father the earl of Lennox, Morton the lord chancellor, Lethington the ex-secretary, Murray and his friends who were in banishment, and many of the stern supporters of the reformation, who suspected Riccio of intriguing with the papal court, willingly joined in the conspiracy. The parliament was at hand in which it was intended to pronounce sentence against the banished lords: it had been reported that measures were in preparation for the establishment of the Roman Catholic faith; and it was determined to arrest both the one and the other by striking the blow against Riccio. Accordingly, when Mary, who was then six months gone with child, sat at supper in a small cabinet adjoining to her bed-room in the palace of Holyrood, the king led the conspirators up a secret stair which communicated with the apartment, while the earl of Morton and a band of armed soldiers seized the gates of the palace. The countess of Argyll, Erskine, captain of her guard, the comptroller of her household, Riccio her secretary, and one or two domestic servants formed the queen's party, some sitting at table and others being in attendance. Indeed, the little closet or cabinet was so small that three or four persons could with difficulty have seated themselves. But its narrow dimensions prevented escape and favoured the ferocious purposes of the conspirators. Led by the king they burst into the cabinet, overturned the table, and threw themselves upon Riccio, who sprung for protection behind the queen. In a moment his fate was decided. One ruffian threatened Mary with his dagger, another held a pistol to her breast, a third, snatching the king's dagger, stabbed Riccio over her shoulder; and at last tearing him from the closet, amidst the shrieks of the women, and the shouts and execrations of the conspirators, they dispatched him, or rather cut him to pieces in an adjoining apartment, with fifty-six wounds.[1]

Mary escapes, and drives the conspirators out of the kingdom.

After this atrocious murder, which, considering the situation of the queen, might have cost her and her infant their lives, the conspirators detained her as a prisoner in her palace, permitted no one but the king and their own party to hold any communication with her; and having been joined next morning by the earl of Murray and the exiles from Carlisle, it was determined to make a complete change in the government. Darnley, weak and profligate as he was, they rewarded by placing at the head of their new system, being well aware that he would soon be their tool. The queen was to be confined in Stirling till she should consent to the full establishment of the reformed religion; and the earl of Murray and his associates were to be restored to their former favour and power. In a single day all these intentions were overturned. Mary, left alone with her husband, regained her ascendancy over him; she convinced him of the perfidy of Morton, Ruthven, and his associates, obtained from him a confession of all the secrets of the conspiracy, escaped with him to Dunbar, and being instantly joined by eight thousand men, advanced with such rapidity against the conspirators, that they fled in dismay to Berwick, and solicited the protectiou of Elizabeth.

Mary's difficulties.

Birth of James V

Darnley, in his confessions to Mary, had betrayed his brother conspirators, whilst he solemnly asserted his own innocence; but Morton and his associates produced in their own defence various bonds and letters, which were signed by the king, and fully established his guilt; and Mary saw, to her inexpressible grief and disgust, that the cruel outrage was planned by her husband. From this moment this miserable prince became an object of contempt and aversion to all. His conduct had been a tissue of cowardice, cruelty, falsehood, and weakness: to treat him with confidence, or to entrust to him any share in the government was impossible; and the unhappy queen, without a stay to rest on, fell into a state of the deepest despondency. Whom indeed could she trust? Murray and his party had but recently been rebels; Morton and his associates were stained by the blood of her confidential servant, murdered at her knees; the king was the chief conspirator, the queen of England had deceived her, the party of Knox and the Scottish church regarded her with avowed aversion; and even the Roman Catholics were somewhat estranged by the preference which at first she had given to their opponents. Under these complicated difficulties, the queen pursued the course which she deemed most likely to ensure success. She broke with none, pardoned some of the conspirators, affected to believe her husband, hoping even against hope, and restored Murray to some portion of the power of which he had been deprived. Such was the state of things, when, the period for her confinement having arrived, she gave birth to a son in the castle of Edinburgh. The child was named James Charles, and on the death of Elizabeth succeeded to the English throne.

Parties in the state.

When her recovery permitted Mary to attend to the affairs of the country, it was apparent that unless immediate steps were taken to establish something like a strong government, the kingdom would fall to pieces; and yet such was the weakness and treacherous nature of the king, that to admit him to a share in it was impossible. She next turned to her nobles. Of these the most powerful were Murray, Bothwell, Huntly, Argyll, Lennox, Morton, and Lethington; but there had long existed a feud between Murray and Bothwell, while Morton, Lethington, Lennox, and their partizans were still in disgrace for the murder of Riccio. It was necessary to make an effort, and the queen succeeded in reconciling Murray to Bothwell: Huntly was made chancellor, Lethington was pardoned and restored to his office of secretary; while Murray, Argyll his brother-in-law, and Bothwell, were entrusted with the chief management of affairs.

Darnley's violent courses.

Enraged at his exclusion from power, the king sullenly retired from court, threatened to murder the earl of Murray, and at last declared he would leave the kingdom. It was in vain that his father remonstrated against his resolution; in vain that the queen herself, leading him before her council, conjured him to detail his grievances, and if she had injured him in any respect, to accuse her without reserve. He declared she had herself given him no cause of complaint; but afterwards, in a letter, he complained that he had no power in the state, that he was neglected by the nobility, and would bear it no longer. Soon after this the unhappy princess was seized by a fever at Jedburgh, during which her life was despaired of. Her enemies ascribed it to the injurious effects of a rapid ride which she took from Jedburgh to visit Bothwell, who had been wounded in a skirmish with some border thieves; it had more probably its origin in that anxiety which followed the conduct of Darnley; but be

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[1] Keith's History of Scotland, p. 283.

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this as it may, she recovered only to be the victim of more aggravated sufferings. Partial reconciliations were followed by no revival of affection or confidence; and in the anguish of a wounded spirit, she sometimes lamented that she had not died at Jedburgh.

divorce
oposed

It was in this season of depression and despair that Murray and Maitland proposed to her a divorce from the king. They had previously confided their project to Huntly, Argyll, and Bothwell; and at first Mary seemed inclined to follow their advice, provided the divorce could be lawfully procured, and without prejudice to her child. But after weighing the whole matter her opinion changed, and when Maitland urged that means could be found to free her of Darnley without injury to her son, declaring that Murray would look on and say nothing against it, she broke off the conference. "I will," said she, "that ye do nothing through which any spot may be laid to my honour or conscience; let the matter be in the state is is, abiding till God of his goodness put remedy thereto."

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arnley.

Having failed in this device, a conspiracy for the murder of the king was entered into by Maitland, Bothwell, Huntly, Argyll, and Sir James Balfour. It has been disputed whether Murray was, or was not, a party to this atrocious design. It is certain that he did not sign the bond, by which, according to the custom of this age, the conspirators bound themselves to each other. There is a strong presumption, however, that he knew of its existence; and the deed was communicated to Morton and his associates, who signed it, and agreed to support the conspirators in the execution of their purpose. Such was the state of matters when the baptism of the young prince took place at Stirling. From this ceremony the king obstinately absented himself, alleging in excuse the neglect and rigour with which he was treated. Soon afterwards he left the court and retired to Glasgow, where he was seized with the small-pox, and appeared in imminent danger. His situation appeared to awaken the tenderness of the queen. She sent her own physician to wait on him, and soon after visited him herself, and ministered to his wants. When his convalescence permitted him to be removed, she returned with him to Edinburgh, and placed him, for the benefit of the air, in a house in the suburbs called the Kirk-of-Field. It was here that the conspirators determined to carry their dreadful purpose into effect. At the solicitation of Elizabeth and the French king, Morton had been pardoned and permitted to return; and in a secret interview between him, Maitland, and Bothwell, the particulars of the murder were arranged. Bothwell undertook the chief part, and his men having obtained access to the cellars of the Kirk-of-Field, undermined the foundation, and placed gunpowder in the cavities which they had formed. According to another account, they deposited it in the queen's bed-chamber, which was immediately under that of the king. While all this had been secretly carrying into effect, Mary continued her attendance upon Darnley: their reconciliation appeared to be perfect, she often slept in the house, and on the evening of the 9th of February, when she took leave of him to attend a marriage of one of her servants, which was to be held at the palace, it was remarked that she embraced him tenderly, took a ring from her finger, and placed it on his. On that night, after she had retired to her chamber in the palace, a sudden and terrific explosion was heard, which shook the city, and it was soon discovered that the Kirk-of-Field was blown up. The dead bodies of the king and his page were found at a little distance in the garden. It is well known that this miserable catastrophe has given rise to a celebrated historical controversy, in which authors of great name and talents have taken different sides; some insisting that the queen was cognizant of the plot for the murder of her husband, and others as positively asserting the contrary. The limits of this historical sketch render it impossible that we should enter into its details.[1] In the preceding narrative we have carefully avoided the introduction of a single controverted fact; in the sequel we shall as sedulously follow the same rule.

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Scotland.
Mary.
A.D.1567.

Accusation of
Bothwell
and the
queen.

Scarcely were the citizens of the capital recovered from the horror and dismay which was incident to such a calamity, when bills appeared on the walls of the Tolbooth, which accused Bothwell of the murder, and added that the queen had assented to it. Soon afterwards, the earl of Lennox, the unhappy father of the late king, earnestly required the imprisonment of the persons named in the anonymous handbills, and Bothwell declaring his innocence, demanded an instant trial. It was granted, and Lennox received due notice of it; but on the day of trial Bothwell appeared surrounded by upwards of four thousand of his friends and adherents; and Lennox, intimidated by the array, or finding it impossible to collect sufficient proof, requested an adjournment. This, however, was peremptorily refused, and the accused was acquitted by the jury, who considered it established by sufficient evidence that Bothwell could not have been at the Kirk-of-Field when the explosion took place.

The nobles
recommend
Bothwell as
a proper
husband
for the
queen.

Bothwell
is divorced
from his
wife, and
marries the
queen.

Soon after this acquittal the Parliament assembled, and the majority of the nobility prevailed upon the queen to consent to an act by which all the grants of crown property which had been made during the present reign were confirmed, and herself and her successors deprived of all power of revocation. In the same assembly of the estates, the verdict passed upon Bothwell, which many accused as informal, was declared just and legal, and soon afterwards a bond was drawn up by twenty-four of the principal peers. It affirmed in solemn terms the innocence of this profligate baron, whom the public clamour still denounced as the murderer of the king; recommended him as a proper husband for the queen; and bound its authors, as they should answer to God, to defend him from all danger, and to promote this unhallowed marriage to the utmost of their power and ability. The tragedy now hurried on to its conclusion. Bothwell, at the head of a thousand men, intercepted the queen on her way from Stirling to Edinburgh, and carried her captive, with the slender suite by whom she was accompanied, to Dunbar castle. Among her attendants were Huntly, Maitland, and Melville, but the first two were in Bothwell's interest, and had signed the bond. The last was completely in his power, and so was the unfortunate queen. He proposed marriage, and on her refusal exhibited the bond signed by her nobles. She still, it is said, resisted his request, and hoped for a rescue; but it was a vain expectation. He became more peremptory, and if we may trust the expressions of Mary, corroborated by Melville and her enemies, he compelled her by fear, force, and other unlawful means, to yield to his wishes, and admit him to her bed. From Dunbar he now carried his victim to Edinburgh. A divorce was procured from his wife on the ground of adultery, and the process having been hurried through the court, and the sentence passed, Bothwell was married to the queen at Holyrood, within a month after his acquittal of the murder of her husband, (May 15, 1567.)

The nobles
rise against
the queen.
A.D.1567.

Events of the deepest and most tragic interest now crowded on each other. The nobles who had advised the marriage, who had acquitted Bothwell, and abetted him in his career of ambition and outrage, at once dropped the mask, assembled their forces, and declared their determination to separate the queen from the murderer of her husband. As they advanced and occupied Edinburgh, the earl and the queen retired; but in a few days they found themselves strong enough to confront their enemy on Carberry hill, near Musselburgh. Both factions, however, seemed anxious to avoid a battle, and an extraordinary agreement took place. Bothwell, whom they had declared their determination to seize and punish as the murderer of his sovereign, was permitted, without molestation, to ride off the field. The queen was assured of their unshaken fidelity; and so completely did she credit their asseverations, that she gave her hand to Grange, and suffering him to lead her to his associates, was conducted by them to the capital.

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[1] The reader who wishes to make himself master of the controversy should consult for the Queen's innocence, the work of Goodall, and that of William Tytler, with the volumes of Stuart, Whitaker, and Chalmers; against her, the Histories of Hume and Robertson, with the Dissertation by Mr. Malcolm Laing.

Mary confined in Lochleven castle.

Within an hour she discovered that she had surrendered herself to her mortal enemies. On her entering the city, a furious mob assailed her with execrations, and displayed before her a broad banner bearing the figure of her murdered husband. Amidst these indignities she was carried to a house, where she was so strictly guarded, that not even her maids were allowed access. And on the succeeding evening she was conveyed by the lords Lindsay and Ruthven a prisoner to Lochleven, a strong castle in the middle of a lake, from which all escape seemed hopeless.

Mary signs her abdication. A.D. 1567.

From those who had thus shamelessly broken their solemn engagement, little else could be looked for but additional indignity and outrage. Mary was soon visited in her prison by lord Lindsay of the Byres, whose fierce temper and brutal manners peculiarly fitted him for the mission on which he was sent. He presented to her three written instruments. By the first she was made to resign the crown in favour of her son; by the second, the earl of Murray was nominated regent during the king's minority; by the third, a temporary regency was appointed to act until Murray returned from the continent. When Lindsay threw these deeds on the table, he plainly informed the queen that no alternative was left, but either to sign them without delay, or prepare for death, as the murderer of her husband. We are not to wonder that, aware that her life was in the hands of her bitterest enemies, Mary instantly obeyed.

Coronation of the young king.

The young king was now crowned, and Murray having arrived from France, assumed the regency, and entered upon the cares of government. He had not, however, for many months enjoyed the sweets of power, when the queen, by the assistance and ingenuity of a youth of sixteen, named Douglas, escaped in the night from Lochleven, and riding first to Seaton, and next day to Hamilton, soon found herself surrounded by a band of her nobles, and at the head of six thousand men. Mary was desirous to avoid war, and addressed repeated pacific proposals to the regent, who was then at Glasgow. She offered to call a free parliament; she was ready to deliver up to justice all whom he accused as guilty of the murder, provided those whom she arraigned of the same crime were also delivered up. This was peremptorily refused, her messengers were arrested, her adherents denounced as traitors; and the queen, aware that it must come to the decision of the sword, determined to await the arrival of additional forces, when she was hurried into an engagement with the regent, who threw himself in her way at Langside, as she was on her march from Hamilton to Dunbar. The result was calamitous. Her army was completely defeated, and she herself compelled to fly from the field with a slender train, who rode to Dundrennan, a distance of sixty miles, before they drew bridle. Next day she intimated her resolution of throwing herself on the protection of Elizabeth. From this step her friends passionately dissuaded her; but she declared she would trust to the assurances which she had received from her good sister; and crossing the Solway, she proceeded through Cockermouth to Carlisle. The return for this act of generous confidence and devotedness is well known. Elizabeth refused to see her, gave orders that she should be detained, kept her in prison a miserable and heart-broken captive for fourteen years, and at last brought her to the scaffold.

Mary escapes from Lochleven. A.D. 1568.

Mary defeated at Langside, Seeks refuge in England. A.D. 1568.

From the imprisonment of Mary, (1568,) till the accession of James the Sixth to the English throne (1603,) there is an interval of thirty-five years. It is occupied by the successive regencies of Murray, Lennox, Mar, and Morton, after whose execution we have that portion of the reign of James which extends from 1581 to 1603. With a rapid review of the most interesting and influential events during this period, we shall conclude our labours.

Regency Murray.

The imprisonment of Mary left Murray the undisturbed possessor of the supreme power in Scotland; but the queen strenuously and indignantly asserted her innocence of the atrocious crimes of which she was accused; and as the English queen could bring forward no possible justification of her conduct in detaining Mary, except her alleged accession to the murder, it was evident that an investigation of the circumstances, if demanded by the accused party, could not in justice be refused. Mary offered to hear the accusation of her enemies in the presence of Elizabeth, and in the same presence to undertake her defence; but this was denied her. It was then proposed by the English ministers that she should consent to a public trial; but this she rejected as beneath the dignity of an independent sovereign. It was lastly suggested that her enemies should be summoned to produce their proofs before certain English and Scottish commissioners, and that the cause should be left to their decision.

Commission at York. Elizabeth partial co duct. A.D.156 1569.

A commission was accordingly held at York, but it led to political intrigues rather than judicial investigation. After some interval Murray was summoned to hold a private interview with Elizabeth at Westminster; and Mary again demanded to be admitted to the same presence, and confronted with her accuser. This was denied, while the English queen permitted Murray to bring forward his charge, and to attempt to substantiate it by letters, affirmed to be in the queen's hand-writing, addressed to Bothwell, and conclusive, as he contended, of her guilt. Again Mary demanded by her commissioners to be heard personally in her defence; and this being refused, they protested against further proceedings, and declared the conference at an end. Cecil, however, insisted that the inquiry should proceed; and having procured all the evidence which he judged necessary, he attempted to persuade the Scottish queen, as the only way of avoiding an ignominious exposure, to resign her crown. Her reply disconcerted him. "They have accused me," said she, "of the murder of my husband. It is a false and calumnious lie. It was themselves that counselled and contrived the murder, some of them were even its executioners. Give me what I am justly entitled to, copies of the letters they have produced; let me see and examine the originals, and I pledge myself, in presence of the queen, to convict them of the atrocious crime they have had the audacity to impute to me." This bold and unexpected tone embarrassed Elizabeth; and Mary having repeated her charge, insisted on having copies of the letters produced against her. The English queen evaded the request, and advised her to resign her crown. To this she declared that no persuasion would ever induce her; and under such circumstances the conferences were abruptly terminated. Murray, with his associates, received permission to return to Scotland. He carried away with him those alleged original letters, which the party whom they inculpated was never permitted to examine; and he left behind him copies, which were also concealed from Mary and her commissioners. It is from these copies, which the accused was never permitted to compare with the originals, that future authors have been obliged to infer the guilt or innocence of the queen; and certainly, if the opinion of Elizabeth is entitled to weight, it is clear that she considered the proof as defective. She and Murray shrunk from a public challenge of Mary; and however suspicious or inexplicable some of the

cotland.
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steps taken by this unfortunate princess may have been, her friends alleged that victory in the conferences at York and Westminster was on her side. Yet was she detained a captive by the very princess who had virtually declared her guiltless. All this might however have been anticipated; and no one who knew any thing of the unscrupulous policy of Elizabeth could have dreamed, that having once possession of the queen, she would ever permit her to return to her dominions. In her detention, she possessed the means of rendering Murray subservient to her wishes, of checking the Roman Catholic party, confirming the ascendancy of the protestants, and destroying the French interest and intrigues in Scotland. These were advantages with which no considerations of the individual guilt or innocence of her royal captive were likely to interfere.

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The subsequent career of Murray was bold and brief. He found himself called to a contest with a party, headed by the duke of Norfolk in England, and by Maitland and Grange in Scotland, whose object was, the restoration of the Scottish queen, and her marriage to Norfolk. The project had been encouraged by the Regent, whether at first sincerely or for selfish and ambitious purposes, is not clear; but in the end he betrayed the plot to Elizabeth, and was the main instrument in bringing this unfortunate nobleman to the scaffold.

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The principles upon which his government was conducted were entirely protestant and English; and Elizabeth, who knew well and valued so able an assistant, cordially co-operated with him to overwhelm the queen's friends, and to extinguish all hopes of the Roman Catholic party in either country. But the task was more difficult than had been anticipated. She succeeded indeed in extinguishing the great rebellion, led by the earls of Westmoreland and Northumberland; but Murray found it impossible to prevent the intrigues of such men as Maitland, Grange, and their associates, who had known him long, and having assisted to raise him to the supreme power, were indignant to find themselves treated with severity or neglect. It was in the midst of this struggle between the regent and his former associates in ambition and guilt, that he was assassinated in the streets of Linlithgow, by Hamilton of Bothwellhaugh, who was incited to this act of revenge by a private injury, of which Murray was only the remote cause.

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His death found Scotland divided between two parties. On the one side were the Protestants who adhered to the young king, and regarded Elizabeth as their protector; on the other the queen's friends, who, being animated with the utmost rancour against their opponents, prepared instantly to appeal to the sword. Previously to this, however, they assembled a parliament at Edinburgh, and fulminated denunciations of treason against their enemies; while the protestants in their turn having chosen the earl of Lennox regent, convoked the estates at Stirling, and soon afterwards having made themselves masters of Dunbarton by a successful night attack, they took prisoner the archbishop of St. Andrews, who had shut himself up in the fortress, and executed him on the instant, without even the semblance of a trial. This outrage led to retaliation, and a civil war, remarkable for its ferocity, began to spread havoc through the country. On Mary's side were the duke of Chastelherault, the earls of Argyll, Athole, Huntly, Crawford, Rothes, and Cassilis, the lords Seton, Boyd, Gray, Livingston, Fleming, with the lairds of Buccleugh, Fernihirst, and many others; to whom we must add the able and crafty secretary Maitland, and the experienced soldier Kirkaldy of Grange. Of the king's party the nobles were neither so numerous nor so powerful. Lennox, Morton, Mar, and Glencairn, lords Lindsay, Glammis, Semple, Methven, Ochiltree, Cathcart, Ruthven, and some others, espoused this side; but if inferior in numbers, they were confident in the assistance of England, and in the support of the church, the commons, and the boroughs.

Scotland.
James VI.
A.D.1571.
The Regent Lennox is slain.

Such was the general comparative strength of each faction. Into the details of the contest we cannot enter; and indeed it had lasted but for a short time, when Lennox was slain in a skirmish at Stirling, and the earl of Mar, one of the most upright-minded and honourable noblemen in Scotland, was chosen to supply the vacant regency. To promote a reconciliation between the two factions, and to restore peace, order, and security of property, to a country distracted by intestine war, was the single purpose to which the new governor devoted himself; but he was thwarted by the ambition of Morton, and many of the higher nobles. These had so long been accustomed to derive individual advantage from public misery, that they laboured as earnestly to increase the contentions of the two parties, as Mar to remove them; and the governor, at last worn out by the struggle, and hopeless of effecting a reconciliation, sank into the grave.

Morton is chosen regent. His character.

He was succeeded in the regency by the earl of Morton, a man who has been justly described as possessing all the faults, some of the talents, but none of the good qualities of the regent Murray, of whom he was an old and tried ally. Sordid and selfish, implicitly devoted to the service of Elizabeth, whose countenance and support he felt necessary to enable him to retain his power, a venal judge, a cruel unrelenting soldier, a hypocrite in religion, and a profligate in private life, it is difficult to find a single virtue to relieve the dark monotony of his vices. Yet Morton had some of the great qualities which distinguished the house of Douglas. He was brave, decisive, politic; and he possessed that rapid power of discerning the instant to act with success, and that deep insight into human character which is commonly acquired by men of talent, bred up in scenes of civil commotion.

State of Mary's party. Intrigues of Norfolk.

On his accession to the supreme power, the regent found the friends of the imprisoned queen still able to make head against him. The duke of Norfolk, who had been pardoned by Elizabeth, resumed his project of marrying Mary, and engaged in a correspondence with her. The duke of Chastelherault, and the earl of Huntly, lord Claud Hamilton, the lairds of Buccleugh and Fernihirst, with the indefatigable Maitland, and Grange, who was reputed the best soldier in Scotland, still supported her cause. Morton, however, strong in his own resources, and supported by Elizabeth, continued the war with success, and at last triumphed over opposition. Norfolk was brought to the scaffold, and the earl of Northumberland, treacherously delivered up by the Scottish regent, shared a similar fate. At last the castle of Edinburgh was invested by Sir William Drury, who joined the Scottish army with a formidable battering train. In this fortress, the single remaining hope of the queen of Scots, Kirkaldy of Grange commanded; and he held it bravely till the walls were destroyed, his guns silenced, and his provisions exhausted. Under these circumstances he surrendered, with his companion Maitland. To this step, Drury had induced him by a promise of favourable terms; but the English queen disregarded the stipulation, and handed over the prisoners to Morton. Kirkaldy and his brother were immediately executed, and Maitland only escaped the same scaffold by taking poison.

Fate of Kirkaldy and Maitland. A.D.1573.

Morton's oppressive government. A.D. 1574-1577.

Morton now deemed himself so strong as to be independent of all parties, and his avarice and spoliations knew no bounds. He oppressed the church, of whom he had formerly affected to be the steadiest patron; and treated the young king and the nobles with so much haughtiness and severity, that he soon became an object of universal dread and hatred. James was now twelve years old, and it was not difficult for a faction of the nobles, who detested the regent, to persuade the young monarch that he ought no longer to be treated as a child. Acting by their advice, he accordingly summoned a parliament. It was numerously attended; and Morton, to the astonishment of all, the moment he learned the king's wishes, declared his willingness

Morton resigns the regency.

to carry them into effect, and instantly resigned his regency. This ready and implicit submission was rewarded by the passing of an act of indemnity, which included a general pardon for any alleged transgressions, and ratified his whole conduct as regent. It is in his anxiety to procure this, that we are to find the secret of his sudden relinquishment of the supreme power; and scarcely was it procured when this extraordinary man, by means of a successful intrigue with a portion of the family of Mar, found means again to become master of the king's person, and re-emerged into as great power and ascendancy as before. His usurpation, however, was this time more short lived. Atholl, Argyll, and some of the most powerful nobles, assembled their forces, and declared their resolution to liberate the sovereign from his ignominious captivity. Instead of a battle, however, the opposite factions came to a compromise, by which the veteran tyrant was shorn of a large part of his power, and the young king recovered something of his independence.

Rise of Esme, duke of Lennox, and the earl of Arran.

A.D.1579.

Morton is tried, condemned, and executed.
A.D. 1581.

James began now to show that strong propensity to favouritism which marked his future career; and the effects of this weakness were seen in the sudden rise into power of Esmé Stewart, duke of Lennox, and captain Stewart, second son of lord Ochiltree, and afterwards the notorious earl of Arran. Of these, the first was a high-born nobleman, of graceful address, amiable feelings, and common-place understanding; but the second, of birth and connections much inferior to Lennox, was ambitious, intriguing, daring, and unprincipled, and soon managed to gain an influence over both the young king, and the duke his favourite. With these advantages, an overwhelming opposition was soon raised against Morton; and as his exactions and cruelty had made him universally odious, it was in vain that his steady friend, the English queen, interposed to save him. Her interference indeed rather accelerated his fate, and the news that she meditated an invasion, roused the spirit of the young king and of his people to instant opposition. When Elizabeth, however, received intelligence that a Scottish army was assembled, she prudently withdrew from the contest; and Morton abandoned to his fate, was arraigned as an accomplice in the king's murder, at the instance of captain Stewart, who had recently been created earl of Arran. Of his guilt there can be little doubt, and he himself, after the jury brought in their verdict, and he had received sentence of death, acknowledged that he was privy to the intended murder. But his trial was conducted, even in those days of prostituted justice, with a reckless disregard of every form of law; and all were aware that the jury, of whom many were his bitter enemies, would, under any circumstances, have found him guilty. He died as he had lived, boldly, expressing a calm contempt of death, and exhibiting all the outward marks of repentance.

The earl of Arran at the head of the government.

Raid of Ruthven.
A.D.1582.

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The death of Morton was followed by the nominal accession of the young king to the supreme power, but by the actual transmission of that power into the hands of his favourites, Lennox and Arran. This last nobleman, owing to the weak and flexible character of Lennox, soon came to rule all, and his rapacity, profligacy, and open defiance of public opinion, completely disgusted the nation. The result was a conspiracy for his ruin, headed by the earl of Gowrie. This nobleman and his associates having contrived to make themselves masters of the king's person, at the castle of Ruthven, and having removed Lennox and Arran from all authority in the state, directed the government as they judged best for their own interests. But the character of the king, although full of many strange contradictions, began now to exhibit a greater degree of talent and energy than his opponents were aware of; and although compelled to dissemble, and showing no symptoms of discontent with this change of masters, James was really disgusted with the durance in which he was held by Gowrie and his faction. With an ability which proved the more successful, because his adversaries were unprepared for it, he contrived to organize a party, and free himself from his servitude; but it happened unfortunately that at this crisis the earl of Arran regained his liberty, and returning to court, soon resumed his baneful influence over the fond and facile monarch. It was by his advice that the king, who had first been inclined to use his victory over the faction of Gowrie with moderation, exchanged this wise resolution for vindictive measures; and although Elizabeth strongly remonstrated against it, he brought Gowrie to the scaffold, and drove his associates into banishment.

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government formed.

Arran was now supremely powerful; but the venality, tyranny, and abuses of his government, soon became intolerable, and worked their own cure by producing a counter-revolution, in which the despotic favourite, after having first courted, and then quarrelled with the Scottish church, in vain attempted to recover his influence by means of the English queen, and was at last chased from court by the associated lords, who made themselves masters of the king's person. A government, upon a model which admitted the principal nobility to a share in the councils of the state, was now established; and Arran, deserted by all parties, sank into insignificance.

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It was impossible that Mary, who had been detained a captive by Elizabeth, contrary to every principle of honour and justice, should not have exerted herself to regain her freedom; and the Roman Catholic party in England were not only interested in her success, but regarded her as their best security against Elizabeth and the Protestant faith. This led to a succession of intrigues, which were discovered by the penetration and activity of Elizabeth's ministers, the discovery only serving to increase the rigour of her confinement. At last the Scottish queen having been arraigned (unjustly as afterwards appeared) of an accession to the conspiracy of Babington, the object of which was the assassination of Elizabeth, and the restoration of the ancient religion, she was brought to trial before a commission, whose jurisdiction she at first peremptorily declined as an independent and sovereign princess. It was unfortunate for Mary that she did not continue in this resolution; but in the idea that a refusal might be construed into an admission of guilt, at last condescended to plead. The consequence was, what might have been expected from the nature of the evidence, the constitution of the court, and the supreme authority of Elizabeth. Mary was found guilty of having compassed divers matters tending to the death of the queen; and after many affected delays, and an atrocious attempt to induce her keeper, Paulet, to dispatch her secretly, Elizabeth signed the warrant for her execution, which was carried into effect on the 7th of February 1587. The meekness with which she received the intimation of her sentence, and the admirable and saintly fortitude with which she suffered, formed a striking contrast to the despair and agony which not long afterwards darkened the death-bed of the English queen.

Elizabet
base conduct.

It might have been expected that if any thing could have roused the king of Scots, it would have been the cruelty and injustice to which his mother had fallen a sacrifice; and for a moment there was an ebullition of indignant feeling. But Elizabeth sent him an artful apology. The blame of the execution was laid upon Davison, her secretary, an innocent and upright man, who simply obeyed her orders; and with that unscrupulous falsehood which this princess seldom hesitated to employ when necessary to carry through her designs, the unfortunate statesman was sacrificed, that his royal mistress might escape. But the English queen had still a firmer hold over the young king of Scots. He regarded the succession to her throne as his undoubted right, and dreaded to irritate her personal feelings, or alienate her Protestant subjects, by appearing to place himself at the head of the Roman Catholic party, who burned to avenge the death of their royal mistress. In vain, therefore, they

cotland.
ames VI.
.D.1567.

looked to the king, who, after a short interval, relapsed into his usual pacific frame of mind, and celebrated his entrance upon majority, by an attempt to abolish those sanguinary feuds amongst his nobility, which had increased to an alarming height, and threatened to pull the country to pieces.

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This laudable endeavour, which did not meet with the success it merited, was followed by James's marriage to the princess Anne of Denmark; an alliance which Elizabeth, with her usual jealous and capricious policy, endeavoured to prevent. But the Scottish king, with unwonted spirit and energy, sought his bride in person in her father's court, and having solemnised his marriage at Upslo, returned with her to Scotland.

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During his absence the kingdom had been unusually prosperous and happy; but it was soon afterwards embroiled by the intrigues and ambition of the earl of Bothwell, who, leaguing with the Roman Catholic faction, attacked the palace of Holyrood with the design of seizing the king's person, and placing himself at the head of the government. A second attempt of the same kind at Falkland was not more successful; and yet such was at this time the impotent state of the law, and the weakness of the royal authority, that these repeated treasons escaped unpunished, and Bothwell lived not only to defend but to repeat them.

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Scotland at this moment presented a melancholy picture. The intrigues of Philip the Second had encouraged the Roman Catholic faction, which was led by the earls of Huntly, Errol, and Angus; and James, aware of the great power possessed by the Romanists, both in Scotland and England, was fearful of treating them with severity, lest he should raise a formidable opposition to his right of succession, which must open on the death of Elizabeth. But this was not the only source of disquiet. The excessive lenity of the king had fostered the feudal quarrels among his nobles, impunity led to new excesses, and the turbulent and audacious Bothwell once more appeared upon the scene, and made repeated attemps to seize the royal person, and administer the government at his pleasure. To these sources of disquiet, were added the interference of Elizabeth, which roused the jealousy of the king, and the intolerant spirit of the protestant ministers, who, horror-struck by the discovery of the intrigues of the Roman Catholic lords, recommended their being treated with the utmost severity.

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These combined causes transformed the kingdom into a scene of almost perpetual tumult and bloodshed; but the monarch at last becoming convinced of the treasonable purposes of the popish earls, assembled an army, and reduced them to the last extremity of distress. Bothwell, too, was driven into exile, and the country began to breath anew, when James found himself involved in a contest with the protestant ministers. The cause of this dispute was the king's wish to lean to the side of mercy in his conduct to the popish lords. It was reported that Huntly, their leader, had been admitted to a secret interview. The clergy, alarmed to the utmost, appealed to their congregations; they defended the conduct of Black, a minister who had openly attacked the court and the queen, in a seditious harangue; they haughtily declined the authority of the privy council; and by their violence, they excited a tumult in Edinburgh, which compelled the monarch to retire to Linlithgow. Under these trying circumstances, the king acted with extraordinary energy, and jealous of so bold an interference with his prerogative, restored tranquillity to the capital, punished the insurgent citizens, compelled the ministers to fly to England, and, according to his original intentions, extended his forgiveness to the popish lords who made a recantation of their errors.

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James, who had been alarmed at the late violence exhibited by the presbyterian clergy, now became intent upon a plan for new-modelling the church; but aware, that if the measure originated in any other quarter than that of the clergy themselves, it would inevitably miscarry, he artfully prevailed on the General Assembly to second his views. The commission appointed by this ecclesiastical council were induced to complain that the church was the only body not represented; and the king, whose object it was to restore episcopacy, procured an act to be passed, by which those ministers upon whom he had conferred the vacant bishoprics and abbeys were entitled to sit in parliament. When this measure came again to be debated in the General Assembly, it encountered great opposition. "Deck these intruders as you will," exclaimed one of the most zealous presbyterians, "under all their disguise I see the horns of the mitre." Yet after a long debate, a majority of the General Assembly declared in its favour; and it was resolved that ministers might lawfully accept a seat in parliament, and that fifty-one members should be chosen as representatives of the church in the supreme court of the country. When, however, the question arose regarding the spiritual jurisdiction which should belong to these persons, the General Assembly so effectually shackled and abridged their powers, that they remained wholly dependant upon this great ecclesiastical council, and exercised no separate spiritual jurisdiction. It was James's hope, that, in the course of time, they would shake off these fetters, but, in the mean time, they could claim none of the privileges belonging to the episcopal order.

Scotland.
James VI.
A.D. 1600.

The Gowrie conspiracy.

When the monarch was thus employed, and his kingdom was enjoying a degree of tranquillity to which it had been long a stranger, the minds of the people were suddenly agitated by a sudden and mysterious attempt made at Perth upon the life of the king by the earl of Gowrie and his brother, Alexander Ruthven. These young men were the sons of that earl of Gowrie who had been executed for treason, and it is probable that a desire to revenge their father's death led to their miserable and ill-concerted enterprise; but much obscurity hangs over the whole transaction. It is certain that Ruthven induced the king, by a feigned story, to accompany him with a slender train from Falkland to his brother's house at Perth. Here he contrived to separate James from his attendants, and leading him into a remote apartment, threw himself upon him, seized him by the throat, and drew his dagger. The king struggled to get to the window, and calling out treason, alarmed his nobles, who rushed into the room, stabbed Ruthven to the heart, and when Gowrie attempted a rescue, put him also to death on the spot. Both these unfortunate men being slain, the utmost pains were taken to detect their associates, to unravel the plot, and to ascertain their precise object, but with so little success, that to this day the mystery is not solved.

Death of Queen Elizabeth.

The queen of England, now in her seventieth year, began soon after this to droop, and her constitution, hitherto uncommonly vigorous and unimpaired, was evidently breaking up. Of all this James was well aware. He had secured the friendship and good offices of Sir Robert Cecil, her chief minister, who, unknown to his mistress, carried on a secret correspondence with the Scottish king; and acting by his advice, he had employed every effort to conciliate the affections of the English people, and to acquire the support of the most powerful of the English nobility. These judicious precautions were attended with the wished-for result. James was Elizabeth's undoubted heir; and on the death of this princess, an event which took place on the 23d of March 1603, he succeeded, with the unanimous consent of the nation, to the throne of England. This great and auspicious event closes the history of Scotland as a separate kingdom.

STATISTICS.

Statistics.

Superficial extent.

Scotland, the northern division of Great Britain, is situated between 54° 38′ and 58° 41′ north latitude, and between 1° 47′ and 6° 7′ west longitude from Greenwich; having the sea on all sides, except the south, where it is separated from England partly by the Tweed and other streams, and partly by a line supposed to be drawn along the high grounds in that quarter. The longest line that can be drawn in about the same parallel of longitude is from the Mull of Galloway in Wigtonshire to Cape Wrath in Sutherland, a distance of about 274 miles, though Dunnet-head in Caithness-shire, is the most northerly point; while its breadth is extremely various, ranging from 147 miles to about 30. The greatest breadth is between Buchanness on the coast of Aberdeenshire, and the Rowanmoan Point on the west coast of Ross-shire. There are other points where the width is not much less; while between Alloa on the Frith of Forth and Dunbarton on the Clyde, the distance is only 32 miles, and between Lochbroom and the Frith of Dornoch, it is rather less than 30. The area of Scotland, calculated from Arrowsmith's map, and as given in the *General Survey of Scotland*, contains 25,520 square miles , and 494 square miles of fresh water lakes. This is the extent of the mainland only, exclusive of the islands on the west, known by the name of the Hebrides or Western Isles; and those of Orkney and Zetland on the north, which altogether are computed to extend over 4224 square miles, of which 144 consist of fresh water lakes. Including these islands, the northern limit of Scotland stretches beyond the 61st degree of latitude, and its longitude lies between the meridian of London and 8° 18′ west; its area being computed to comprehend 30,238 square miles, of which the fresh water lakes occupy 638 square miles, or about 1-48th part of the whole.

Table shewing the total extent of the several Counties of Scotland, thirty-three in number, including Buteshire, and the county of Orkney and Zetland, in square miles, and English statute acres; specifying the extent of Land and of Fresh Water Lakes in each County.

Counties.	Extent in Square Miles.			Extent in English Statute Acres.		
	Land.	Lakes.	Total.	Land.	Lakes.	Total.
Aberdeen,	1,960	10	1,970	1,254,400	6,400	1,260,800
Argyle, exclusive of Islands,	2,200	60	2,260	1,408,000	38,400	1,446,400
Ayr,	1,039	6	1,045	664,960	3,840	668,800
Banff,	645	2	647	412,800	1,280	414,080
Berwick,	442	...	442	282,880	...	282,880
Caithness,	687	10	697	439,680	6,400	446,080
Clackmannan,	48	...	48	30,720	...	30,720
Cromarty,	256	10	266	163,840	6,400	170,240
Dunbarton,	228	31	259	145,920	19,840	165,760
Dumfries,	1,253	10	1,263	801,920	6,400	808,320
Edinburgh, or Mid-Lothian,	354	...	354	226,560	...	226,560
Elgin, or Moray,	473	7	480	302,720	4,480	307,200
Fife,	467	3	470	298,880	1,920	300,800
Forfar, or Angus,	888	4	892	568,320	2,560	570,880
Haddington, or East Lothian,	272	...	272	174,080	...	174,080
Inverness, exclusive of Islands,	2,904	132	3,036	1,858,560	84,480	1,943,040
Kincardine, or Mearns,	380	2	382	243,200	1,280	244,480
Kinross,	72	7	79	46,080	4,480	50,560
Kirkcudbright,	821½	12½	834	525,760	8,000	533,760
Lanark, or Clydesdale,	942	3	945	602,880	1,920	604,800
Linlithgow, or West Lothian,	120	...	120	76,800	...	76,800
Nairn,	195	3	198	124,800	1,920	126,720
Peebles,	319	...	319	204,160	...	204,160
Perth,	2,588	50	2,638	1,656,320	32,000	1,688,320
Renfrew,	225	2	227	144,000	1,280	145,280
Ross, exclusive of Islands,	2,069	60	2,129	1,324,160	38,400	1,362,560
Roxburgh,	715	½	715½	457,600	320	457,920
Selkirk,	263	1½	264½	168,320	960	169,280
Stirling,	489	13	502	312,960	8,320	321,280
Sutherland,	1,754	47	1,801	1,122,560	30,080	1,152,640
Wigton,	451½	7½	459	288,960	4,800	293,760
Sum of these,	25,520	494	26,014	16,332,800	316,160	16,648,960
Islands.						
Hebrides, viz.						
Buteshire, including Arran, &c.	161	4	165	103,040	2,560	105,600
Isles belonging to Argyleshire,	929	21	950	594,560	13,440	608,000
Isles belonging to Inverness-shire,	1,150	59	1,209	736,000	37,760	773,760
Isles belonging to the shires of Ross and Cromarty,	560	20	580	358,400	12,800	371,200
Orkney Isles,	425	15	440	272,000	9,600	281,600
Zetland Isles,	855	25	880	547,200	16,000	563,200
Totals,	29,600	638	30,238	18,944,000	408,320	19,352,320

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From what has been already said respecting the extreme variation in the breadth of Scotland at different places, the fact may be inferred, that the outline on the sea-coast is exceedingly irregular, and of great extent, the sea penetrating to a great depth, both on its eastern and western sides. Of these arms of the sea, the most considerable are the Firths of Forth and Tay, and the Moray and Dornoch Firths, on the east; and the Firth of Clyde and the Luce and Wigton Bays, on the west and south-west; whilst there are a very great number of smaller inlets, called lochs, such as Loch Fyne, Loch Long, Loch Etive, Loch Lynnhe, Loch Broom, &c., which indent the country in all directions, to an extent varying from ten to seventy miles. With this irregularity of outline is combined a surface generally rugged and mountainous. With the exception of narrow tracts along its principal rivers, there is very little of the country flat or level, or what would be regarded as productive land in more favoured regions. "To such a degree," says Mr. M'Culloch, "is this the case, that, estimating the whole extent of the country, exclusive of lakes, at 19,000,000 acres, it is doubtful whether so many as 6,000,000 be arable; whereas, taking the extent of England and Wales at 37,000,000 acres, the arable land certainly exceeds 29,000,000; so that, while in Scotland, the proportion of the cultivable to the entire land is less than one-third, in England it exceeds three-fourths. With the exception, indeed, of a few tracts of rich alluvial land, (carses), Scotland has no very extensive vales; the surface of the rest of the country being, even where most level, considerably varied with hill and dale."[1] In the south of Scotland, a tract of mountainous country, known by various names, stretches in a south-west direction, from the Cheviot hills in Roxburghshire, on the borders of England, to the Irish channel, sending off branches on both sides, whilst detached hills prevail over the whole of the contiguous districts. These high grounds, however, are for the most part clothed in green, almost to their summits, and have little of that wild, romantic, and desolate character, which distinguishes many of the mountains of the Highlands. Northward from the isthmus formed by the Firths of Forth and Clyde, the low grounds constitute but a small proportion of the whole. Here, in latitude 57°, the Grampians extend from sea to sea, with a breadth of from forty to sixty miles; and parallel to them, to the south, is another chain, called the Siedlaw, Ochills, and Campsie hills. Between these two ranges lies the fertile valley of Strathmore; whilst, farther north, cultivation is mostly confined to the sea-coast, the banks of the larger rivers, and the narrow glens between the mountains. On the north-west, beyond the line of the Caledonian canal, the country is, with few exceptions, singularly rugged and sterile; consisting of lofty mountains, either covered with heath, or presenting a mass of naked rocks, interrupted only by deep and dark ravines, lakes, and precipitous streamlets. But the eastern coast of Ross-shire is comparatively level and fertile; and Caithness, the north-eastern county of the mainland of Scotland, is generally low, marshy, and unproductive.

ghlands.

Scotland is divided into Highlands and Lowlands. "Those countries, whose inhabitants speak a different language, and wear a different garb," says Mr. Home, in his *History of the Rebellion*, 1745,[2] "are not separated by firths or rivers, nor distinguished by northern or southern latitude. The same shire, the same parish, at this day, contains part of both; so that a Highlander and Lowlander (each of them standing at the door of the cottage where he was born) hear their neighbours speak a language which they do not understand." The line which separates the Highlands from the Lowlands is by no means well defined; but it may be described as beginning at Dunbarton, on the Firth of Clyde, and proceeding northward by Crieff, Dunkeld, and Blairgowrie, it runs through the forest of Morven, in the heights of Aberdeen, to Carron, in Banffshire; from Carron it stretches due west by Tarnoway, in Morayshire, to the town of Nairn; from Nairn the line is continued to Inverness; and from this latter place, it proceeds in a tortuous direction, to Dunistra, on the south side of the Firth of Dornoch, where the line of separation may be said to terminate, the country to the north of this firth being altogether Highland, except a narrow stripe of land along the shores of the German Ocean, which washes the east coast of Sutherland and Caithness. To the west of this line lie the Highlands, which, including the Hebrides, constitute in superficial extent nearly one-half of Scotland, although the inhabitants of this division do not form an eighth part of the population of that kingdom. The face of the country is wild, rugged, desolate, and mountainous. In almost every strath, valley, or glen, there glitters a stream or lake; and numberless firths, or arms of the sea, penetrate the land. The *passes* into the Highlands lie in deep ravines or glens, so narrow, and so overhung by mountains, that they admit of being very easily defended, and till recently, when roads have been made, they were impracticable almost to every one except the natives. To this must principally be ascribed the successful resistance opposed by the Highlanders to the attacks of the Romans and the Saxons; and hence, also, these northern people still form a distinct race, the lineal descendants of the ancient Celtic inhabitants of the country, and differing essentially in language, dress, and manners, from the Lowlanders.

Climate.

The climate of Scotland, as may be expected, from its insular situation and high latitude, is cold, cloudy, and humid. This is its general character, as compared with the greater part of England; yet, even in the south of England, frost is sometimes more intense, and snow falls more copiously than in Scotland. Corn, however, and most of the fruits and vegetables common to both divisions of Great Britain, attain maturity about three weeks earlier in the south of England than in Scotland; and some plants, such as hops and a few others, cannot be profitably cultivated at all in the latter country. The mean annual temperature of Scotland is very high for the latitude, being about 46½° in places near the level of the sea. In the more southerly parts of the kingdom, the climate differs but little from that of the northern parts of England. Sir David Brewster states the mean annual temperature to be 48·36 at Leith. At Edinburgh, which is elevated from 300 to 400 feet above the level of the sea, and situated two miles from it, the annual temperature is 47·8, and this may be taken as a near approximation to the general average of Scotland; the mean temperature of winter being 38·6, of spring, 46·4, of summer, 58·2, of autumn, 48·4, the coldest month being 38·3, and the warmest 59·4.[3] The observations published in the *New Statistical Account of Scotland*, and in the *Transactions of the Royal Society of Edinburgh*, closely approximate to the above estimate. In the parish of Inch, Wigtonshire, the mean temperature for the year 1837 was 48·41. At Applegarth Manse, in the interior of Dumfries-shire, the average annual temperature for seven successive years, ending in 1831 inclusive, was 47·12; that of the spring being 40·31, of the summer, 56·86, the autumn, 54·18, and of winter, 39·92. At Wick in Caithness the mean annual temperature is 46·7, that of the winter being 40·35, the spring, 44·41, the summer, 53·77, and the autumn, 48·82; whilst at Sumburgh-head, the most southerly promontory of the Shetland Islands, in latitude 59° 52′, the mean annual temperature is 45·5, that of the winter being 40, the spring, 43·29, the summer, 50·60, and the autumn, 47·48. The range of the barometer is 2·82 inches, or from 30·92 to 28·10 inches; and in the Orkney and Shetland Islands it is somewhat more, or about three inches. The fall of rain is very different in different districts; but the average is about 31 inches. The quantity which falls on the east coast of Scotland ranges from 22 to 26 inches; whilst, on the west coast and in the Hebrides, it is nearly double, varying, according to situation, from 35 to 46 inches. The number of fair days throughout the year is, on the west coast, only 160; whilst on the east it is 230. The mean annual fall of rain at Edinburgh for the years 1824 and 1825, was $23\frac{1}{2}$ inches; at Glasgow, for an average of thirty years, it was 30 inches; whilst, still farther west, at Mount Stewart, in the Isle of Bute, it was, on an average of seven years, 46·6 inches, the mean average of the whole country being, as just stated, 31 inches. The prevailing winds throughout Scotland are from the westerly points; but on the east coast it blows from the easterly points about a third of the year. Easterly winds generally prevail in March and April, and often in May and part of June, and not only check vegetation, but are attended with slightly unfavourable effects on the health of the inhabitants, particularly such of them as are nervous, dyspeptic, consumptive, or rheumatic. But the climate of Scotland is eminently salubrious. There are, properly speaking, no fens or marshes. The low grounds are, in general, highly cultivated. From whatever point the wind may blow, except the east, a wide expanse of sea is passed over; and the air, though moist, is purified from injurious emanations, which are readily absorbed by the ocean. Hence it has been affirmed, that the mean duration of life is greater in Scotland than in almost any other country.[1] "We are pretty confident, from extensive observation in different countries, that the proportion of the population that reaches seventy or eighty years of age, and the vigour then remaining, are greater in Scotland than almost any where else."

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[1] Statistical Account of Great Britain, vol. i. p. 239.

[2] Home's Works, vol. iii. 385, 386.

[3] Ibid.

Mountains. The mountains of Scotland consist either of detached groups, more or less closely wedged together, or of ridges or chains. These latter may be characterized as running in a north-east and south-west direction. The most celebrated chain, the Grampians, mentioned by Tacitus,[2] extend from the south-eastern boundaries of Argyleshire, with a more or less defined line, to the heart of Aberdeenshire. This chain may be regarded as a natural rampart, forming the south-eastern boundary of the Highlands. With the exception of Ben Nevis, the highest mountains in Scotland are comprehended in the Grampian range. Another chain, to the south of the Grampians, and nearly parallel to them, stretches from Montrose to the Clyde, in Dunbartonshire; but being intersected by the Tay and the Forth, it is divided into three distinct portions, which bear different names. From Montrose to the Tay, this chain is called the Siedlaw hills; from the Tay to the Forth, it is known by the name of the Ochills; and the remainder passes under the names of the Dundaff, Fintry, and Campsie hills. The low country, or strath, which separates this range of hills from the Grampians, is called Strathmore, or the great valley. There is also a chain of mountains in the south of Scotland, stretching from the Cheviot hills, on the borders of Northumberland, to Loch Ryan, in Wigtonshire. There are other smaller ranges, such as the Monagh Lea mountains, which run parallel to and along the western side of the Spey; the Lomond hills in Fifeshire; the Pentland hills in Mid-Lothian, and others. The altitude and situation of the principal hills and mountains in Scotland having already been given under the head of Physical Geography, it is unnecessary to repeat the information here.

In the neighbourhood of the village of Leadhills, in Lanarkshire, 1564 feet above the level of the sea, is the highest cultivated land in Scotland. In Aberdeenshire, the plough sometimes reaches the height of about 1300 feet; but, with few exceptions, an elevation of 600 feet seems to be the limit of the tillage lands of Scotland. None of the Scottish mountains ascends to the line of perpetual congelation; yet snow may be found all the year round in some of the dark recesses, on which the sun never shines.

Vales. From the rugged and mountainous character of the surface of Scotland, the vales or level tracts cannot be expected to be extensive or numerous. They are, indeed, when compared with England, very much the reverse. Of these vales, called sometimes *straths* or *carses*, the following are the most important. The vale or *carse* of Stirling and Falkirk is a tract of low alluvial land, which extends on both sides of the Forth, with little interruption, and to a greater or less width, from Borrowstonness to about twenty miles north of Stirling, including the vales of the Teith and the Allan, two tributaries of the Forth. These lands are peculiarly fertile, and produce the richest crops of wheat and other grain. The vale of the Earn, a tributary of the Tay, known by the name of Strathearn, is of a similar character, but of comparatively limited extent. The carse of Gowrie, which lies on the north of the Tay, from Dundee to Perth, is incomparably the most fertile and productive district in Scotland, and is thought not to be surpassed in these respects by any other district of equal extent in the united kingdom. Strathmore stretches from Lawrencekirk in Angusshire to the neighbourhood of Perth, lying between the bases of the Siedlaw hills and the Grampians. This valley is not entirely flat, but is characterised by occasional gentle eminences. The *Merse*, or level lands of Berwickshire, stretch from the confluence of the Leader and the Tweed to the town of Berwick, occupying most of the low and generally level part of the country, or nearly the half of its surface. The carse of Baldoon, lying south of the river Bladenoch, and on the east shore of the bay of Wigton, is of limited extent, but of nearly equal fertility to the carse of Gowrie. There are other less important straths or carses, such as those along the Teviot in Roxburghshire; Tynedale, or the vale of Tyne, in East Lothian; and the Howe, or vale of Eden, in Fifeshire. These lands are either loamy or alluvial.

Moors. By this term we mean tracts of land composed of morasses, intermixed with rocks, lakes, and peat-moss. The moor of Rannoch, lying between Schehallion, Ben Cruachan, and Ben Nevis, is one of the most lonely, wild, and dreary districts in Scotland. It may be said to be entirely devoid of value, and would not of itself bring any rent. It is not inhabited, and very seldom visited. There is a tract about ten miles inland on the west coast of Sutherlandshire, not very dissimilar, but, though more rugged, it is not quite so dreary as that of the moor of Rannoch. The *flow* of Glenluce lies between Newtonstewart and Luce Bay, stretching along the public road for about ten miles, composed chiefly of peat and morasses, and forming one of the bleakest and most dreary rides in Scotland.

Rivers. From the rugged and mountainous nature of the country, the rivers of Scotland are characterised by a more rapid course, are more diversified by rocks and cataracts, and are more limpid than those of England. Their course is also necessarily shorter, and few of them are navigable, at least to any great extent. Being generally mountain streams, they are peculiarly liable to sudden overflowings, their rise and fall being equally sudden. From a very tedious and elaborate set of experiments, it is computed that they carry out to the sea, on an average, about $\frac{1}{2000}$ the weight of their waters in mud; that is, a film of about $\frac{1}{50}$ of an inch annually, or one inch in fifty years over the whole surface from which they draw their waters.

The principal rivers of Scotland, with the single exception of the Clyde, are exclusively confined to the east. Three inconsiderable rivers flow in a south-easterly direction, the

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[1] Malthus, i. cap. x.

[2] Agricolæ Vita, c. 29.

Dee, which falls into the Solway Firth about six miles south of Kirkcudbright, and is navigable for small vessels two miles above that town; the Nith, which rises in the north of Dumfries-shire, and falls into the Solway Firth more than seven miles below Dumfries, being navigable to within two miles of that place; and the Annan, which rises on the south side of Hartfell, near Moffat, and falls into the same estuary at the town of Annan. The last is not navigable beyond this burgh. The rivers which flow in a northerly or north-easterly direction are the Ness, which flows from Loch Ness, and, after a short course, falls into the Moray Firth near Inverness; the Findhorn, which, rising in the Monagh Lea mountains, falls into the same estuary at Findhorn, after a winding course of upwards of 50 miles; and the Spey, the most rapid of the Scottish rivers, which flows from Loch Spey towards the west of Inverness-shire, and, after receiving innumerable tributaries, and traversing the best wooded portion of the Highlands, falls into the Moray Firth. The course of the Spey is nearly 100 miles; it drains above 1300 square miles of country, but is not navigable. With the exception of the Ayr, which is likewise not navigable, and falls into the sea at the town of the same name, the only river on the west coast worth mentioning, is the Clyde, (the *Glotta* of Tacitus), which, in a manufacturing and commercial point of view, is the most important stream in Scotland. It rises on the west of the Moffat mountains, and, after a circuitous course of nearly eighty miles, falls into the Firth of Clyde below Dunbarton. It receives various tributaries, and is navigable to Glasgow, passing in its course the principal manufacturing and commercial towns in Scotland; Glasgow, Hamilton, Lanark, Paisley, Port-Glasgow, and Greenock. The navigation of the Clyde was formerly much obstructed; but under the management of a Parliamentary board, called the River Trust, these obstructions have been nearly removed, and the channel rendered so deep and straight that vessels of 400 tons can now resort to the Broomielaw at Glasgow. The falls of Clyde, which are about 30 miles south-east of Glasgow, are very striking and celebrated. The first considerable fall is that of Bonnington, its height, including that of a little one immediately above it, being about thirty feet. The second is Corra Linn, where the water dashes from one shelving rock to another, its perpendicular height being about seventy feet. Dundaff fall is only ten feet in height; whilst that of Stonebyres, which includes three distinct falls, is not less than seventy-six feet.[1] All the other rivers are on the east coast, namely, the Tweed, the Forth, the Tay, the North and South Esk, the Dee, and the Don. The Tweed rises near the sources of the Annan and Clyde, and running past Peebles through a beautiful pastoral country, falls into the German ocean at Berwick-upon-Tweed, after a winding course of about a hundred miles. The descent from its source to its embouchure is about 1500 feet; and it is navigable only to Berwick. The Forth, (the *Bodotria* of Tacitus), rises on the east of Ben Lomond, and receiving the waters of the Teith and the Allan, it becomes a considerable stream at Stirling, to which the tide flows, and to which it is navigable for vessels of about seventy tons. From Stirling to Alloa is only six miles by land, but the stream of the Forth is so tortuous that it is no less than sixteen by water. The river may here be said to terminate in the Firth, which extends to the German ocean, a distance of forty miles. Its width is various. At Queensferry, eight miles west of Edinburgh, it is two miles; at Leith it is six; and thence it gradually expands till it is lost in the open sea. It is navigable for vessels of 300 tons as far as Alloa. The only low water pier of which it can boast is that of Granton, about a mile and a half west of Leith. The Tay rises to the north of Loch Lomond, and expanding into the romantic sheet of water called Loch Tay, it flows in a circuitous route past Dunkeld and Perth, and falls into the Firth of Tay at the confluence of its waters with the Earn, about twenty miles from the mouth of the estuary. It is navigable to Dundee for vessels of 500 tons burthen, and to Perth for those of 100 tons. It receives many tributaries, of which the Earn, just mentioned, is the most important. The Tay is the largest of the Scottish, and, in respect to the volume of water it conveys to the sea, even of the British rivers. The North and South Esk have their source in the Grampians, and fall into the sea at Montrose, within three miles of each other. The South Esk is navigable to Montrose, about a mile and a half from its mouth. The North Esk is not navigable. The basin of Montrose, through which the South Esk flows, and which bounds the town on the west, comprehends about 2000 acres of land; it is covered by water at full sea, and exhibits nothing but bare sand at ebb tide. This expanse, it has been calculated, might be reclaimed at a gross cost of L.11,938.[2] The Dee and the Don have also their rise in the Grampians, and fall into the sea, the former at New Aberdeen, and the latter at Old Aberdeen. The Dee is navigable for about a mile from its mouth; the Don is not navigable.

The Scottish rivers, as stated at the beginning of this head, are of such a character, that there is no room for reclaiming waste land from their channels. This is prevented by the rapidity of their streams and by their rugged course. But several attempts have been made to reclaim lands from innundation on the shores of the Firths of Forth and Tay. Without entering into particulars the following results may be given:[3]

FORTH.	Acres.	Cost.	Rent.	Value at 30 years' purchase
Formerly reclaimed	40	£ 2,000	£ 160	£ 4,800
Recently reclaimed	366	18,063	1464	43,920
TAY.				
Formerly reclaimed	105	3,050	600	18,000
Recently reclaimed	142	5,730	920	27,600
Totals......	653	£30,843	£3144	£94,320

In addition to this, it has been stated that the extent of land now in process of being reclaimed, on different estates on the shores of the Tay, may be computed at 1140 acres, at a gross cost of L.50 per acre. The following extract, on the subject of embankments, from a work just published,[4] contains minute and interesting information: "About 68 Scots acres of land have been here, (the parish of St. Madoes,) at different times reclaimed from the Tay by embankments. In 1826, in consequence of an arrangement between Sir John Richardson, the proprietor, and Mr. R. W. Rannie, tenant, Pitfour Mains, by which the latter agreed to raise an embankment at his own expense, and after being allowed to take the first crop free, to pay L.4, 10s. annually, per Scots acre, for the reclaimed land, during a lease of nineteen years; operations were commenced, which resulted in the complete reclamation of 50 acres during the autumn of that year. The whole expense of embankments, sluices, levelling, water cuts, and trenching amounted to L.1530. So productive, however, did the new soil turn out, that Mr. Rannie has been amply rewarded for his enterprise. According to his own account, he has had, before liming and manuring, on some parts of a field, about 60 bolls of potatoes per acre, the average produce being from 40 to 50 bolls. After liming and manuring, he has had, on some parts of a field, 70 bolls per acre, the average being from 50 to 60 bolls, of 32 stones Dutch to the boll. He has had of oats, before liming and manuring, from 10 to 11, after liming and manuring, from 12 to 13 quarters per acre; and of wheat from 6 to 7 quarters per acre. He commenced liming in 1829 and manuring in 1835, the rotation, up to that period, being potatoes, and wheat, or oats, alternately. In 1833, Sir John Richardson reclaimed 18 acres more at an expense of L.1200; and, by means of head-dikes, break-waters, and other contrivances, which he is from time to time throwing out into the river, for the purpose of accommodating silt, upwards of 150 acres more may ultimately be added to the parish; of these, from 15 to 20 may be banked off in the course of two years."

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[1] Naismith's Survey of Clydesdale, p. 19, &c.

[2] Quarterly Journal of Agriculture, March 1838.

[3] Ibid. for December 1837.

[4] New Statistical Account of Scotland, part xxiii. p. 631.

Lakes.

From a table already given, under the head of Superficial Extent, we have already found that the fresh water lakes in Scotland occupy an area of 638 square miles, or cover an aggregate extent of 408,320 English statute acres. The only counties that are devoid of lakes are those of Berwick, Clackmannan, the Lothians, and Peebles; whilst those of Roxburgh amount to only 320 English acres. The greatest extent of lakes are in Inverness-shire, (84,480 English acres,) Argyleshire, exclusive of islands, (38,400,) Ross-shire, (38,400,) Perthshire, (32,000,) and Sutherlandshire, (30,080.) The lakes, generally speaking, occupy the valleys or ravines amongst the mountains, and are thus distinguished for their length, their breadth being comparatively trifling. The only Lowland lakes worth specifying are Loch Leven, St. Mary's Loch, and Loch Ken. The first, situated in Kinross-shire, is four miles in length by two in breadth, having the Lomond hills on its east, and Benarty hill on its south; whilst the towns of Kinross and Milnathort lie on its western margin. This lake is remarkable for a peculiar species of red trout, which is highly valued;[1] and it also produces char, perch, pike, and other species of fish. The fishery is let for a considerable sum; and it is a remarkable fact that Loch Leven is the only Scottish lake that yields any revenue to its proprietors. There is not even an attempt made to derive any profits from any other lake; nay, they are not fished for the domestic consumption even of the neighbouring inhabitants. But Loch Leven is principally celebrated for an island in the lake in which are the picturesque ruins of a castle, where Queen Mary was confined by her subjects, and from which she effected her escape (1568) a few days previous to the fatal battle of Langside. There are other small islands in the lake, the principal of which is St. Serf's, where was once a famous monastery, of which Andrew Winton, author of the *Chronykil of Scotland*, was prior. St. Mary's Loch, a most beautiful and picturesque sheet of water, three miles in length by from half a mile to a mile in breadth, is in Selkirkshire. Loch Ken is formed by the expansion of the river Ken in Kirkcudbrightshire, and forms part of the river. It is ten miles in length by rather less than a mile in breadth. The other lakes are all north of the Firths of Clyde and Forth. Loch Lomond is the most celebrated as well as the largest lake in Scotland; indeed, it is the largest in the British dominions. This noble sheet of water is above twenty-four miles in length, its greatest breadth is ten miles, but, towards its upper part, it is not more than half a mile. Its depth varies from twenty to a hundred and twenty fathoms, and its greatest depth is towards the north. It is studded with numerous and richly wooded islands, some of them being very small, but the largest, Inchmurrin, is two miles in length and one in breadth. Some of them, particularly Inchmurrin, are stocked with deer. Both sides of the lake are flanked by high and rugged mountains, among which "the lofty Ben Lomond" stands conspicuous, its height being 3195 feet above the margin of the water. The surface water of Loch Lomond is from three to five feet higher in winter than in summer; but its mean height is about twenty-two feet above the level of the sea at Dunbarton. Its surplus water is conveyed to the Clyde, a distance of six miles, by the river Leven. Loch Katterin, so celebrated in Sir Walter Scott's *Lady of the Lake*, lies in the district of Menteith, Perthshire, and is one of the most romantic in Scotland. Its length is eight miles, and its greatest breadth less than one. It does not seem necessary to give a minute description of the other lakes; but the following table, taken from the *General Report of Scotland*, will shew their number, dimensions, and situation.

Name.	Length in miles.	Greatest breadth in miles.	Square miles.	Counties where situated.
1. Lomond....	24	7	45	Dunbarton and Stirling.
2. Awe........	25	2½	30	Argyle.
3. Ness........	22	2½	30	Inverness.
4. Shin........	20	1½	25	Sutherland.
5. Maree......	12	3	24	Ross, west coast.
6. Tay.........	15	2	20	Perth.
7. Arkeg......	12	2	18	Inverness.
8. Shiel........	16	1	16	Inverness, west coast.
9. Lochy......	16	1	15	Inverness.
10. Laggan	8	1½	12	Inverness.
11. Morrar	9	2	12	Inverness.
12. Fannich ...	7	1½	10	Ross, centre.
13. Ericht......	14	2	10	Perth and Inverness.
14. Earn........	8	1¼	9	Perth.
15. Naver......	6	2	9	Sutherland.
16. Stennis	8	2	8	Orkney, mainland.
17. Rannoch...	9	1	8	Perth.
18. Leven......	4	2	7	Kinross.
19. Fuir.........	4	2	6	Ross.
20. Lydoch.....	6	1	6	Perth and Argyle.
21. Dee & Ken	10	0¾	6	Kirkcudbright.
22. Loyal	6	1	6	Sutherland.
23. Glass.......	5	1	5	Ross, east.
24. Katterin...	8	0¾	5	Perth, Menteith.
25. Doon.......	9	1	4½	Ayr.
26. Huichart ...	3	1	3	Ross.

Geolog

In a general point of view, Scotland may be separated, geologically as well as geographically, into three portions. By passing a line on the map nearly straight from Stonehaven, through Dunkeld, to the middle of the Isle of Bute, and thence with a slight curve to the Mull of Cantyre, we shall have traced the southern boundary of the primary non-fossiliferous system of rocks. Another line, but much more irregular than the former, drawn from St. Abb's Head in Berwickshire, passing near Peebles, Sanquhar, and New Cumnock, to the south of Girvan on the western coast, will form a general parallelism with the former line, and will contain the old greywacke, now named the Cumbrian system, lying to the south, and extending to the boundary between England and Scotland, whilst the land included between the two lines comprehends the old red sandstone, and great central basin of Scotland.

That extensive tract of Scotland which constitutes the northern division, is composed chiefly of gneiss, mica slate, chlorite slate, and clay slate, with subordinate masses of hornblende slate, talc slate, and primitive limestone. These, with granitic centres, often rise into magnificent mountains, of which the Grampians form a part. In many of these deposits, particularly in the mica slate, garnets of a brown colour are very abundant. In the primary deposits no organic remains have ever been discovered.

These, however, are not the only stratified formations which constitute this extensive district. The old red sandstone fringes the extremities of the land, commencing near the

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[1] Statistical Account of Scotland.

Moray Firth, extending on both sides of Loch Ness till within a short distance of Fort Augustus, and then proceeding northward, expanding the whole breadth of Caithness, and constituting the principal formation of the Orkney Isles. On the western site of the mainland, the old red sandstone is deposited in numerous patches on the gneiss formation, as at Loch Broom, Gairloch, and Applecross.

The new secondary rocks have been but sparingly observed in Scotland; yet it is a curious fact that the few patches that have been discovered are superimposed on the old red sandstone, and have not been reposing in uninterrupted order in the secondary series. Thus the lias shales, highly micaceous, and some of the upper beds of the oolitic system, occur at the mouth of the Cromarty Firth, from Dunrobin Castle to the ord of Caithness, Applecross, and other points on the mainland, and in the Western Islands, on the borders of Mull, the south and east of Skye, and near to the rocks of Arran. The equivalent of the fresh water deposits of the wealds of Sussex, geologically situated above the oolitic group and below the chalk, is seen in Moray and Skye. In the central and southern divisions of Scotland, these newer groups of rocks have not been detected. In this division of Scotland very few metallic ores have been found. Lead mines were formerly wrought at Tyndrum, to the west of Loch Tay. Lead mines are at present wrought at Stronbean in Argyleshire, at which place the carbonate of strontian was first discovered. At Glen Strathfairer, in Inverness-shire, there have been detected veins of plumbago running between the laminæ of the mica slate.

We may here briefly refer to the geological character of the Western Isles. Dr. M'Culloch[1] calls the Long Island, consisting of a series of islands lying in a south-west and north-east direction, the gneiss island, from the predominance of that species of rock. Another group, embracing Skye, Rum, Canna, Mack, Egg, and Mull, he denominates the trap islands. There are five basaltic islands off the north-west side of Mull, of which the smallest but the most celebrated is Staffa, which is well known for its basaltic columns and cavern, called Fingal's cave. This cave, one of the most remarkable natural excavations in the world, is formed of the columnar bed of basalt, where it declines to the level of the sea, which washes the feet of the columns, that are like the pillars of an immense cathedral, placed close to each other, the sea forming the floor. The top of the arch, at the entrance, is 66 feet; but it gradually declines to 40 at the extremity, at the distance of 227 feet. The breadth of the cave is about forty feet. There are other similar caverns of less note on the island. The basalt of which the columns in Staffa are composed, is similar to that of the Giant's Causeway in Ireland; and it is probable that they are both of submarine origin, having been raised by the sea. St. Kilda, the most western of the Hebrides, is composed of several varieties of the trap rock. Arran, in the Firth of Clyde, even to the top of the highest mountains, is principally granitic.

In tracing the geological features of the country in the ascending order of the groups, we come next to the transition or greywacke system, now divided into two principal sections, the lower or Cumbrian, and the upper or Silurian. As far as has hitherto been ascertained, the Silurian division is unknown in Scotland; and the Cumbrian rocks, destitute of organic remains, cover the greater part of the area of the south of Scotland. These greywacke strata stand at high angles of from sixty to ninety degrees, and consist chiefly of coarse slaty strata, seldom divisible into thin roofing slates, and often alternating with arenaceous and coarse conglomerates. Amongst them, limestone is seldom found, and, when it is, the quality of it is inferior. In the division of which we now treat, coal and its accompaniments are known in few places; it is, however, wrought at Canonby, near Langholm, and at the Carter Fell. The only other rock formation, found in connexion with the old transition group here, with the exception of igneous rocks, is a red sandstone, ascertained, in some situations, to be the old red, but in others, considered as the new red sandstone, particularly in Dumfries-shire.

In the third geological division of Scotland, namely, the centre of the kingdom, is placed the great coal basin; but, adhering to our rule of marking the successive formations in the ascending order, we shall first treat of the old red sandstone, the most ancient rock in this subdivision of the country. This rock abuts against the line of the primary rocks, and stretches across the whole country from the German Ocean to the Atlantic, pursuing, like the mountain ranges, a south-westerly, or north-easterly direction. Its line forms a long, uninterrupted, extensive, and fertile valley. In the north-western part, it rises into hills, on the sides of one of which, east of Menteith, are deep and hideous fissures, the effect of some convulsion of the earth.

The formation appears to be of vast thickness, especially towards the north, and may, it is supposed, be divided into three portions; the lower, the middle, and the upper beds. In what are considered as the lower strata, the remains of fishes have been found in a high state of preservation. The well known Arbroath pavement belongs to the old red sandstone series.

But the most important group in this central district is the coal formation, consisting of limestone, ironstone, freestone, coal, and clays. The extent from east to west is bounded only by the extremities of the land. To the north, it is cut off from the old red sandstone by a range of trap hills, crossing the country from east to west. On the south, it is bounded by the greywacke and the old red sandstone. Its breadth, extending on both sides of the Forth and Clyde, averages forty miles, and its length about seventy miles.

The mountain limestone forms generally the basis of the group, although it is frequently found interstratified with other members of the series, and abounds with great numbers of organic remains. Below the mountain limestone, however, but belonging to the same group, a bed of limestone is worked at Burdie-house, near Edinburgh, in which the organic remains differ essentially from those which have been just named. These remains consist of many of the plants which distinguish the coal formation; but that alluded to includes also the teeth, scales, and other bones of fishes which partake of the reptile character, some of which must have been of gigantic dimensions. Small fishes are also found in a fine state of preservation. The same limestone has been found in other parts of the country, and is of superior quality to the common limestone, for mortar, plaster, and the smelting of iron.

The clay limestone is found in beds and nodules, the workable kind containing from twenty-seven to forty-five per cent. of iron. The kind termed black band is in high request. From this ore is smelted vast quantities of pig iron. The iron works in Scotland have been increasing beyond all example; at Carron, Gartsherrie, Shotts, Cleland, Airdrie, Clyde, and other places. The quantity of iron produced in Scotland in 1830 amounted to 37,500 tons. But four years afterwards, in 1834, the latest date of which we have any correct accounst, the quantity had nearly doubled, being about 72,000 tons. These works are generally within ten or a dozen miles of Glasgow.

The coal is found in beds varying from a few inches to forty feet in thickness, is extracted in great quantity, and is used as fuel, both for domestic and manufacturing purposes. One variety, cannel coal, is of superior quality for the preparation of gas. From the fire clay are manufactured fire brick and gas retorts; and the sandstone furnishes an inexhaustible store of substantial and beautiful material for building.

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[1] Western Islands of Scotland, Vol. II.

These several deposits contain in abundance the impressions of the vegetables which distinguish the carboniferous period; and, what is remarkable, the remains of animals, the same as occur in the Burdie-house limestone, are found in the shales, and even in the coal itself. In the island, no strata newer than the carboniferous system is known to exist. All is covered over with accumulations of clay, gravel, sand, and soil.

Roads.

Until after the middle of last century there was scarcely a good road in Scotland. Soon after the rebellion of 1715, Government began to open up the country by roads made by the military, hence called military roads, which extended in all about eight hundred miles; but these being confined for the most part to the Highlands, intended for military purposes, and formed with little or no regard to such ascents and descents as do not impede the passage of an army, were of little advantage in an economical point of view. It is in the recollection of persons still living, when corn, coals, and other heavy articles, were usually carried upon the backs of horses, even in the southern counties of Scotland; the roads, or rather the tracks, being for the greater part of the year unfit for wheel-carriages. But so great a change has been made in this respect, particularly within the last forty years, that mail-coaches, and other carriages, now run day and night at the rate of from eight to ten miles an hour through every part of the country, from the borders of England to the northern extremity of Great Britain.

The only funds formerly applicable to the making and the repairing of the roads in Scotland were what is called the Statute Labour, or the labour of the occupiers of the land, for six days annually, upon the roads passing through their respective parishes, and a small assessment imposed upon the proprietors. This labour, which has been converted into payment in money, and also the sums raised by assessment on the proprietors, under the name of road and bridge money, are now applied to bye-roads, or such as communicate with the great turnpikes. Almost every county has procured an act of Parliament which fixes the rate of these assessments; but this varies in different counties according to circumstances.

The turnpike roads and bridges in the Lowlands have, for nearly a century, been made, and are kept in repair by means of tolls exacted from those who use them, under the authority of private acts of Parliament. The first of these acts was obtained in 1750, at which time the roads were so bad that the journey from Edinburgh to Glasgow, a distance of forty-two miles, occupied 1½ days, whereas it is now effected in from 4½ to 5 hours. The trustees named in these acts are commonly empowered, whether wisely or not, to borrow money upon the security of the funds to be received; by which means the work is more speedily executed. The board of trustees consists of the sheriff-depute, his substitute, and the justices of the peace in the county, together with all individuals, and their eldest sons, who are owners of estates worth L.100 Scotch a-year, and upwards, of valued rent. The result of this is, that "in consequence of the excellent materials which abound in all parts of Scotland, and of the greater skill and science of Scotch trustees and surveyors, the turnpike roads in Scotland are superior to those in England."[1]

Highland roads and bridges.

In the Highlands, the nature of the country, and the state of the population, did not admit of the same system as in the Lowlands. The military roads had not only been made, but were kept in repair at the public expense, for which L.5000 a-year was usually granted by Parliament; but a great many new roads and bridges were required; and, in 1803, an act was passed, proceeding upon "a survey and report of the coasts and central Highlands of Scotland," by which Parliament agreed to provide half the estimated expense of the necessary roads and bridges, the other half to be defrayed by the landed proprietors; and Commissioners were named to carry into effect the beneficent intentions of the Legislature. It appears from the report just referred to, that, under this act, the Commissioners had, in 1821, expended, on 875 miles of road, and several large bridges, upwards of L.450,000, of which L.240,000 was granted by Parliament, and the rest defrayed by the counties through which the roads passed; and that L.100,000 more had been laid out by them upon harbours, of which L.50,000 was paid out of the funds arising from the forfeited estates in Scotland, and the remainder raised by the burghs, and by the contributions of individuals. If, to these sums, we add the amount of the losses sustained by the contractors, as stated in the Report, and the expense of the new roads made at the sole cost of the proprietors, to communicate with the Parliamentary roads, together with the charges of repairs, the whole amount expended within these twenty years upon the roads, bridges, and harbours of the Highlands of Scotland, may not be too highly stated at a million sterling. The Commissioners have under their charge both the maintaining of their own roads, and part of the military roads, the extent of the whole in 1821 being 1183 miles; and about L.10,000 a-year, of which L.5000 is granted by Parliament, was considered to be necessary for this purpose, including all charges of management.[2] The military roads have been in many instances allowed to fall into disrepair; but nearly three hundred miles of them are still kept up.

Summary Statement as to the Turnpike Roads in Scotland in 1829.[3]

Length of turnpike roads miles.	3,666	Debts................	L.1,495,082
Number of turnpike trusts..	190	Income from all sources	187,584
Acts of Parliament,.........	394	Expenditure.............	181,028
		Excess of income over expenditure............	6,556

Canals.

The Caledonian Canal, the greatest work of the kind ever attempted in Great Britain, stretches south-west and north-east across the island, from a point near Inverness to Fort-William, a distance of 60½ miles, including Lochs Ness, Oich, and Lochy, by which nearly two-thirds of it are formed. The excavated or artificial part is twenty-three miles; and there are in all twenty locks. The depth in some places is only seventeen feet, but it was originally meant to be twenty. As it is, however, frigates of 32 guns, and merchant ships of 1000 tons can pass through it. It is 50 feet wide at the bottom, and 122 at top. But with all its magnificence, it has been found to be an improvident speculation. The total cost of the canal, up to 1822, when it was opened, was L.905,258; and the aggregate outlay to the first of May 1839, was no less than L.1,023,628. Besides, the Commissioners have incurred a debt, including cash advanced by the bank, and outstanding claims, of L.39,146. Nor has the income ever met the expenditure. In the year ending on the first of May 1839, for example, the expenditure was L.4170, whereas the income, though above the average, was only L.2532. It has, therefore, become a question with government whether the undertaking should be maintained or abandoned. The Lords of the Treasury, accordingly, employed Mr. James Walker, engineer, to institute a minute investigation of the entire works, and to report. The report was presented to the House of Commons in 1838; and a select Committee was appointed to take the whole subject into consideration. The result of their investigations was, a recommendation that steam tugs should be employed in the locks, so as to ensure a speedy navigation, and that a sum not exceeding L.200,000 be placed at the disposal of the government, to be expended in the repair and improvement of the canal, under the authority of an act of Parliament, which should be procured for the purpose.[1] This recommendation will, it is hoped, be acted upon. (NAVIGATION, INLAND). The Crinan canal is situated in Argyleshire, and is intended to afford a communication between Loch Gilp and the Western Ocean, so as to avoid the difficult and circuitous passage round the Mull of Cantyre. It was originally undertaken in 1793 by subscription of share-holders; but the sum subscribed (L.108,000) being quite insufficient for the completion of the work, the government advanced the money, and the canal was transferred on mortgage to the Barons of Exchequer in Scotland. The management has since 1817 been lodged in the hands of the Commissioners of the Caledonian Canal. It is nine miles long, and twelve feet deep, admitting vessels of 200 tons burden. The income scarcely covers the expenditure.[2] The Forth and Clyde Canal, sometimes called the Great Canal, though begun in 1768, was not finally completed till 1790. The length from Grangemouth on the Forth to Bowling Bay on the Clyde, is 35 miles, and, including the lateral branch to Port-Dundas, Glasgow, 38½. Its depth is ten feet; and it has in all thirty-nine locks. Though iron swift boats and other lighters ply upon it, its staple trade consists in the transit of sailing vessels of 120 tons and under. The Edinburgh and Glasgow Union Canal, which was finished in 1822, stretches from Port-Hopetoun, Edinburgh, until it joins the Forth and Clyde Canal at Port-Downie, near Falkirk, a distance of 31½ miles. Its depth is only five feet, so that its traffic is quite limited. The Monkland Canal stretches from Glasgow to Woodhall, about two miles south-east of Airdrie, a distance of twelve miles, and communicates by a lateral branch with the Forth and Clyde Canal at Port-Dundas. The Glasgow, Paisley, and Ardrossan Canal has not been completed; indeed it is not now intended to complete it. The progress of railways seems partially to supersede the use of canal communication. The canal in question has been constructed from Port-Eglinton, near Glasgow, to the village of Johnstone, a distance of eleven miles, and was opened in 1811. It was on this canal that the experiment was made in rapid travelling by canals, demonstrating that it was practicable for a properly constructed boat, carrying passengers and goods along a canal, to go at a rate of nine or ten miles an hour, without injury to the banks. These light boats are now common on canals suited for such travelling. The Aberdeenshire Canal, completed in 1807, stretches from the harbour of Aberdeen to Inverury. The length is 18¼ miles, and the number of locks is seventeen.

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[1] Sir H. Parnell's Treatise on Roads, p. 313.

[2] Anderson's Guide to the Highlands, &c. p. 6. Ninth Report of the Commissioners for Highland Roads and Bridges.

[3] Parliamentary Papers, No. 703, 1833, p. 176.

lways.

The first act obtained, in 1808, for a railway in Scotland, was for that between Kilmarnock and Troon, a distance of 9½ miles. The Monkland and Kirkintilloch railway connects the rich coal and ironstone district of New and Old Monkland, and, within fourteen miles of the city of Glasgow, with the Forth and Clyde Canal, near Kirkintilloch. The Ballochney railway, which has been in operation for about ten years, is merely an elongation of the last mentioned line, four miles eastward into the interior. The Glasgow and Garnkirk railway stretches eight miles west from Glasgow, till it communicates with the Monkland and Kirkintilloch line, forming a direct communication with Glasgow, and avoiding the circuitous route of that line. The Wishaw and Coltness railway, which is meant to connect the Monkland and Kirkintilloch branch with the rich coal and ironstone beds of Wishaw, Coltness, and Allanton, has not yet been completed, though the act was passed in 1829. The Slamannan railway, which is in progress of construction, is to extend from the eastern termination of the Ballochney line to the Union Canal, within a mile of Linlithgow, a distance of 12½ miles. An act has been passed (1837) for forming a branch to the town of Bathgate. The Pollock and Govan railway, which was meant to connect these two places, which lye on the south of Glasgow, with that city, an interval of three miles, is in the same unfinished state. The Paisley and Renfrew railway, which extends from Paisley to the river Clyde at Renfrew ferry, a distance of 3½ miles, was opened in 1837. The Glasgow, Paisley, and Greenock railway is meant to connect Glasgow and Greenock by way of Paisley. It runs nearly parallel with the Clyde, and is meant to be completed in 1840. The Glasgow, Paisley, Kilmarnock, and Ayr railway is intended to connect these towns and the adjacent districts. The line from Glasgow to Paisley is declared to be common to the latter line, and that of the Glasgow, Paisley, and Greenock railway, and to be executed at the joint expense of both companies. The Glasgow and Paisley railway is to send branches out to the different towns in the district through which it passes. An act was obtained in 1838 for constructing a railway between Edinburgh and Glasgow. The line is to run nearly on a parallel with the Union Canal, past Ratho, Winchburgh, Linlithgow, and Falkirk, to pass that canal near Port-Downie, and to proceed onward to Glasgow by a line nearly parallel to the Great Canal. The distance will be forty-six miles. The capital of the company is L.900,000. Twenty-nine miles of the line have already been contracted for, and the work will be completed at farthest in 1842. The Edinburgh and Dalkeith railway was opened in 1832. It extends to Dalhousie Mains on the South Esk, but a private branch has been carried over that river by a viaduct, and extends southwards for upwards of a mile. The Dalkeith line is about to be carried over the North Esk, in order to connect extensive coal fields in that quarter with the city of Edinburgh. There are also branches to Leith and Fisherrow. On this railway upwards of 100,000 tons of goods, and 300,000 passengers are annually conveyed. The Edinburgh, Leith, and Newhaven railway is only meant to extend 2¼ miles. It is to commence at Canal Street, at the east end of Princes Street gardens, and proceed by a tunnel of 2800 feet, or rather more than a fifth of the whole line, under St. Andrews Street, St. Andrews Square, Duke Street, Drummond Place, &c. to the foot of Scotland Street, and thence to Newhaven in nearly a straight line, with a branch along the north side of the Water of Leith, to the wet docks at Leith. The work has been begun, but when it will be completed is uncertain. If the terminus of the line were to be united with that of the Edinburgh and Glasgow railway, much advantage would accrue to both speculations. But, according to act of Parliament, a mile intervenes at present between the dépôts of the two. The Dundee and Newtyle railway is eleven miles in length, but branches are in progress to Cupar-Angus and to Glammis. There are on the line three inclined planes, and a tunnel of 340 yards. The Dundee and Forfar railway was opened in 1838. Its length is 16¾ miles. The Arbroath and Forfar railway is just completed. The distance is 15¼ miles.

Land, valuation, rental of, &c.

About the middle of the seventeenth century, the lands of Scotland were valued, with a view to ascertain what proportion of the land-tax and others should be paid by each county; and this valuation, called the "valued rent," which had been undertaken by the authority of Cromwell, was afterwards

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[1] See Thirty-fourth Report of the Canal Commission, Mr. Walker's Report, and Report of Secret Committee.

[2] Ibid.

Statistics. established by an act of the Scottish Convention in 1667.[1] It is still the standard by which the counties, and the estates of each county, are assessed for payment of the land tax,[2] and all local imposts on land. The "valued rent" of the whole Scottish counties, as it stood in 1674, was L.3,804,221 Scots, or L.317,018, 8s. 4d. sterling. In 1811, the landed property of Scotland was subdivided as in the following proportions,[3] and there is every reason to believe that the document is not very far from the truth at the present time:

Description of the Estates.	Number of Proprietors.
Large properties, or estates above L.2000 of valued rental,................................	396
Middling properties or estates from L.2000 to L.500 of valued rental,.................	1077
Small properties, or estates under L.500 of valued rental,......................................	6181
Estates belonging to corporate bodies,........	144
Total,..........................	7798

The total extent of land in Scotland, exclusive of lakes, is 18,944,000 acres, but of this quantity only a fourth part, or 5,043,450 acres, are susceptible of cultivation.[4] But even of this small proportion, nearly a half, or 2,489,725 acres, are estimated to be in grass. The following table[5] will shew the distribution of the land in tillage, with the quantity and value of the crops:

	Acres.	Produce per acre.	T produce.	Price per quarter.	Value.
				s.	*L.*
Wheat, ...	220,000	3 qrs.	660,000	50	1,650,000
Barley,......	280,000	3½	980,000	30	1,470,000
Oats,.........	1,275,000	4½	5,737,000	25	7,171,875
Beans & Pease,	100,000	...	...	...	...
Potatoes,	130,000	£5, 5s	...	...	2,520,000
Turnips,..	350,000				
Flax, ...	16,000	8, 0s	...	...	128,000
Gardens,....	32,000	13, 0s	...	...	416,000
Fallow,......	150,000	...	...	...	...
Total,........	2,553,000	...	...	...	13,355,875

Such are the average quantity and value of the lands actually in tillage. But the average value per acre of the arable soils in pasture is estimated in the *General Report* at L.2; and on this hypothesis, the produce of 2,489,725 acres of pasture, will be L.4,979,450. But there still remains 14,000,000 acres of mountain pasture, waste land, and plantations,[6] which, at an average rent of 3s. per acre, will be L.2,100,000. Hence the total annual value of the land produce in Scotland will be,

Value of crops and garden,................	L.13,355,875
... pasture land,......................	4,979,450
... mountain pasture land, &c.......	2,100,000
Total,...	L.20,435,325

This is the value of the gross produce of the soil. Most of the land is rented by tenants, only about a tenth part being supposed to be farmed by the landowners. The exact amount of the rental of Scotland cannot be known. The rental for 1810, including mines, fisheries, quarries, and the like,[7] was ascertained to be L.4,851,404; and it is supposed that, though considerable variations have taken place in different districts, the rental of Scotland continues at nearly the same amount; for although many of the rents contracted for, during the last years of the late war, have been greatly reduced, yet others, from the falling in of the older leases, have been proportionally advanced. As the common duration of the lease in Scotland is 19 years, the average term of the current leases must be between 9 and 10 years; so that half the leases current in the beginning of 1810 must have been entered into in the first year of the century, at a period previous to any great enhancement of land having taken place. Hence it is that we regard the rental of 1810 and of the present time as nearly equal to each other. It is conjectured by an eminent authority, that the rental of the 14,000,000 acres of mountain pasture, including wood and waste lands, does not exceed L.850,000, or, in other words, that it averages 1¼s. per acre, whilst he estimates the rental of the arable portion at an average of 16s. an acre.[8] Rent, we may here remark, has advanced more in Scotland during the last seventy years, than perhaps in any old settled country during a similar period. The entire rental of Scotland is not supposed to have exceeded L.1,000,000, or L.1,200,000, in 1770. In 1795, it is believed to have been at least L.2,000,000; and since that time it has a good deal more than doubled.

It is here worthy of remark, that both the law and the practice of Scotland are favourable to agricultural enterprise. What in England are termed "tenants at will," or tenants without a lease, are unknown in this portion of the empire. Leases in Scotland may be said to be universal, extending to 15, 19, or 21 years. It was not uncommon, indeed, about fifty years ago, and before that time, to give liferents, or leases for twice nineteen years, or even longer, a circumstance highly favourable to enterprise on the part of the tenant. With the exception of some districts in the Highlands and Islands, the system of small farms has been abandoned, and has given way to farms of great extent, rented by persons of intelligence and capital. There are no tithes. Poor-rates are entirely unknown in about three-fourths of the parishes of Scotland; and where this assessment does exist, it is of comparatively trifling amount. Besides, so large are the farms, that, exclusive of owners who cultivate their own property or portions of it, there are supposed to be only about 40,000 tenants in Scotland. And as farms are large, so they cannot be divided or sublet without the consent of the landlord. This consent is seldom or never granted; so that in point of fact no such subdivision ever takes place. A lease, moreover, is heritable; and on the death of a tenant, it is not parcelled out amongst his children, but descends entire to his oldest son, or heir at law. All these circumstances combined afford great encouragement to agricultural improvement and enterprise.

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[1] Burton's Manual of the Law of Scotland, p. 120.

[2] By the Union, the land tax was limited to L.48,000, deducting all expenses. In 1797, it was limited to L.47,954, 1s. 2d., and made perpetual, but liable to be redeemed by the proprietor, for stock in the three per cents. equal in annual value to one-tenth more than the tax.

[3] General Report of Scotland, iii. appendix, p. 4.

[4] The least proportion of cultivated land is in the counties of Selkirk, Sutherland, and Orkney, being only about six acres in the hundred; the greatest is in the county of Haddington, or East Lothian, where not quite a fourth remains uncultivated.

[5] Statistical Account of British Empire, i. p. 537.

[6] The total extent of woodland was estimated in the General Report of Scotland (ii. p. 321,) at 913,695 acres, of which 501,469 were natural woods, and 412,226 plantations. The quantity of the latter has since increased, so that the total of woodland cannot be less than 950,000 acres.

[7] General Report, i. p. 123.

[8] Statistical Account of the British Empire, i. p. 539.

Statistics. *Table, shewing the extent of Land (exclusive of Lakes), in the several Counties of Scotland in imperial statute acres, the extent of cultivated and uncultivated acres in each; the total rental of the land, including mines, fisheries, &c., in 1810, according to the returns under the Property Tax Act; the rent per acre in the same year; and the valued rent in Scotch money.* Statistics.

Counties.	Extent.	Description of Land.		Ascertained Rental for 1810.	Rent per acre in 1810.			Valued Rent in Scotch Money.		
	Acres.	Cultivated Acres.	Uncultivated Acres.	*L.*	*L.*	*s.*	*d.*	*L.*	*s.*	*d.*
Aberdeen,	1,254,400	451,584	802,816	233,827	0	3	8¾	235,665	8	11
Argyle,	2,002,560	270,990	1,731,570	192,074	0	1	11	149,595	10	0
Ayr,	664,960	325,830	339,130	336,472	0	10	1½	191,605	0	7
Banff,	412,800	123,840	288,960	79,396	0	3	10¼	79,200	0	0
Berwick,	282,880	137,197	145,683	231,973	0	16	5	178,366	8	6⅓
Bute, &c.,	103,040	29,440	73,600	18,591	0	3	7¼	15,042	13	10
Caithness,	439,680	92,333	347,347	30,926	0	1	5	37,256	2	10
Clackmannan,	30,720	23,040	7,680	32,048	1	0	10¼	26,482	10	10
Cromarty,	168,960	21,080	147,880	10,860	0	1	4	12,897	2	7⅓
Dunbarton,	145,920	53,990	91,930	56,973	0	7	9¾	33,327	19	0
Dumfries,	801,920	232,557	569,363	246,002	0	6	1½	158,502	10	0
Edinburgh,	226,560	144,999	81,561	277,828	1	4	6¼	191,054	2	9
Elgin,	302,720	121,088	181,632	62,312	0	4	1½	65,603	0	5
Fife,	298,880	209,216	89,664	335,291	1	2	5¼	363,192	3	7⅙
Forfar,	568,320	369,408	198,912	260,197	0	9	1¾	171,239	16	8
Haddington,	174,080	139,264	34,816	180,654	1	0	9	168,873	10	8
Inverness,	2,594,560	244,365	2,350,195	145,844	0	1	1½	73,188	9	0
Kincardine,	243,200	92,416	150,784	159,896	0	13	1¾	74,921	1	4
Kinross,	46,080	27,648	18,432	22,753	0	9	10½	20,250	4	3⅕
Kirkcudbright,	525,760	168,243	357,517	192,047	0	7	3¾	114,597	2	3½
Lanark,	602,880	271,296	331,584	298,019	0	9	10½	162,131	14	6
Linlithgow,	76,800	57,600	19,200	82,947	1	1	7¼	75,018	10	6½
Nairn,	124,800	37,440	87,360	11,728	0	1	10½	15,162	10	11
Orkney and Zetland,	819,200	46,368	772,832	16,236	0	0	11½	57,786	0	4
Peebles,	204,160	24,500	179,660	57,382	0	5	7½	51,937	13	10
Perth,	1,656,320	530,022	1,126,298	460,739	0	5	6¾	339,892	6	9
Renfrew,	144,000	72,000	72,000	127,069	0	17	7¾	69,172	1	0
Ross,	1,677,440	149,895	1,527,545	91,090	0	1	1	75,043	10	3
Roxburgh,	457,600	205,920	251,680	230,667	0	10	1	314,663	6	4
Selkirk,	168,320	10,100	158,220	39,776	0	4	8¾	80,307	15	6
Stirling,	312,960	195,600	117,360	177,499	0	11	4¼	108,509	3	3½
Sutherland,	1,122,560	63,045	1,059,515	28,457	0	0	6	26,093	9	9
Wigton,	288,960	101,136	187,824	123,837	0	8	6¾	67,641	17	0
Totals,	18,944,000	5,043,450	13,900,550	4,851,404				3,804,221	0	0
The average rent per acre in Scotland in 1810,					0	5	1½			

Judicial Establishments of Scotland.

The king. In a remote, and what may be termed the aboriginal period of our judicial annals, the king was chief justice of the kingdom; and, with his council, made progress through the realm for the administration of public justice. At that time, indeed, the king executed in person the principal duties of government; and it was not till comparatively recent times that the different departments of the state began to be exclusively assigned to distinct and responsible officers.

As late as the middle of the fifteenth century, an act was passed, in which "the three estates concluded, that our sovereign lord ride through the realm incontinent, after there be word sent to his council, where any rebellion, slaughter, burning, reif, or thieft happens; and there to call the sheriff of the shire, and ere the king depart out of that shire, to set remeid of the harm, or gif ony sik sall happen to be done, whether the default be in the officers or in the doers, to be punished by the king; the quhilk conclusion and ordinance, all the barons of common assent and consent are obliged to assist baith with their power in bodies and gudes." This act was passed in the third parliament of king James the Second; and in the fifth parliament of his successor, when the courts of justice were regulated by statute, there was a special proviso to the effect that, "nevertheless, it sall be lawful to the kingis highness to take decision of ony matter that comes before him, at his compleasance, like as it was wont to be of before," 1469, c. 26. Two centuries afterwards, Charles the Second claimed a like power and prerogative; and "in a dutiful and humble recognisance thereof," the estates of parliament declared, that notwithstanding of any jurisdictions or offices whatsoever, "his sacred majesty may, by himself or any commissionated by him, take cognisance and decision of any cases or causes he pleases," all government and jurisdiction within the kingdom originally residing in him, 1681, c. 18. Such a right, however, formed one of the grievances complained of at the Revolution; and since that event it has been deemed a settled part of the constitutional law of the land, that the king has committed all judicial power to the judges, and cannot himself administer justice in the courts.

The justiciar (*justiciarius*) was anciently the king's more Justiciar.

immediate and principal officer. He seems to have been derived from Normandy; and agreeably to the mixed constitution of that country, he was here, as in England, *caput legis et militiæ*, at the head both of the law and of the military force of the kingdom. He accompanied the king in his progresses through the realm, or represented him in his absence; and he had thus powers and jurisdiction as universal in their nature as they were unlimited in extent. We find, accordingly, repeated instances of the military prowess as well as judicial firmness of our early justiciars; and, not to mention other instances, in the middle of the thirteenth century, Durward, when thwarted in the project he had conceived of securing the throne to his descendants, joined Henry the Third in France, and served in his army, till, by the influence of the English monarch, he was re-instated in his high office of lord justiciar.

It does not appear, however, that the justiciar ever became here the formidable officer which he proved to be in England, where he was at one time a terror both to the king and to his subjects. Various circumstances concurred to limit his power. The chief of these, no doubt, was the influence of his adversary, the Lord Chancellor, as the head and organ of the ecclesiastics; but much also was owing to the early partition of the office into a justiciary of ancient Scotland, or the territory north of the Forth, and of Lothian, or the territory south of the Forth. This partition of the office, indeed, is observed in the very earliest notice of our justiciars. The series begins in the reign of Malcolm the Fourth, and from that time we have distinct and separate justiciars for Scotland and for Lothian. In neither of these was Galloway comprehended, that district enjoying its own peculiar laws and customs;[1] but in 1258 it also got a separate justiciar. This state of matters continued till the invasion of Scotland by Edward the First.

In 1296, Sir William de Ormesby, a justice of the common pleas, and justice in ayre in England, was constituted lord justiciar of Scotland by Edward, who also associated with him William de Mortimer, an English justice of assize; and the next year the same king made Roger de Skotre, an English lawyer, justiciar of Galloway. But in 1299, John earl of Buchan was *justiciarius Scotiæ;* he was son of the last regular justiciar of Scotland, Alexander earl of Buchan, who was upwards of thirty years in office previous to his death in the year 1289. In 1305, however, Edward again put down the Scotch; and thereupon distributed the kingdom into four districts, appointing for each district two justices, an Englishman and a Scotchman. These officers were of the nature of the English justices of assize; and when we take into consideration the nature of the appointments which were at the same time made in the counties, the object in view cannot be mistaken. Edward evidently contemplated putting the whole island under one judicial system, which had shortly before been introduced into England, namely, that of having annual or temporary sheriffs with a limited jurisdiction, and confining the law business of the country to a few courts and judges; a system very different from that which previously existed both in England and Scotland, where the great object was to bring justice home to every man's door in permanent local courts. The project, however, was stopped by Edward's death; the justiciars of Scotland and Lothian were then displaced, and permanent sheriffs restored. Robert the Second also restored to the people of Galloway their ancient laws.[2] Matters appear to have generally continued in this state till the disastrous battle of Flodden. On that event, which united all classes of the community, the office of lord justiciar, or, as he was now styled, lord justice general, (in contradistinction to the special justiciars now frequently appointed, as well for particular trials as for particular places and districts,) came into the hands of a single individual, and comprehended the whole kingdom. The High Court of Justiciary also began to be settled at Edinburgh, and from that time commence the regular series of its books of adjournal.

The Justiciar or Justice-General might now have become formidable; but circumstances again concurred to reduce his power. The office fell into the noble family of Argyll, where it continued hereditary for a century; the Court of Session was established with a universal civil jurisdiction; and as that court was co-ordinate with it on the land, the admiral of Scotland came to be co-ordinate with it on the seas. By statute 1587, c. 82, eight senators or advocates of the College of Justice, were appointed as justiciar-deputes for the different quarters into which the realm was then divided; and by 1672, c. 16, instead of the justice-deputes, five lords of session were constituted commissioners of justiciary, along with the lord justice-general, and the justice-clerk, which latter was now made vice-president of the court. By statute 1681, c. 16, too, the high admiral was declared the king's lieutenant and justice-general on the seas. By a recent act, however, the Court of Justiciary re-acquired a jurisdiction in crimes at sea; and by Will. IV. c. 69, which entirely abolished the court of admiralty, the office of lord justice-general was made to devolve on, and remain with that of lord-president of the Court of Session. The effect of this seems to have been to place the justice-general at the head of the administration of the law; and thus, by a singular revolution, to restore him, after the lapse of three hundred years, to his former situation as lord chief-justice of Scotland.

It may, in conclusion, be remarked here, that in the Court of Justiciary, which, being a superior or at least co-ordinate tribunal, was but indirectly affected by the changes in the law introduced by the Court of Session, several usages of our most ancient common law have been preserved to this day. The court meets about eleven o'clock, which was *the hour of cause* of old, (1587, c. 87) whereas the Court of Session, in direct contrast, rose at that time, meeting, agreeably to the early hours of the ecclesiastics, at eight in the morning, (1537, c. 49). So also, jury trial, when laid aside by the other courts, continued here; the verdict is still by a majority; and in the *assizes oath*, we may trace at once the original character of a jury as an inquest of the vicinage, and also the rhythmical measures of our old legal formulæ. The circuits of the Court of Justiciary were arranged in their present form by the act 1587, c. 82. Previous to that time the justiciar made a progress through the realm, from shire to shire, successively; but, by the above act, the realm was divided into four districts, or quarters. The present circuits are, besides the Lothians or home circuit, the southern, western, and northern circuits. The assize towns of the south, are Jedburgh, Dumfries, and Ayr; those of the west, Glasgow, Inverary, and Stirling; those of the north, Perth, Aberdeen, and Inverness.

Court o
Session.

The Court of Session, that is to say, the first court so called, was erected in 1425, the year following King James the First's return from his long captivity in England. It was composed of the "chancellor, and with him certain discreet persons of the three estates, chosen and depute by the king;" and was to have a like jurisdiction as that exercised by the king and his council. It was, however, but of short duration; for, on the king's death, or rather on that of Bishop Wardlaw of St. Andrews, by whose influence it was in all likelihood erected, Bishop Cameron, the chancellor, was removed from office, and the court of the session expired. Attempts were afterwards made to revive it by Bishop Horsewood, secretary to king James II.; and, thirty years afterwards, by Bishop Elphinstone, whose zeal for the establishment of the Roman law is well known. Accordingly in 1503, the court of daily council, which was essentially a revival of the former court of the session, was established by means of Bishop Elphinstone. And at length, whilst the kingdom was yet in a state of distraction from the fatal losses at Flodden, the present Court of Session or College of Justice was instituted; and of the numerous attempts of the clergy to establish the Roman law as the common law of the land, this was the last and most successful.

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[1] Stat. Alex. II. c. § 1. fin.

[2] 2 Rob. I. c. 35.

According to the simple principles of our old law, all suits originated by plaint, claim, or summary application to the judge, setting forth the cause of action; and the judge was bound of common right to administer justice therein. But afterwards, a maxim was introduced that the judges were substitutes of the crown, and consequently should take cognisance only of what was specially referred to them. Brieves or mandatory letters from the king to the judges were then invented; and the chancel of the royal chapel became the great *officina justitiæ*, the shop or mint where the king's writs were framed, and sold out to parties injured, according to the exigency of the case. These writs issued out from the chancel or chancery until the institution of the College of Justice, when the chancellor and clergy, who were the principal judges there, began a mint or shop of their own in the *Bill chamber* of the court, so called because the brieves, or, as they are here termed *letters*, issue out, not on the oral application of the party, but on his "bill" or written supplication. This course of proceeding was adopted from the court of Rome; and it is observable, that in both cases the language employed is sometimes identical. Thus, when the request or prayer of the bill is granted, the judgment is, *Fiat ut petitur*, which are the very words used by the Pope in the like case; and the odd phrase, "Finds the letters orderly proceeded," is but a verbal translation of the *Male appellatum et bene processum* of the papal court. The names of the letters are also the same, letters of advocation, suspension, and reduction, being equally well known in both places; and letters of horning, caption, and relaxation, have their papal origin impressed upon them. The comparison might be carried through our whole process to its minutest technicality, and also to the style and habit of the judges. After the manner of the ecclesiastical tribunals, too, the judges deliberated in secret conclave with shut doors, parties and their counsel, and all others being removed (1537, c. 66); and there was no report of the judges' opinions, or of the reasons of the judgment, but only of the vote or sentence. At the Revolution, however, the court was thrown open; but so powerful is custom over all men, that to this day the great body of the practitioners continue to walk the Outer House.

In modern times the court has been altered in almost every particular; its constitution and jurisdiction, the number of the judges, the distribution of the business, and the forms of proceeding. The machinery was indeed bad, but the spirit which pervaded it was worse; and the best antidote to this would perhaps be the full force of public opinion, that is, perfect publicity, not merely of hearing and judgment, but of every step in the administration of justice.

According to its first institution, the court consisted of a president and fourteen ordinary lords, half of the temporal estate and half spiritual, of which the president likewise was one. The Lord Chancellor, who was also an ecclesiastic, was made principal of the college, as it was termed, and as such had a vote with the judges; and there was a reserved power to the king to appoint, at his pleasure, three or four extraordinary lords, a power which the crown always exercised, and also sometimes greatly abused. It was the Reformation which gave the first blow to the court. From that event it began to lose its ecclesiastical, which had been its earliest and most distinguishing feature. The Revolution followed, and opened up to the public eye the heretofore secret tribunal. And at the union with England it ceased to be supreme, though this last peculiarity, and that by which *the Lords* became so formidable in the country, was long struggled for, and is yet perhaps but imperfectly given up by the court. These important changes, however, affected the spirit and character of the court, rather than its external form, which remained much as it was before. But they prepared the way for alterations there too; and during the last thirty years, a great number of public statutes have been passed, altering the details of the court, and otherwise regulating the administration of justice throughout the kingdom.

In 1808, the commencement of the period just referred to, the court was formed into two divisions; or, in effect, two communicating but equal and independent courts. The reason assigned for this change, was the greatly increased number of lawsuits from the great extension of agriculture, commerce, manufactures, and population, and the consequent multiplication of transactions in Scotland. There is every ground to believe, however, that much of the supposed business was caused by the tedious methods of proof and written pleadings adopted by the court, and its endless judgments and rehearings; for in the degree in which these have been abolished, the court has been able to absorb and dispatch the business of the other superior courts, and still to allow a decrease in the number of its judges. These are now only thirteen in all. Each division is composed of four judges; the Lord President, who is properly head of the whole court, presiding in the First Division, and the Lord Justice-Clerk presiding in the Second. The remaining judges sit separately in the Outer House, as Lords Ordinary. This term was originally given to all the judges under the president, and they served in the Outer House by rotation; but amongst other recent changes, the five junior judges were at first made permanent Lords Ordinary, as attached to a particular division of the Inner House, but now without any such relation. The junior or youngest Lord Ordinary of all is Ordinary on the Bills, and has a peculiar class of cases assigned to him. But it is to be observed, that from him, and from the other Ordinaries, an appeal lies, or a proceeding in the nature of an appeal, to the Inner House; which, besides this appellate, has also some original jurisdiction. It is not necessary to add, that there is much imperfection in this whole system of judicature. There appears to have been little unity of design in its formation; there is considerable complexity in its actual working, and there is no great satisfaction in its results.[1]

Let us now turn our attention to the local courts throughout the kingdom.

Celtic Judge.

In early times the realm was divided into provinces, clanships, or counties, in each of which was a maormor, maor, mayor or mair, as the king's executive and ministerial officer; and in every county or province there were divers judges, each exercising judicial functions. The provinces and judicial districts of those times, however, are now but imperfectly known; and, as might be expected, the series of mayors and judges cannot by any means be made out. With re-

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[1] In the year 1800, the number of causes enrolled in the Outer House, was 2413; in 1810, it was 2643; in 1820, it was 2069; and in 1831, it was 1956. In the years 1836 and 1837, the business stood thus:—

Year.	Causes Enrolled.	Decrees in Absence.	Decrees in force by Lords Ordinary.	Reclaiming Notes to Inner House.	Decrees in force by Inner House.	Average Number of Appeals to House of Lords.
1836,	1,770	546	710	456	382	45
1837,	1,565	564	600	356	375	

spect to the latter, viz., the Celtic judge, we have not traced him to a later period than the beginning of the fourteenth century. He was in all probability extinguished during king Edward's invasion of Scotland in the unhappy times which followed on the death of king Alexander the Third. The sheriff was then universally established; and as that officer engrossed to himself the functions both of the judge and mair, the former disappeared entirely from our annals, whilst the latter gradually degenerated into the sheriff's officer, with whom, accordingly, he is, to the present day, found mixed up in some of the northern counties.

Sheriffs.

The most ancient sheriff was certainly the *comes* or earl. There is no direct evidence to that effect, however; and from a remote time, the officer so called was the *vice-comes.* The office was not a century in existence amongst us, when, falling into the hands of the great local proprietors, it began to descend to heirs with the paternal estate. The sheriffship of Ayr, which was erected in the year 1221, out of the bailiaries of Kyle, Carrick, and Cuningham, was from the first hereditary. It is not surprising that the hereditary *vice-comes* should soon cease to perform in person the duties of his office; these were accordingly devolved on a deputy or *sub-vice-comes.* The earliest officer of this sort we have met with, is *Alan de Pilch*, or Alan of the hairy garment, sub-vice-comes de Inverness, temp. Robert I.;[1] but sheriff-deputes are mentioned much earlier,[2] and to such an extent was the abuse of deputation carried, that in some counties, that of Cromarty for instance, the district was partitioned into various deputy-sheriffships, and individuals appointed, such as officers of the army, medical men, and others, in situations of life perfectly incompatible with the due discharge of the office. The office also in many instances became hereditary; and another was required to execute the active duties of the place, or *pro-sub-vice-comes.* Thus, at the time of the jurisdiction act in 1747, there were in most or all of the counties, omitting the *comes*, count or earl, a sheriff-principal or high sheriff, and sheriff-depute, and a sheriff-substitute. All these were continued by the above act; but the judicial powers were confined to the two last, whose duties and qualifications have also been repeatedly regulated. It would undoubtedly have been more agreeable to principle, however, to have abolished offices which grew out of the abuses of the times, and assigned to every sheriff a reasonable district in respect of extent and population, with constant residence therein, and the exercise of judicial functions only. In determining the number, character, and situation of courts in a country, the great problem evidently is, so to distribute them as to secure two things, namely, to bring justice home to every man's door, and to mature a sound and fixed system of jurisprudence. In England, the latter object appears to have been principally regarded since the days of Edward the First, before whose time England and Scotland were equally distinguished for their local courts. But what, we may ask, avails the best system of law, if it be remote or difficult of access? The end is in such case sacrificed to the means; and a multitude of petty courts, with a few practitioners in each, would prove the ruin not only of the legal profession, but of the law itself.

The sheriff-principal, or high sheriff, is lord lieutenant of his county, and appointed at pleasure by the crown. The sheriff-depute, so called, is also appointed by the crown; but he is quite independent of the high sheriff. He must be an advocate of at least three years' standing; he holds his office during life, or good behaviour; and he receives a salary, varying, according to the shire, from L.350 to L.1200 a-year. The sheriff-substitute must be of the profession of the law, though not necessarily a member of the bar. He is named by the sheriff-depute of the shire, but paid by the crown, and is otherwise an independent officer. In every county there is a high sheriff or lord lieutenant. The same may be said of the sheriff-depute, except as to the united shires of Clackmannan and Kinross, Elgin and Nairn, Ross and Cromarty. Ross, Sutherland, and Caithness, were originally parts of the great shire of Inverness; but in the seventeenth century they became disjoined, and were erected into separate shires. By the jurisdiction act, however, Ross was put under the same sheriff with the ancient shire of Cromarty, and has continued so ever since. Sutherland and Caithness were then also re-united; but in 1806 these were again separated. Kinross was originally part of Fife; but it was afterwards separated, then re-united, and in 1807 disjoined again, and united to Clackmannan. With respect to the sheriff-substitute, in every shire there is at least one; but Edinburgh, Fife, Forfar, Perth, Renfrew, and Sutherland, have each two, Kirkcudbright and Argyle have each three, Lanark and Inverness have each four, and in one of the districts of Ross there is a sort of assistant substitute.

The jurisdiction of the county courts was originally most extensive; and as to civil suits in particular, there seems to have been scarcely any limitation. It was the policy of the Court of Session, however, to make itself the great law court of the kingdom; and as it gradually absorbed the civil jurisdiction of the justiciary, so, by a bold stratagem, it stripped the sheriff of all power to decide upon questions of real property. Such questions were formerly tried under the brieve of right, a judicial writ so named, because issued to try what was esteemed the highest right, that of property in land; and it is clear that this brieve was *in viridi observantia*, and competent to sheriffs, till within a very few years of the institution of the Court of Session. This is clear from the act 1503, c. 95, which was passed to regulate it; and it is familiarly referred to by the poet Dunbar, in his Dance of the Seven Deadly Sins, where, speaking of the occupations of the damned, he says,

> "Nae minstrels playit to them bot doubt,
> For glee-men there were holden out
>   Be day and eik be night,
> Except a minstrel that slew a man:
> Swa tith his heritage he wan,
>   Entering be *brieve of right!*"

Yet the Court of Session was scarcely established, when it boldly adjudged this brieve "nocht to have bene, nor yet to be thir mony yeires in use;"[3] and having thus, by repressing the writ, ousted the sheriff of his real jurisdiction, soon took it to itself exclusively,[4] by letters prepared for the court in its own Bill-chamber. The sheriff, however, still continued competent to possessory actions; and by a recent statute, his jurisdiction has even extended to all actions and proceedings relative to nuisance or damages, arising from an undue exercise of the right of property, and also to questions touching the constitution or exercise of real or judicial servitudes, which is so far a restoration of his ancient powers. Besides the ordinary jurisdiction, civil and criminal, of the county court, the sheriff is empowered to decide summarily in questions of debt, when the sum in dispute does not exceed eight pounds. These small debt courts were instituted in 1825, with a view to extend and improve the like jurisdiction, which had been conferred upon justices of the peace about thirty years before. The summary redress which such courts afford is of the greatest benefit to trade and to good neighbourhood, in consequence of the little sacrifice of time, money, and feeling they require; and they are accordingly now extensively established, not only in this country, but in England. There can be no doubt, however, that they had their origin in Scotland.[1]

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[1] Robertson's Index, p. 29.

[2] Stat. Will. c. 14. Stat. Alex. II. c. 14.

[3] Skene *voce* Breve de recto.

[4] Bishop of Aberdeen *v.* Ogilvy, 3d July 1563.

The courts we have now adverted to comprehend the public and general courts of the kingdom, which have a public and general jurisdiction; but besides these, there are, or rather were, some whose jurisdiction was limited to particular sorts of causes only. We allude to the Court of Exchequer, and the ecclesiastical and maritime courts.

Court of Exchequer.

With respect to the first of these, the old Scotch court, composed of the treasurer and lords auditors of exchequer, was superseded at the union by a Court of Exchequer, composed of a lord chief-baron and four puisne barons; and in addition to certain ministerial powers continued from the old court. it had the like authority, jurisdiction, and course of procedure as the Court of Exchequer in England, after which generally it was modelled. It was an absurdly large and expensive establishment. It had comparatively nothing to do; and as the judges might be, and some of them commonly were, English barristers, it never could be opened up, like the exchequer of England, to the ordinary law business of the country. Accordingly the barons were gradually reduced, and the business is now transacted by a lord of session sitting as a judge in exchequer.

Commission of Teinds.

The Commission of Teinds, which was first erected at the Reformation, was in like manner remodelled at the Union. It was formerly vested with powers for the planting of churches, assigning and modifying stipends, and the valuation and sale of teinds. But by a recent statute, all actions for the valuation or sale of teinds, all actions of suspension or reduction of localities, and all actions of declarator or reduction connected with teinds, must be brought and decided in the Court of Session.

Courts ecclesiastical.

In times of popery, causes ecclesiastical were tried by the archdeacon's official, the bishop's commissary, and the auditor or official principal of the province; from which last an appeal lay to the pope, who generally determined the matter by commission. But at the Reformation, commissaries named by the crown were appointed in every commissariat; and a Commissary Court, with original and appellate jurisdiction, was also established at Edinburgh, of which Sir James Balfour, the former official of St. Andrews, within the archdeaconry of Lothian, was the first chief-judge. The commissary courts continued till recent times, when the office of the local commissaries was abolished, and soon afterwards the Commissary Court of Edinburgh, their powers and jurisdiction being transferred to the Court of Session, and, in as far as regards confirmation of testaments, to the sheriff or county courts.

Court of Admiralty.

The jurisdiction of the Admiralty cannot perhaps be traced to an earlier period than the beginning of the sixteenth century, when the office of lord justiciar, who was of old the supreme judge in all manner of causes, became hereditary in the noble family of Argyll, and the authority of the Admiralty was also long very limited. It was confined to seafaring causes, and in these it had no exclusive jurisdiction.[2] The earliest collection of maritime laws in Scotland, is that contained in Balfour's *Practicks*, and entitled "The Sea Laws, collectit furth of the Actis of Parliament, the practiques and lawis of Oberon, and the lawis of Wisbeig, and the constitutions of Francois, king of France, 1543, 1557." This we conceive was the *Lib. Kintor.* referred to by Balfour, and the work of David Kintore, then judge of the Admiralty. Towards the end of the same century, Alexander King, advocate, filled the same office; and from the date of his *Treatise on Maritime Law*, apparently the first regular treatise on that branch of jurisprudence in Great Britain, the court of Admiralty rose into importance. By the act 1609, c. 15, it was declared a sovereign judicatory, and letters of horning were allowed on its decrees; and the reputation of the court being afterwards sustained by a succession of eminent judges, such as Acheson of Glencairney, Roberton of Beidlay, and Lyon of Carse, all of whom became lords of Session, it began to extend its jurisdiction generally to mercantile, and not, as before, to mere seafaring causes. The above act was then ratified by that of 1681, c. 16, by which the ground of the court was farther cleared and enlarged; the admiral being now also styled the high admiral, and declared the king's lieutenant and justice-general on the high seas. By a later statute, provision was made for a stated salary of L.100 to the judge of the Admiralty. This was renewed by the act 1704, c. 8; and by 26 Geo. III. c. 47, the salary was made L.400, which was afterwards raised to L.800 a-year. The court, however, did not long enjoy this flow of prosperity By the 6 Geo. IV. c. 120, jurisdiction in prize and capture was withdrawn, and vested in the Admiralty of England; and by a later statute the court was altogether abolished, and its remaining jurisdiction transferred to the Court of Session, and Sheriff courts; the High Court of Justiciary having also previously re-acquired, as of old, a co-ordinate jurisdiction in crimes at sea.

Sanctuaries

An ancient species of exempt territory was that of *sanctuary*. The first of the sort were probably churches; and

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[1] The following table, from official returns, of causes brought for the five years preceding 1832, will give an idea of the working of the ordinary civil courts of the sheriffs in some of the principal counties.

	Actions brought.	Decreets in Absence.	Litigated.	Appealed to Sheriff-Depute.	Taken to Court of Session or Justiciary.
Edinburgh,	6,732	2,322	2,248	611	91
Lanark,	10,227	4,320	5,907	1,725	181
Perth,	6.823	3,377	2,971	887	85
Aberdeen,	6,033	3,777	2,256	543	71
Forfar,	3,531	1,636	1,823	298	7
Argyle,	3,033	1,580	679	No return.	9
Ayr,	2,764	938	1,826	1,461	54
Dumfries,	2,653	1,420	1,233	No return.	47
Fife,	2,442	1,1083	1,596	382	34
Inverness,	2,385	1,413	801	232	28

The following table, from official returns, will show the working of the small debt courts, and at the same time point out the preference given to the sheriff, or to the justices of the peace, in the counties named.

Number of Small Debt Causes decided in the year 1832.

	By the Justices.	By the Sheriff.
Edinburgh,	9,254	4,055
Lanark,	9,001	11,182
Aberdeen,	2,322	2,769
Forfar,	1,767	2,093
Perth,	993	1,543
Argyle,	338	1,133
Ross,	190	1,320
Inverness,	141	1,531
Clackmannan,	21	224
Haddington,	2	282

[2] See Leg. Burg. c. 27; Pitcairn's Criminal Trials, vol. i. part i. p. 129, and part ii. p. 93; and A. S., 16th January 1554.

in regard to them we find a rescript of Pope Innocent III. to the king of Scots,[1] and thereupon the statute Alex. II. c. 6, which is among the earliest regulations on the subject in the Scotch law. There were of old divers sanctuaries, or, as they were termed, *girths*, (1469, c. 35; 1535, c. 23; 1555, c. 31), and mostly ecclesiastical; there being a constant rivalry at all times between the sovereign power and the ecclesiastical. But the only one now in use, is the sanctuary of Holyrood, which, besides usage, has two main foundations, namely, a religious house, and a royal palace, especially the former, the precincts being usually called the sanctuary of Holyroodhouse, and the court there the Abbey court. The jurisdiction of the place is administered by a bailie, who holds a court for debt, and other civil obligations, where the debtor dwells within the precincts.

Regalities and Stewartries.

Regalities were another species of exempt territory. They were rights of exclusive power and jurisdiction, civil and criminal, real and personal, granted by the crown to the higher nobility;[2] and though the impolicy of such grants had long been perceived, yet they were not altogether abolished till the passing of the jurisdiction act, in the middle of last century. By 1455, c. 43, it was enacted that all regalities in the king's hands should be annexed to the royalty and made subject to the king's courts and officers. It was about the date of that act that the great district of Kirkcudbright fell to the crown by the forfeiture of its lord; and a *seneschallis* being thereupon appointed, it has ever since remained the stewartry of Kirkcudbright. But neither this nor the islands of Orkney and Zetland, which were also erected into a stewartry,[3] differs materially from a shire; each having a court perfectly of the nature of a sheriff or county court. Besides these, there were other stewartries, such as Strathern and Menteith in Perthshire, and Annandale in Dumfries; but by the jurisdiction act, they merged into their respective shires.

Burghs.

Burghs form yet another species of exempt territory; the principal character of a burgh being its separate jurisdiction and independent government, but upon reasons altogether different from either sanctuaries or regalities. They arise neither from superstition nor princes' favours. They have their origin in the wants and social tendencies of our nature; they are the chosen seats of civilization and the arts of life; and the distinction between them and shires pervades the entire political constitution of the country. There are three sorts of burghs, namely, burghs of barony, burghs of regality, and burghs of royalty or royal burghs; and in establishing these last, it would seem to have been the general policy of government to divide the realm into districts, in each of which a royal burgh was placed. Several of the burghs are counties of themselves, or counties corporate, such as Edinburgh, Stirling, Perth, Aberdeen, and Inverness; and these obviously contain within themselves all the elements of government and judicature. But it has unfortunately happened, that none of the burgh courts has kept pace with the advance of intelligence, the progress of trade, or the increase of commercial transactions. Justice continues to be administered there just as it was centuries ago. The consequence is, that the peculiar feature of the burghs as independent jurisdictions has in many cases given way; the burgh courts have been forsaken for the sheriff and justice of peace courts; and it seems to have become a public question of policy, whether they should not be altogether abolished. The same causes, however, which gave origin to burghs, remain; and therefore it would seem to be the wiser policy to improve the burgh courts, rather than to abolish them; to improve them, by relieving the magistrates of all, or at least the more important judicial duties, and to devolve these upon fixed and qualified judges.

The superintendence of the royal burghs was in the king's chamberlain, who held *ayres*, or itinerant courts, at which the magistrates and burgesses of burghs were bound to give attendance, and where he heard and determined all charges made against them. He was also in use from the earliest times, to hold, in the southern part of the kingdom, courts of four boroughs; which were so called because composed of delegates from the four burghs, originally of Edinburgh, Stirling, Berwick, and Roxburgh, but afterwards of Edinburgh, Stirling, Lanark, and Linlithgow. These delegates assembled before the chamberlain, and formed for appeals from the chamberlain ayres, and the different burgh courts, a tribunal which was to burgesses what the high court of parliament was to the other inhabitants of the kingdom, the last and highest court of appeal. The northern burghs had been long under a peculiar government of their own. They formed a sort of Hanseatic league; for as early as the reign of William the Lyon, a royal charter was granted to the king's burghers of Aberdeen and of Moray, and all beyond the Grampians, to hold their free "ansum" or hanse, as freely, quietly, fully, and honourably, as their predecessors had done in the time of the granter's royal grandfather.[4] In the beginning of the fifteenth century, a court of four boroughs was holden at Stirling, where it was resolved that deputies from each of the royal burghs south of the Spey should convene yearly to consider and conclude on all matters affecting the commonweal of the royal burghs, their liberty and court. This convention was in all likelihood formed in imitation of the northern Hanse. The inconvenience of having two separate yet similar assemblies in the kingdom, however, must have been quickly felt; and, at the same time, the ease and propriety of uniting them, and thus assimilating the regimen of all the burghs, obvious. Accordingly, in the end of the same century, an act of parliament was passed, (1487, c. 3.) appointing deputies from all the royal burghs, "*baith north and south*," to meet in convention yearly, thus forming the convention of royal burghs which has been ever since continued. The place of meeting was fixed at Inverkeithing, on the north of the Forth, probably from its central situation; but the convention soon removed to Edinburgh, which had long been the seat of the court of four boroughs, and was now become the metropolis of the kingdom. On the institution of the Court of Session, the court of four boroughs and the chamberlain ayres quickly fell into disuse, their judicial, and many of their ministerial functions having been engrossed by that court; and from the time of Malcolm lord Fleming, who fell at Pinkey in 1547, the office of chamberlain, or, as he was now styled, lord great chamberlain, ceased to be exercised. The convention, however, continued its yearly meetings; indeed, its records begin only at this time, when the Lord Provost of Edinburgh became by devolution its standing preses, and the Town-Clerk of Edinburgh its standing clerk.

Let us now return to the general and ordinary courts of the kingdom; the Court of Justiciary and Court of Session, the Sheriff Court, and the Bailie Courts of burghs.

Judicial proceedings.

The Court of Justiciary was originally the great pattern followed in the administration of justice throughout the kingdom; but soon after the institution of the Court of Session, an act passed (1540, c. 72.) requiring all sheriffs and other temporal judges to copy the proceedings, not of the justices, as before,[5] but of the Lords of Session; and the principle of this enactment was adopted in the recent judicature act regulating the forms of process in civil matters. The course of proceeding in ordinary actions is now generally as follows. The defendant, or, as he is called, the defender, is first summoned on the original writ to compear in court peremptorily on a day named, the intervening days being held as *induciæ legales*. If, when the cause is called, the defender do not appear, decree in absence may pass against him. If he appear, he is allowed certain days, termed *induciæ deliberatoriæ*, to see the original writ and productions, and determine whether and how he shall proceed. He then puts in his defence and plea, admitting or denying the facts alleged, stating any other facts which he offers to prove, and subjoining a summary of the pleas in law on which he means to found. The defences and all subsequent steps of procedure must be drawn by counsel; and after the defences are given in, every order in the cause must be moved for in court and determined by the judges. If the parties choose they may go to judgment on the summons and defences; but commonly more specific pleadings are ordered, such as a condescendence and answers, or mutual condescendences, which are similar to the *responsive allegations* of the ecclesiastical courts, and both are borrowed from the *articuli et responsiones* of the papal process. These papers being revised by the parties, the record, ready to be closed, is transmitted to the judge for private consideration; after which, it is put out by him for debate. Parties are then heard in court by their counsel, and the judge may thereupon either give judgment at once, or, as is commonly the case, take the proceedings to chambers again for consideration, and there write out his decision; or, if any difficulty occur in the determination of the case, he may report the point to the Inner House for their direction or decision; or again, if the cause involves details or difficulties, he may order cases, that is to say, full argumentative pleadings, and then either decide the cause or report it to the Inner House. When the Lord Ordinary gives an interlocutor or judgment, it may be carried to the Inner House by reclaiming note, upon which counsel are heard, and the decision of the Lord Ordinary either altered or adhered to, and with or without cost, as the court may determine.

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[1] Decret. Greg. 46 3. Tit. 49. c. 6.

[2] *Regales*, Cod. Theod. vii. 1, 9.

[3] See 1669, c. 13.

[4] Kennedy's Annals of Aberdeen, vol. i. p. 8.

[5] Stat. Rob. III. c. 33.

In jury causes, that is to say, causes appropriated for trial by jury, or in which jury trial is to take place, the course of proceeding now pointed out is but partially followed. In such causes a record is made up in the manner described; but as the system of pleading adopted in the Scotch courts does not, as in the common law courts of England, bring out the issue whether of fact or law, issues must be prepared. This is done by an officer of court, and in settling issues there is frequently considerable difficulty. In the proceedings of sheriff and bailie courts, however, there is something like an approach to the English system, an answer or reply to the defence being allowed. But here the analogy ends. There is no rejoinder unless ordered; and from the multitude of pleas pleadable in each paper, a single issue, or indeed any issue, in the technical sense of the term, is never produced. It is also to be observed, that jury trials in civil causes gradually fell into disuse in the local courts after the institution of the Court of Session, where such mode of trial was unknown till recently introduced by statute; and it has not been re-established except in the Court of Session. The details of a jury trial, when it does take place, need not be specified here, though they differ in some few particulars from the like proceeding in England.

Of the several methods of defence and proof in criminal cases, the earliest, and at the same time the rudest, was battle, in which the parties litigant put the truth of their averment on the issue of a judicial combat.[1] This method of trial, so truly barbarous, was termed the judgment of God, though that appellation came more peculiarly to designate another method of a different origin, but no less uncertain as a criterion of truth. This was ordeal, which, if not introduced, was at least continued and countenanced by the ecclesiastics. It was of various kinds, but those known in Scotland were water, fire, and iron;[2] and accordingly, as the accused was able to bear applications of these, so accordingly was he judged guilty or innocent. Another method of trial used also instead of battle, was that by compurgators, where the defendant exculpated or purged himself of the guilt imputed to him, by declaring his innocence on oath, and also producing a number of persons to swear that they believed he swore truly, which they did in general on their knowledge of his character.[3] But all these methods of trial have been abolished, or have gradually become obsolete, which leads us to notice the course of proceeding now in use in ordinary cases.

The first step is to commit the accused for examination, when, if no case is made out, he is dismissed, otherwise he is committed for trial. From that moment he may sue out and "run his letters," a proceeding analogous to the *habeas corpus*. Trial being determined on, the accused is summoned to the day fixed, being at the same time served with a duplicate of the indictment or criminal letters, and lists of the assize (jurors) and witnesses on his own behalf. On the day of compearance, he must appear personally, (otherwise he is outlawed,) and stand at the bar or pannel whence he is termed the *pannel;* but in all cases he is allowed counsel and agent. If, on arraignment, he has no special matter to plead, the libel is read to him, and his confession, if made, is recorded. If any special plea on the relevancy is offered, it is determined by the judges on oral or written argument. Issue being joined, the evidence on both sides is laid before the court and jury, which are now impannelled for that purpose. The jury are then addressed by the pannel or his counsel, and the evidence is afterwards summed up by the presiding judge, with a direction in law to the jury; when the jury, after deliberation, return, unanimously, or by a majority, a verdict of guilty, not proven, or not guilty, as the case may be. A verdict of not guilty declares the prisoner's innocence; a verdict of not proven indicates suspicion, but insufficient proof of guilt; and in the case of a verdict of guilty, but in that only, sentence is pronounced. The nature of the sentence depends not only on the crime, but also on the public prosecutor; for of a long time past that officer has been in use to exercise a power to restrict the pains of law. This important power is commonly exercised with great discretion; yet undoubtedly it is a dangerous one to hold, and to it more, perhaps, than to any other cause whatever, is to be ascribed the singularly lax state of the criminal law of Scotland in reference to the punishment for crime.

Public Prosecutor.

There seems little doubt but that in early times the king was public prosecutor, as he was also generalissimo and chief justice of the kingdom. His great officer, the justiciar, who followed him, as we have seen, in the two latter capacities, followed him likewise in the capacity of public prosecutor; and what the justiciar did throughout the realm generally, the same did the sheriff in his particular county. Accordingly, we find it enacted in our early law that if any stranger remained in a town longer than a night without finding a pledge or surety for his good behaviour, "the justiciar or the sheriff shall accuse him;"[4] and so late as the middle of the fifteenth century it was enacted "that all mairs and serjeants arrest at the sheriff's bidding, albeit na party follower be, all trespassers, and that the sheriff follow said trespassers in the king's name, gif na party follower appears," (1436, c. 140.) In process of time however, as the principles of civil liberty and the elements of our constitution came to be better understood, distinct officers were appointed to the different departments of the State; and this office of public prosecutor naturally devolved upon the crown counsel. The principal of these is the lord advocate, and next to him is the solicitor-general, an officer derived from the English courts, and probably not known in Scotland earlier than the union of the crowns in the beginning of the seventeenth century. There are also four standing deputies to the lord advocate, or "advocate deputes," as they are termed, who had their origin by the act 1587, c. 82, which divided the realm into circuits for the administration of criminal justice. The procurators fiscal of the county and burgh courts, who are the public prosecutors in their respective districts, may also be regarded as deputies of the lord advocate. It is true they do not derive their authority from him; but they communicate with him in the prosecution of criminals, and in that department have generally the same powers and duties. The following table will shew the great importance of public prosecutor.

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[1] Quon. Att. c. 61, Leg. Burg. c. 24.

[2] Stat. Will. c. 7, 15; Stat. Alex. II. c. 7.

[3] Quon. Att. c. 5, §. 7; Leg. Burg. c. 24.

[4] Quon. Att. c. 63.

Number of Indictments and Criminal Letters issued from the Justiciary Court.

Year.	For trial in the High Court.	For trial on circuit.	Of both which there were at the instance of the Lord Advocate.
1812	18	56	68
1813	24	62	83
1814	22	60	76
1815	22	108	122
1816	30	120	125
1817	43	176	210
	159	582	684

The following statement will also give some idea of the working of the criminal jurisdictions of Scotland. It relates to the year 1836. In that year there were 2922 persons charged with crime in the several counties and burghs of Scotland. Of these 289 were discharged without trial, and 219 from other causes; and of the remaining 2414, there were tried by the Justiciary, 574, (viz. 173 in the high court, and 404 on circuit); by sheriffs, 1325, (viz. 547 with jury, and 778 without jury); and 515 by burgh magistrates, justices of the peace, and others. Of the above 2414 also, 2152 were convicted; in 194 cases the charges were found not proven; 30 were declared not guilty; 36 were outlawed, and two were found insane on arraignment. And finally, of the 2152 convicted, 1647 were sentenced to imprisonment of different periods, 305 were condemned to transportation for different periods, 187 were punished by fine, 6 were discharged on sureties, 2 had sentence of death, 1 was executed, and 5 received no sentence.

Next in dignity to the crown counsel is the dean of faculty, *facultatis juridicæ decanus;* or rather we should say that between these learned personages there has been a contest waged, the latter claiming precedence of the former. This claim, however, seems to be just a *residuum* of the once greater claims of the whole college of justice, and the dispute but a continuation of the conflict formerly maintained by the court against all power except its own. The place of dean of faculty has been held by some of the first men of the kingdom; and in the course of the last two hundred years there have been no less than three instances of elevation from it at once to the presidentcy of the Court of Session, Sir George Lockhart, Sir Hugh Dalrymple, and Mr. Blair. But in all the common elements of rank there cannot be a doubt of its inferiority to that of crown counsel.

According to the original constitution of the Court of Session, the members were associated into a college, with a view to a collegiate or common life; the judges or lords of Session being "senators" of the college, and the advocates the *facultas juridica*, or faculty of law, subordinate to whom were the students of law, or "servitors," as they were termed, who were attached to particular advocates as their pupils in the study of the law. The celebrated Sir Thomas Hope was in early life a "servitor" to Sir Thomas Nicolson. The term "servitor" was a college term, well known in the University of Oxford; but it has gone out of use with us, those formerly so designed being now termed "advocates' first clerks." But to what extent such intention was ever carried out, or whether any thing existed here in the nature of the English laws of court or Doctors Commons, does not appear. At present there is nothing of the sort. The original entry money to the Faculty was L.40 Scotch, and so it continued till 1672, the year in which the statute for the regulation of the judicatories passed, when the sum was raised to 200 merks. In the beginning of last century it had advanced to L.40 sterling, and now, after repeated advances, the fees of entry are upwards of 250 guineas besides extras. The number of the Faculty which, forty years ago, was about 260, is at present about 470, averaging of late about twelve in the year; but a fourth part only are in attendance on the courts.

Agents.

The distinction of counsel and agents in Scotch practice is of modern origin. The earliest agents properly so called, or practitioners below the bar, were the "servitors" above mentioned, or advocates' first clerks in the Court of Session; and all others were forbidden to act as agents.[1] By the injunctions of their chief officer, the Secretary of State, in 1594, Writers to the Signet were also prohibited from acting as agents; and by a bye law of the body itself in 1676, every member who should take it upon him to act as an agent, was made liable to be prosecuted. They came at length, however, to act likewise as agents, and are now a large and influential body. Sixty years ago they were not more than 100; but about forty years ago they were 280. At present they are upwards of 700 in number, and almost all of them resident in Edinburgh; and the average entries yearly are the same in proportion as into the Faculty. There is another class of agents, the Solicitors before the supreme courts, enrolled under AS. 9 July 1754, and AS. 1772. They are upwards of a hundred in number, which is somewhat more than the enrolled number of advocates' first clerks, a body which has remained much about the same for the last forty years.

Country Procurators.

With respect to the procurators of the inferior courts, they appear to have generally continued, till recent times, on the same close footing on which the practitioners of all the courts stood previous to the institution of the Court of Session; nor are they to this day admitted by the supreme court, or marshalled, like the bar, into one body, but are severally admitted, on varying qualifications, by the respective courts throughout the kingdom. They are of course restricted to the particular court so admitting them; whereas the advocates of the College of Justice form the proper bar of Scotland, and being admitted by the supreme court, may practise in any court of the kingdom. The same principle might be extended with evident advantage; and the local courts opened up to the talent and practical skill of the agents of the Court of Session. The present arrangements are very plainly imperfect, and incapable of maturing a uniform and settled system of jurisprudence in the country. There is not a tenth part of the law business of the country conducted by the counsel and agents of the supreme court. Unless a different provision is made, both the law and the legal profession of Scotland will inevitably suffer.

Advocates in Aberdeen.

In the style of the procurators of Aberdeen, there is a peculiarity which may here be taken notice of and explained. They are styled *advocates*, which name is otherwise appropriated to the advocates of the College of Justice. The truth is that the appellation of advocate is amongst the earliest which we find in our records applied to practitioners of the law, (1424, c. 45); and it appears that persons so designated were formerly in every court of the kingdom, (1424, c. 45, 1429, c. 116—125.) The term was used synonymously with procurators; and at the institution of the Court of Session both terms were applied together, (1537, c. 64.) The sheriff court of Aberdeen was the earliest county court regulated subsequent to the erection of the Court of Session; and in the act of court then passed, the two names were used promiscuously. Hence has arisen the common use of the style of advocate; but the advocates of Aberdeen form no part of the proper bar of Scotland, any more than the practitioners of any of the local courts whatsoever. The entry of procurators of Edinburgh was not regulated by the sheriff till 1765, and for fifteen years more they remained unincorporated. It was still later before the procurators of Glasgow were erected into a corporation; and it was not till above thirty-five years ago that the procurators of Paisley were incorporated.

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[1] See AS. 13th July 1596, Stat. 1672, c. 16, and AS. 26th February 1678.

Habit of e Bar.

We have now a word or two to say with respect to the garb of the profession. The proper habit of the bar is the long robe which now characterises the profession, and which seems to have been adopted by the advocates of the College of Justice as the ecclesiastical array. Anciently, however, a sort of cloak or tabard of green was worn, (1455, c. 45.) which colour it will be recollected, was symbolical of learning amongst the ancient Britons; and accordingly that class of their priesthood called *Ovats*, and who professed the liberal arts, wore habits of green. In the burgh court of Edinburgh the cloak was worn till the beginning of the seventeenth century, when the procurators were required to wear gowns instead.

xecutive fficers.

It remains to advert shortly to the executive officers of the law. These are, properly speaking, the sheriffs in their respective counties, and the magistrates in the burghs; and in the criminal warrants of the superior courts this is clear. But the ordinary civil process of the Court of Session is executed by the messengers and other officers at-arms; and the like process of the sheriff and bailie courts is executed by the sheriff and burgh officers respectively. The messengers-at-arms amount to upwards of two hundred in number, and are distributed throughout the different shires and districts of the kingdom. They are all associated, however, under the Lyon herald, king of arms, who, as head of the office or college of arms, has authority and jurisdiction over all the members and officers of the establishment. In this respect the Lord Lyon may be regarded as essentially at the head of the civil branch of the executive department of the law; and accordingly it might deserve consideration whether it would not be expedient, with a view at once to give unity of management to the entire department, and also to relieve the sheriff of all but judicial duties, to devolve upon the Lord Lyon and his officers the execution of process of every kind, and the whole ministerial powers of the sheriff, in as far as these are executive, or auxiliary to the courts of law.

In order to give a clear and concise view of the manner in which justice is distributed throughout Scotland by means of the circuit courts of justiciary, and the courts of the sheriffs-depute and sheriffs-substitute, not including the burgh and justice of peace courts, the following Tables are subjoined.

The great divisions of the realm in early times were Lothian, Galloway, and Scotland. In the first of these, justice-ayres were holden at Edinburgh, Peebles, and soon afterwards Glasgow; and if we credit the *Reg. Mag.* lib. ii, c. 20, the *loca capitalia Scotiæ* were, Scone for Gowry, Cluny for Stormonth, Rait for Athole, Dalguish for Fife, Perth for Strathearn, Forfar for Angus, Aberdeen for Mar and Buchan, and Inverness for Ross and Moray. The judicial districts assigned by king Edward I., in 1305, were Lothian, Galloway, beyond the Forth to the Grampians, and beyond the Grampians. At the institution of the Court of Session in 1532, the realm was divided, for the purposes of civil judicature, into four quarters, as follows:—

Forfar, Kincardine,
Aberdeen, Banff,
Elgin, Forres, Nairn,
Inverness, Cromarty.

Edinburgh, Haddington,
Linlithgow, Berwick,
Roxburgh, Peebles,
Selkirk.

Dumfries, Annandale,
Kirkcudbright, Ayr,
Wigton, Lanark,
Renfrew, Stirling.

Dunbarton, Argyle,
Bute, Clackmannan,
Kinross, Fife,
Perth.

By 1587, c. 82, the realm was divided, for the purposes of criminal judicature, into four quarters, of seven shires each, but these are not stated.

Statistical Table of the Judicature of Scotland.

Circuits.	Assize Towns since 1672. c. 16.	Shires.	Area square miles.	Population, 1831.	Number of Sheriff Substitutes.	Court Places.	Number of Procurators in each.	Number of ordinary actions brought into Sheriff Court, 1828-1832.	Number of causes advocated and appealed to Justiciary.
The Lothians, or Home Circuit,...	Edinburgh,..	Edinburgh,........	360	219,345	2	Edinburgh,.....			
		Haddington,.......	250	36,145	1	Haddington,....	19	523	11
		Linlithgow,.... Bathgate,......	112	23,291	1	Linlithgow,....		898	7
Southern Circuit,..	Jedburgh,...	Berwick,..........	446	34,048	1	Berwick,........		1302	9
		Roxburgh,.........	715	43,663	1	Roxburgh,......		1189	9
		Peebles,...........	360	10,578	1	Peebles,.........		129	2
		Selkirk,............	263	6,833	1	Selkirk,..........		135	5
	Dumfries,...	Dumfries,.........	1800	73,770	1	Dumfries,......		2653	47
		Kirkcudbright,...	882	40,590	3	Kirkcudbright,			
	Ayr,.........	Wigton,...........	451	36,258	1	Wigton,.	8	538	4
		Ayr,...............	1600	145,055	1	Ayr,............	40	2764	54
Western Circuit,...	Glasgow,....	Lanark,............	870	316,819	4	Glasgow,.......	193	10,227	181
						Lanark,..........	7		
						Lower Ward,..			
						Hamilton,.......	27		
		Renfrew,..........	241	133,443	2	Renfrew,.......	48	2400	
						Greenock,......	27		
		Dunbarton,.......	230	33,211	1	Dunbarton,....	9	1014	

Statistical Table of the Judicature of Scotland—continued.

Circuits.	Assize Towns since 1672. c. 16.	Shires.	Area square miles.	Population. 1831.	Number of Sheriff Substitutes.	Court Places.	Number of Procurators in each.	Number of ordinary actions brought into Sheriff-Court, 1828-1832.	Number of causes advocated and appealed to Justiciary.
Western Circuit,	Inverary, 20 Geo. 2.	Argyle,	3800	100,973	3	Inverary,	12	3033	9
						Campbelton,	6		
						Tobermory,			
		Bute,	257	14,151	1	Bute,	4	367	1
	Stirling,	Stirling,	489	72,621	2	Stirling,	40		
						Falkirk,			
		Clackmannan, Kinross,	131	23,801	2	Clackmannan,	7		
						Kinross,	7		
Northern Circuit,	Perth,	Fife,	504	128,839	2	Cupar,	32	2442	34
						Dunfermline,	12		
		Perth,	2588	142,894	2	Perth,	71	6823	85
						Dunblane,	6		
		Forfar,	840	139,606	2	Forfar,		3531	7
						Dundee,			
	Aberdeen,	Kincardine,	317	31,431	1	Kincardine,		1166	27
		Aberdeen,	1985	177,657	1	Aberdeen,	129	6033	71
		Banff,	500	48,604	1	Banff,	28	2407	11
		Moray, Elgin, Nairn,	1040	43,585	4	Elgin,	23	1438	8
						Nairn,		157	
	Inverness,	Inverness,	4600	94,797	4	Inverness,	25	2385	28
						Fort William,	4		
						Skye,	5		
						Newton,			
		Cromarty, Ross,	2836	74,820	4	Dingwall,	11	1938	18
						Tain,			
						Stornoway,	2		
		Sutherland,	1754	25,518	1	Dornoch,		675	
						Tongue,			
		Caithness,	618	34,529	1	Caithness,		1280	3
		Orkney and Zetland,	1325	58,239	2	Kirkwall,	6	1106	8
						Lerwick,			

Civil divisions.

The divisions which are recognized under this head are counties or shires, and parishes. Of the *counties*, the origin of which is very ancient, and has not been ascertained, a list, and other particulars respecting them, have already been given. They are thirty-three in number, but most of them are subdivided by local acts of parliament into two or more districts, for the purpose of police and internal economy; and several of them comprehend a variety of territorial divisions, founded on the natural circumstances of the country. Thus the county of Berwick is popularly divided into the three districts of the Merse, Lauderdale, and Lammermuir; Lanarkshire into the upper, middle, and lower wards; Ayrshire into Kyle, Cunningham, and Carrick; and in the extensive Highland counties, the subdivisions are still more numerous. There is no trace in Scotland of the minor divisions of the English counties, called hundreds, wapentakes, and the like. Of the judicial divisions of Scotland an account will be found in this article under the head of Judicial Establishments. Respecting the date of the erection of *parishes*, there have been various conjectures. They were purely an ecclesiastical regulation, and could not have been formed till the Christian system had been generally received, and its preachers become numerous; and as this division, and the necessary previous ecclesiastical establishment, infer no inconsiderable degree of civilization, it is highly probable that it did not take place before the ninth or the tenth century.[1] Mr. Chalmers supposes that parishes were gradually formed after the year 843; but that they existed in the time of Malcolm III., who died in 1093, is ascertained by authentic records.[2] The number of parishes has not been uniform. Previously to the Reformation the bishops possessed the power of uniting or disjoining parishes. Between this period and the Union, in 1707, the authority was transferred from the bishops and vested in several successive commissions of the Scottish parliament. In 1707, parliament vested this power in the Court of Session, but confined the power of the court to cases where consent had previously been given by persons possessing three-fourths of the valued rental of the parish; and this is the existing law. The disjoining or union of parishes is, therefore, attended with considerable difficulty, and very rarely takes place, except in cities where the consent of the municipal authorities, if patrons of the parish, and of the presbytery of the bounds, is sufficient for the purpose. Hence in Edinburgh five new parishes have been erected out of the parish of St. Cuthbert's, within the last forty years. The number of parishes is at present 916, exclusive of what are commonly called *quoad sacra* parishes. These latter parishes have been formed in either of the two following ways. First, owing to the inconvenient extent of parishes in the Highlands, and the consequent distance of many of the people from the parish church, missionaries supported by a royal grant, were appointed to certain localities with the privileges *quoad spiritualia* of parochial clergymen, except that they could not be constituent members of any of the church courts, and could not even have sessions of their own. But in the year 1833, these localities were, by an act of the General Assembly, converted into parishes *quoad sacra*, and their ministers declared to be constituent members of the ecclesiastical courts. The number of these new parishes is forty-one. Secondly, from the many difficulties attending the erection of new parishes, means have been introduced, in addition to the establishment of the new *quoad sacra* parishes referred to, to supersede the necessity of such a step; and this object was accomplished by the institution of "chapels of ease," or subsidiary places of worship, without any assigned locality. These parishes, the first of which was erected in 1798, amounted in 1834 to sixty-six, when the General Assembly conferred on them the same rights and privileges which belong to parish ministers, and appointed them a certain defined locality *quoad sacra*. Since that period they have greatly increased in number, and are yearly increasing, so that it would be both difficult and unnecessary to ascertain the exact amount. But they do not affect the original parishes in any way, except in regard to the spiritualities.

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[1] Murray's Literary History of Galloway, 2d edit. 1832, p. 7.

[2] Caledonia, vol. i. p. 23.

Religious instruction.

Church of Scotland. The reformation from popery began at an early period in Scotland, but was not triumphant until the year 1560, when popery was abolished, and the protestant religion established by act of parliament in its stead. But whilst popery was abolished, the protestants could not agree amongst themselves as to the system of ecclesiastical polity which should be established in its place. Episcopacy, or the government of the church by bishops, received the support of the king and of many of the most powerful families; whilst presbytery, or the polity introduced by Knox from Geneva, where he had studied under Calvin, was embraced by the great body of the people. But amidst the struggle for pre-eminence, the presbyterians, who constituted five-sixths of the protestant population, took matters into their own hand, and embodied their ecclesiastical system in a work entitled *The Second Book of Discipline*,[1] which was ordered by the General Assembly that met in 1581, to be engrossed in the registers of the church as ecclesiastical law, and which has ever since formed the basis of the polity of the established presbyterian church of Scotland. This Assembly first divided the country into presbyteries and Synods.[2]

But whilst presbytery was thus the religion of the people, it did not receive the sanction either of the Privy Council or Parliament. On the contrary, in 1584, episcopacy was established as the national church; presbytery was declared illegal; and the presbyterian clergy were exposed to much obloquy and persecution. But the public voice again got the ascendancy; and presbytery was for the first time ratified by act of parliament, in 1592, as the national church. But not being acceptable to the king and the court, this polity was superseded by episcopacy in 1606; nor did it again obtain the supremacy till the famous General Assembly, held at Glasgow in 1638, which abolished prelacy, and restored the presbyterian form of worship. The proceedings and acts of this Assembly were afterwards confirmed by the king and the parliament. But in 1660, on the restoration of Charles II., presbytery was compelled again to give way to episcopacy, which maintained the predominance till the Revolution. The act of William and Mary, re-establishing presbytery, was passed in 1690.[3]

Standards of the Church. To the celebrated Assembly of Divines that met in Westminster in 1643, the presbyterian church of Scotland, which was represented in that meeting by commissioners chosen by herself, is indebted for her standards both as to her formularies and her doctrines. To the deliberations of this assembly she is indebted for a Directory of Public Worship, a Form of Ordination, the Larger and Shorter Catechisms, and the Confession of Faith; all which were adopted by the General Assembly, and confirmed by the Scottish parliament, as agreeable to the word of God.[4] The doctrines of the church are Calvinistic, the leading tenets being predestination, original sin, particular redemption, irresistible grace, justification by faith, and the perseverance of the saints.

Parishes. Every parish in Scotland enjoys the privilege of having a resident clergyman; residence being obligatory by law as early as the year 1563. The number of parishes, according to the civil law, is 916; and of these 27 are collegiate, that is, have each the services of two clergymen, who preach alternately in the same place of worship. The whole number of parishes, both civil and *quoad sacra*, was, in 1836, 1023; so that, including the collegiate charges, the whole number of clergymen is 1050.

Church Judicatories. The Kirk-session is the lowest court. It is composed of the minister of the parish and the lay-elders. The minister is officially moderator or president of the session. This court takes cognizance of cases of scandal, of the poor's fund, and of parochial ecclesiastical discipline. There is a power of appeal from the session to the presbytery, which is the next court in dignity.

The *Presbytery* is composed of a number of contiguous parishes. A presbytery consists of the ministers of all the parishes within its limits; of the professor of divinity, if there be any university within its bounds, and of a lay-elder from each parish. The presbytery takes young men on trial as students of divinity, and candidates for licence; ordains presentees to vacant livings; and has the superintendence of religion and education within its precincts. Its decision is not final, if an appeal be lodged to the synod. A presbytery generally meets monthly; and it must necessarily meet at least twice a-year. The number of presbyteries is eighty.

The *Synod* is composed of two or more presbyteries. It consists of every parish minister within its limits, and of the elders who last represented the different sessions in the presbytery. There is a power of appeal from the synod to the General Assembly. The number of synods is sixteen.

The *General Assembly* is the highest ecclesiastical court, its decisions being final. It meets annually in the month of May, and sits for ten successive days. It is honoured with the presence of a nobleman as representative of the sovereign, under the title of Lord High Commissioner. But this high functionary has no voice in the deliberations of the court; and even his presenee is not absolutely necessary. The Assembly, unlike the inferior courts, consists of representatives from the presbyteries, royal burghs, and universities of Scotland, formerly from the church of Campvere, now extinct, and from the churches in the East Indies, connected with the Church of Scotland.[1]

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[1] The *First Book of Discipline* was presented by the reformers to the parliament of 1560, which abolished popery; but it was not ratified by the legislature, though it was subscribed by a great many of its members as private individuals. But the parliament, though it did not give the sanction of its authority to *The First Book of Discipline*, accepted and confirmed *the Confession of Faith* drawn up by the protestants, the object of which being not so much to establish any particular set of doctrines as to abjure popery; and hence it is called the *Negative Confession.* Another *Confession of Faith*, or *National Covenant*, as it was called, was drawn up in 1580, and subscribed by the king, his household, and by persons of all ranks in the state, but not confirmed by parliament. (Knox's History of the Reformation. Peterkin's Compendium of the Law of the Church of Scotland.)

[2] Cook's History of the Church, I. chap. iv.

[3] Cook's History; Baillie's Letters and Journal; and acts of General Assembly.

[4] Baillie, *passim;* and Murray's Life of Samuel Rutherford, chap. viii. 193—217.

Eighty presbyteries send, ministers		218
Do. do. elders		94
City of Edinburgh, elders		2
Sixty-five other Royal Burghs		65
University of Edinburgh	one representative each	5
University of Glasgow		
University of St. Andrews		
Marischal College, Aberdeen		
King's College, Aberdeen		
Churches in India, a minister and an elder		2
Campvere (now extinct,)		0
Total number of members		386

We may here state that the course of study for the church is abundantly ample, extending at least to eight years in one or more of the Scottish universities. The first four years are devoted to literary and philosophical study; the other four to Hebrew, church history, and theology properly so called. After this course of study is ended, a young man can be taken on trials by the presbytery for licence as a preacher or probationer. The average annual income of the Scottish clergy, which is generally derived from teinds or tithes,[2] is supposed to be about L.200, exclusive of the manse and glebe. In parishes where the teinds have been exhausted, or do not produce to the clergyman an income of L.150, the government has provided a fund, so as to raise such income to this minimum amount. The parishes thus assisted are called bounty livings, and amount to 208.[3]

Dissenters. The great body of the Scottish dissenters are presbyterians, entertaining Calvinistic opinions, and recognising the same confession of faith and the same standards as the members of the established church; they abandoned that church in consequence of certain alleged errors in discipline, and particularly the undue exercise of patronage, for lay-patronage has always obtained, with more or less vigour in the Scottish establishment, except for more than twenty years prior to 1712. (See SECEDERS.)

The dissenting body next in importance to the United Associate Synod, is the Relief, which was founded in 1755. The founders of this sect professed to differ from the Established Church on no other point than the right of patrons to appoint ministers against the inclinations of the people.[4] But the breach between this body of dissenters and the Establishment has now become wider; while the different sections of dissenters seem more disposed to union among themselves. The two numerous bodies of the Secession and the Relief, are at present (1839) engaged in making advances towards a union of these denominations. The Original Burgher Associate Synod declined to join the coalition formed between the Burghers and Antiburghers in 1820. The different congregations belonging to this sect are, with few exceptions, disposed to join the Established Church; indeed, some of them have already done so. There is another class of presbyterian dissenters, generally called Cameronians, but who assume the title of the Reformed Presbyterian Synod, who are the successors and representatives of the Covenanters in the time of Charles the First and his son. This small but interesting body refused to accept the settlement of Presbytery, as established by law in 1690, unless the king should consent to subscribe the Solemn League and Covenant, and the standards of the Church. The Cameronians are, perhaps to this day, the most rigid presbyterians in Scotland. But without descending into particulars, the following table will afford a pretty correct view of the extent and importance of the different religious bodies in Scotland.[5]

Summary of the Religious State of Scotland.

Established Church, including the *quoad sacra* parishes, up to 1836,		1023
United Associate Synod,	361	
Relief Synod,	108	
Original Burgher Associate Synod,	44	
Associate Synod of Original Seceders,	33	
Reformed Presbyterian Synod,	33	
Total number of dissenting Presbyterian congregations,	579	
Scottish Episcopal Church,	82	
Independents,	90	
Baptists, Methodists, Quakers, Glassites, Unitarians, and other Protestant sects,	40	
Total number of Protestant dissenting congregations		791
Majority of the Established Church,		232
Roman Catholic chapels,		55
Majority of Established Church over all other sects,		177

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[1] Hill's Constitution of the Church of Scotland, *passim.* Burton's Manual of the Law of Scotland, pp. 85, *et seq.*

[2] The history of tithes, or *teinds* in Scotland, since the Reformation, is involved and intricate. We need not enter on the consideration of the subject here, but merely state that, at the approach of the Reformation, most of the teinds, and much of the property of the church were alienated, and bestowed on laymen, or devolved on the crown. But to overlook the intermediate steps, the greatest change which took place in the matter was in the reign of Charles the First, who revoked all the ecclesiastical grants (except the church lands) which had been made during the two preceding reigns. This revocation having taken place, though with difficulty, it was provided that the lands, except such as had been already appropriated to the payment of stipend, should be valued and sold. The landholders were entitled to sue for a valuation or *modus*, and to purchase the teinds of their own estates. To facilitate the inquiry into the value of teinds, commissioners and sub-commissioners were appointed, the latter of whom were enjoined to visit their several parishes, and to report to the commissioners. Some of their reports, when made, were sanctioned; others have been brought forward for approval at later periods. The result was, that by far the greater part of the teinds have been bought up by the proprietors of the respective lands, after stipends, commuted into a money payment, had been modified to the clergymen, the teinds being held by these proprietors under the condition of augmenting, if necessary, such stipends to the extent of their value; in other words, there are in these cases no tithes or teinds, but part of the rent of the proprietors constitutes ministers' stipend, and a certain additional portion, in cases where the valuation is not exhausted, is still liable to augmentation of stipend. In cases where no valuation has taken place, the value of the teinds is calculated at one-fifth of the existing rent, and is also paid in money. The body of commissioners just spoken of, continued to act from the date of their appointment, to the Union in 1707, at which period the Court of Session was authorised to supply their place, and to determine in all cases of valuation and sale of teinds. As the commissioners had been empowered to modify the stipends of the ministers, the same power was transferred to the Court of Session. A clergyman is entitled, when the teinds of the parish are not exhausted, to apply to the Court for an augmentation of his stipend, which it is competent for that Court either to grant or refuse. But, whether granted or not, twenty years must elapse before such applications can be renewed. The stipend generally consists of so many chalders of grain. The value of the grain is determined by the *fiar* prices, which are struck in each county in Scotland in the month of February or March annually; and this value, which necessarily varies yearly, is then payable in money. The teinds are also appropriated to the building of parish churches and manses, and the keeping of them in repair. The ministers of Edinburgh and Montrose are paid not by teinds, but by a local tax, levied on the occupiers of houses; a circumstance that has been the source, particularly in Edinburgh, of much irritation and discontent. (Sir J. Connel on Teinds, *passim.* Dunlop's Parochial Law. Burton's Manual of the Law of Scotland, pp. 100—116.)

[3] Peterkin's Supplement. Dunlop's Parochial Law.

[4] M'Kerrow's History of the Secession, vol. i. p. 361–8.

[5] M'Culloch's Statistical Account of the British Empire, ii. p. 430.

We have not included the Jews in the foregoing enumeration, as they do not perhaps amount to above a hundred in all Scotland. Some of the dissenting congregations, besides, are very small; and we do not think it probable that the dissenters amount to much more than the fourth part of the whole population of Scotland, assigning to the Established Church all who do not attend any dissenting place of worship.

Schools.

The subject of education engaged the attention of the Scottish Parliament even in comparatively rude times, viz. as early as the year 1494. The protestant church zealously took up the subject, and many acts of the General Assembly were passed in support of it. But it was not till 1616 that the Privy Council interposed and passed an act in favour of parish schools; nor was it till seventeen years afterwards, that this act of Council was ratified by Parliament. The disturbed state of the times prevented the act from becoming operative; and it was not, in truth, till some time after the Revolution, namely, in 1696, that the celebrated statute of William and Mary was passed, which forms the foundation of the present parochial system. The provisions of this act were immediately carried into effect in most parishes; and now the system is in universal operation throughout Scotland. The landowners and clergymen have it in their power, according to law, to establish more than one school in a parish, if circumstances seem to demand it; in which case the salary assigned to each of the teachers is less than the maximum sum (L.34, 4s. 4½d.) given when there is only one schoolmaster in a parish. From a Parliamentary paper,[1] we learn, that the number of parochial schools in Scotland is 1047; that the number of teachers is 1170; that the aggregate amount of the salaries paid to them is L.29,642, 18s. 11¼d.; and that their total income, including salaries, fees, and all other emoluments, but exclusive of their dwelling-house and garden, is L.55,339, 17s. 1½d., being an average of only L.47, 5s. 11¾d. to each teacher. But ill-paid though the teachers be, they are, generally speaking, a well educated and meritorious class of men; and the parochial system has given such a stimulus to education, that the endowed schools have been found, in the progress of society, to be too few to answer the demand for instruction on the part of the people. Hence it appears from the same official document, that the number of schools not parochial, is not less than 3995, and the number of teachers 4469, being nearly four times the amount of the parochial schools and teachers.[2] The greatest number of pupils attending the parochial schools between Lady-day and Michaelmas 1833, was 71,426; and the lowest number was 50,029. The greatest number attending the schools not parochial, between the same dates, was 189,427; and the lowest number was 139,237. What the incomes of the non-parochial teachers may be, we have no data to judge. They are pretty high in our large towns, but miserably low, perhaps not above ten shillings a-week, in rural districts. Taking the average of the preceding number of pupils, attending both the parochial and non-parochial schools, namely, 225,061, the inference is, that 10½ out of 100 of the population are at school; but when we take into account the number of female seminaries, of private boarding schools for boys, and children taught in private families by governesses and tutors, not to mention Sabbath evening schools and classes for religious instruction, we may with propriety conclude, that at least 9½ out of every 100 of the population are at the same time under tuition; a larger proportion than is known to be similarly situated, excepting in particular districts, in any other country of Europe.

Universities.

The origin of the Scottish universities is not of any remote date. But as early as the year 1282, Dervorgille, wife of John Balliol, founded and endowed a college at Oxford for the reception of Scottish students; and, in 1326, a college, known by the name of the Scotch college, was founded and endowed at Paris by David Murray, bishop of Moray, for a similar purpose.[3] But at length Scotland enjoyed the advantages of universities within the limits of her own territory. That of St. Andrews, the oldest in the kingdom, was founded by papal authority in 1413; that of Glasgow, by the same authority, in 1450; that of Aberdeen, also under the sanction of the pope, in 1494, though education did not commence there till 1500; and that of Edinburgh, founded by the presbyterians, in 1582. The university of St. Andrews consisted at one time of three colleges, instituted at different periods, viz. St. Salvador's, St. Leonard's, and St. Mary's; but in 1748, the two first were united, and the buildings of St. Leonard's were alienated and converted into dwelling-houses. The university of Aberdeen consists of two colleges; King's, founded, as just stated, in 1494; and Marischal college, instituted and endowed by George Keith, Earl Marischal, in 1593. The universities of Glasgow and Edinburgh contain one college each; but embrace all the faculties in their course of instruction. The following table shews the number of professors in the different universities, with the date of their foundation.

	When founded.	Principals.	Professors.
St. Andrews,............	1413	2	11
Glasgow, ...	1450	1	19
Aberdeen, King's College,...	1494	1	9
———— Marischal College,	1593	1	12
Edinburgh,.......................	1582	1	30

Each of these universities enjoys the privilege of conferring literary honours in all the faculties. The aggregate number of students attending all these seminaries is about 2900, of whom about 1300 belong to the university of Edinburgh; 1100 to that of Glasgow; and the remainder to Aberdeen and St. Andrews, the attendance on the latter not exceeding 130. There are no religious tests to exclude students from any of our Scottish colleges. Jews, Catholics, Protestants, enjoy the same privileges. But the professors should, according to law, belong to the Established Church, and are liable to be called upon to sign her standards. This condition, however, is not always exacted. The session extends from the beginning of November till the end of April. There are a few summer classes in the universities of Edinburgh and Glasgow, but these extend only to three months preceding the first of August. A Royal Commission was appointed in 1826 for visiting the universities and colleges of Scotland, and in 1830 gave in a voluminous report. Another Commission was nominated in 1836, for visiting the university of Aberdeen. Their report has just been presented. But though a bill was brought into Parliament in 1836, founded on the former report, providing for a general board of visitors appointed by the crown over all the universities, that bill was withdrawn; and no measure on the subject has since been brought forward.

Poor.

Though poor-rates are not generally imposed in Scotland, yet a law involving a compulsory assessment for the support of the impotent poor, was passed as early as the year 1576. But the very existence of such a statute seemed nearly unknown till about the middle of last century "As long as there was no secession of presbyterians from the Established Church, the weekly collections, under the

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[1] Educational Inquiry, Scotland, Session 1837, vol. xlvii.

[2] Under the head of schools non-parochial, are included those established by the Society for Propagating Christian Knowledge, namely, 340; those founded by the General Assembly's Education Committee, namely, 89; and those instituted by the different dissenting congregations.

[3] Irving's Lives of Scottish Poets, 2d edit. vol. i. p. 61.

Statistics.

management of the kirk-session, were in general found sufficient for the management of the poor. In some years of peculiar hardship or scarcity, such as the four last years of the seventeenth century, or the year 1740, voluntary assistance was no doubt given; and in some instances temporary assessments were resorted to, to enable the kirk-sessions to meet the usual emergencies. But on all ordinary occasions the resources of the kirk-sessions were considered as sufficient, and continued to be so at least as late as 1755."[1] And as legal assessments were reluctantly introduced, notwithstanding the existence of a law in their favour, so they have spread tardily. At this moment they embrace only 236 parishes, being little more than a fourth of the total parishes of Scotland. These assessments have not only been introduced, but are the heaviest, in the parishes bordering on England; and with the exception of our larger towns, they decrease or disappear as we recede from the infectious example of the sister kingdom. Thus every parish in the synod of Merse and Teviotdale is burdened with assessment. In the midland synods, less than the half of the parishes are assessed; whilst in the northern synods, embracing 157 parishes, only three are exposed to that burden.

Table, shewing the proportion of parishes assessed or not assessed, the number of permanent or occasional poor, the average relief given to each, &c.[2]

	Not Assessed.	Voluntarily Assessed.	Legally Assessed.	Total.[3]	Rate per cent. to the population.	Average relief given to each.
Parishes,	517	126	236	879	...	...
Poor on permanent roll,	24,379	6592	26,998	57,969	2.50	£1 18 6
Occasional poor,	6,209	2494	11,645	20,348	.87	0 14 8
Lunatics,	$211\frac{2}{3}$	$186\frac{2}{3}$	$712\frac{2}{3}$	1111	.048	10 12 4
Total poor,	30,800	9273	39,358	79,429	3.42	...
Total funds, including assessment, church-door collections, other voluntary contributions, and session funds,	£34,991	£19,824	£100,305	£155,121	...	...
Total annual expense for levying assessment, litigation as to claims, &c.,	£334	£332	£7344	£8009	...	...

Savings Banks and Friendly Societies.

Both these institutions have long existed in Scotland, but were based till recently on an insecure foundation. With the view of putting them on a sound footing, the act of 10 Geo. IV., c. 56, and of 4 and 5 Will. IV., c. 40, were passed. All friendly societies, claiming the benefits of these acts, are obliged to submit a statement of their rules and regulations for the approval of the officer appointed by government for the purpose; and these must receive his sanction ere the parties become entitled to the privileges conferred by the act in question, namely, the being allowed to invest the funds of the society in government securities at a minimum rate of interest ($2\frac{1}{2}$d. per cent. per day), and in the funds of savings banks. Upwards of five hundred friendly societies have been instituted on the principle of these acts. The act as to savings banks, which has been in operation in all other parts of the empire since 1819, was extended to Scotland in 1835. According to the provisions of this act, the money of savings banks can be invested in government securities at the rate of L.3, 16s. $0\frac{1}{2}$d. per cent.; but the interest paid to depositors is not to exceed $2\frac{1}{2}$d. per cent. per day, or L.3, 8s. $5\frac{1}{4}$d. per cent. per annum. No individual can deposit more than L.30 in any one year, exclusive of interest, nor more than L.200 in all. Savings banks have been established under the law in Edinburgh, Glasgow, Cupar, Kirkaldy, Dunfermline, Dalkeith, and other towns. The deposits in the Edinburgh institution amount to about L.170,000, in rather less than $3\frac{1}{2}$ years; and the other savings banks in Scotland have been equally successful.

Parliamentary representation.

The peers of Scotland, by the treaty of union, elect sixteen of their number to be their representatives in the House of Lords. This election takes place in the palace of Holyrood on the dissolution of parliament. These sixteen peers, who are not elected for life, as is the case with the Irish representative peers, but for the continuance of the parliament for which they are chosen, enjoy all the privileges of the peers of England. The other peers of Scotland have all the privileges of the House of Lords, except the legislative and judicial powers, and the privileges thence arising. The number of Scottish peers at the union was one hundred and fifty-four; and there has been since restored five, making one hundred and fifty-nine; but the present number is eighty-three, namely, seven dukes, four marquises, thirty-nine earls, three countesses, six viscounts, twenty-three barons, and one baroness. Thirty-six of these are also British peers; and two are likewise peers of Ireland.

Scotland, before the passing of the reform bill in the year 1832, was represented in the House of Commons by forty-five members, thirty being returned by the counties, and fifteen by the royal burghs, sixty-six in number. The number of the Scottish representatives since the passing of the reform bill, is fifty-three, thirty being, as before, chosen by the counties, whilst the burghs and towns, seventy-six in number, of which ten are not royal burghs, send twenty-three. The counties, thirty-three in number, return only thirty members, because, for parliamentary objects, Kinross and Clackmannan, Elgin and Nairn, and Ross and Cromarty, are respectively united. The aggregate number of the county freeholders or voters, at the passing of the reform act, was 3211. The burgh constituencies were still more limited. With the exception of Edinburgh, which sent a member of itself, the other burghs were parcelled out in groups, and each burgh in the group voted by a delegate chosen by the magistrates and town-council, amounting, upon an average, to twenty in each, or 1320 in all. The aggregate number of the county constituencies, in 1838-39, was 46,480, or nearly fifteen times the former amount; and of the burgh constituencies, 36,373, or fully twenty-seven times its former extent. The total constituency of Scotland is 82,853.[4]

Populatio

The population of Scotland was supposed to be 1,050,000 in the year 1700; it was ascertained by Dr. Webster to be 1,265,380, in 1755; and the authors of the *Statistical Account of Scotland* afford the means of estimating its amount about 1798, when it appears to have been 1,526,492. Since the year 1801, inclusive, we have had four decennial census. The following table gives the population of Scotland at the different periods referred to, with the rates of increase in each decennial period since 1801, and the number of males and females in 1831.

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[1] Sir Henry Moncreiff's Life of Dr. Erskine, p. 468.

[2] Report of a Committee of the General Assembly on the management of the poor in Scotland, 1839.

[3] This is not the correct total, inasmuch as Edinburgh is in fact divided into thirteen parishes, although it is sometimes reckoned but one parish, and is here accounted only one, as far as poor-rates are concerned.

[4] Burton's Manual, *ut supra*, p. 29, *et seq.*

Year.	Numbers.	Increase per cent.	Males.	Females.
1700	1,050,000	...	...	...
1755	1,265,380	...	...	...
1798	1,526,492	...	...	...
1801	1,599,068	...	...	...
1811	1,805,688	14	...	...
1821	2,093,456	16	983,552	1,109,904
1831	2,365,114	13	1,114,816	1,250,298

The amount of square miles, as stated under a previous head, being 29,600, the average population is within a fraction of eighty to the square mile. Great as has been the advance of population since the beginning of the last century, and particularly since 1801, it has been considerably less than its progress during the same period in England or Ireland. This desirable result seems to have been owing principally to the consolidation of farms in the low country; the extinction of the cottier system in the Highlands, and the substitution in its stead of large sheep farms; the comparative want of poor-laws; and the obstacles interposed by the law of Scotland to the sub-letting of farms, and to the subdivision of land. But however it may be accounted for, the fact is certain that, as compared with the increase of wealth, the population of Scotland has increased less rapidly than that of either of the two sister kingdoms. The Scotch have therefore advanced much more rapidly than the English or Irish in wealth, and in the command of the necessaries and conveniences of life. Their progress in this respect has, indeed, been quite astonishing. The habits, diet, dress, and other accommodations of the people, have been signally improved. It is not too much to affirm, that the peasantry of the present day are better lodged, better clothed, and better fed, than the middle class of landowners were a century ago.

Table, shewing the aggregate number of acres in Scotland, with the number of persons, families, and inhabited houses, according to the population returns of 1831, *and also the number of acres corresponding to each family and house.*

Aggregate number of acres.	Number of		Inhabited houses.	Number of acres corresponding to			Number of persons corresponding to	
	Persons.	Families.		each person.	each family.	each house.	each family.	each house.
18,944,000	2,365,114	502,301	369,393	8.009,761	37.714,438	51.204,133	4.708,554	6.402,703

The classification of individuals, principally of males, of twenty years of age and upwards, in different departments of industry in Scotland, according to the census of 1831, is

Occupations.	Numbers.
Occupiers employing labourers,................	25,887
Ditto not ditto,....................................	53,966
Labourers employed in agriculture,............	87,292
Employed in manufactures, or making machinery for ditto,...........................	83,993
In retail trade or handicraft, as masters or workmen,...................................	152,464
Capitalists, bankers, professional, and other educated men,..............................	29,203
Labourers employed in labour not agricultural,..	76,191
Other males 20 years of age, except servants,..	34,930
Servants 20 years of age, (males),............	5,895
Female servants,..................................	109,512

Table shewing the population of the principal towns at different periods, with the number of inhabited houses, and the average number of persons to a house.

Cities and towns.	1811.	1821.	1831.	Inhabited houses, 1831.	Persons to a house, 1831.
Edinburgh and Leith,.......	102,987	138,235	162,403	10,174	15.954.710
Glasgow, with Gorbals, &c............	110,460	147,043	202,426	41,598	4.866.243
Aberdeen, ...	35,370	44,796	58,019	5,116	11.349.695
Paisley, with Abbey parish,...........	36,722	47,003	57,466	3,696	15.548.160
Dundee,......................................	29,616	30,575	45,355	3,892	11.653.391
Greenock,....................................	19,042	22,088	27,571	2,577	10.698.874
Perth,...	16,948	19,068	20,016	2,049	9.768.667
Kilmarnock,.................................	10,148	12,769	18,093	1,578	11.465.779
Dunfermline,................................	11,649	13,681	17,068	2,347	7.272.262
Montrose,....................................	8,955	10,338	12,055	1,190	10.130.252
Dumfries, without Maxwellton,.......	9,262	11,052	11,606	1,509	7.691.166
Inverness, ...	10,757	12,264	14,324	2,125	6.740.705
Ayr,...	6,291	7,455	7,606	892	8.526.905
Falkirk, ...	9,929	11,536	12,743	1,646	7.741.798
Wick, ...	5,080	6,713	9,850	1,578	6.242.078
Stirling,......................................	5,820	7,113	8,340	785	10.624.208

It appeared from a previous table, that the entire population of Scotland had increased sixteen per cent. during the ten years ending in 1821, and thirteen per cent. during the subsequent ten years. But it is evident from the preceding table, that the increase in the population of the larger towns is considerably greater during the same periods, being

26¼ and 26½ per cent. respectively. The advance of Glasgow, in particular, has exceeded that of any of the large towns in the empire, not even excepting London, Manchester, and Liverpool, having been 33 per cent. for the ten years ending in 1821, and 37 per cent. for the subsequent ten years.[1]

Revenue.

But the great prosperity and advancement which Scotland has undergone, is best proved by the state of her public revenue.[2]

The revenue of Scotland at the union, including taxes then imposed,	L.160,000
And her net revenue for the year 1804,	1,934,276
Ditto for 1813, including the property-tax, and other war taxes,	4,155,599
Revenue for 1822, the property-tax, &c. having been repealed,	3,436,642
Ditto for 1836,	4,592,797
Ditto for 1838,	4,692,724

Thus not only has the revenue of Scotland risen from L.160,000 to L.4,692,724 since the Union, or is now twenty-nine times greater than it then was, but the people are undoubtedly now more able to pay the larger sum than they formerly were to contribute the smaller.

Shipping.

The following table, illustrative of the state of Scottish shipping at different periods, bears also unequivocal testimony to the great prosperity and advancement of Scotland.[3]

Year.	No. of vessels.	Tonnage.	No. of men.
1707	215	14,485	...
1760	976	52,818	...
1800	2155	161,511	13,883
1822	3071	276,931	29,830
1837	3244	334,870	24,292

Steam navigation.

The first boat successfully impelled by steam in Europe was the Comet, which began to ply on the Clyde in 1812, and was the result of the skill and ingenuity of the late Henry Bell. Nor was there more than one steam-boat in Scotland for two years afterwards. In 1819, they had increased to 11; in 1830, to 61; and in 1837, to 109, (tonnage, 13,368), of which 63, or considerably more than the half, belonged to the Clyde.[4] The following table shews the rapidly increasing number and tonnage of the steam-boats which entered the different ports of Scotland, and cleared out, at different periods, since 1820.

Year.	Inwards.		Outwards.	
	Ships.	Tons.	Ships.	Tons.
1820	9	505	...	...
1825	498	57,709	731	72,811
1830	1886	240,270	1717	212,167
1837	3340	563,438	2851	483,586

Manufactures. Linen.

On the subject of the Scottish manufactures our notices, derived from official or other documents, shall be brief, particularly as under the articles Dundee, Glasgow, &c., we have already given pretty ample information on the different manufactures for which the country is distinguished. The linen manufacture was the earliest, and long regarded as the staple, branch of industry carried on in Scotland. But such were the narrow limits within which it was confined, that, at the Union, in 1707, it was not supposed to exceed 1,500,000 yards a-year. In 1727, a board of trustees was established for the superintendence and encouragement of the linen manufacture; and bounties and premiums were given on its production and exportation. The regulations as to the inspection and stamping of the linen intended for exportation, by which the trade was much annoyed, were abolished in 1822; and the bounties ceased in the year 1830. The quantity produced for sale in 1728 was 2,000,000 yards; in 1775, 12,000,000 yards; in 1822, 36,000,000 yards; and the exports alone, in 1835, exclusive of home consumption, was between 60,000,000 and 70,000,000 yards, worth about L.1,600,000. Dundee and the east of Scotland, including Fifeshire, are the great seats of the manufacture, particularly in Osnaburghs, sail-cloth, and the coarser fabrics; and Dunfermline and the neighbouring towns and villages, the principal seat of damask, diaper, and the finer fabrics. Previously to 1791, all the yarn used in the manufacture was spun upon the common hand-wheel; but the spinning by machinery began at that time to be introduced; and such has been the facility of production consequent on the erection of flax-mills, that the cost of the yarn, including the raw material, is now less than the spinning amounted to thirty years ago. The number of flax, hemp, and tow factories was, in 1837, 175, employing no fewer than 15,462 workers, of whom 4231 were between thirteen and eighteen years of age, and 163 between nine and thirteen.

Cotton.

Lanarkshire, which includes the city of Glasgow, and also the contiguous county of Renfrew, has always been the principal seat of the cotton manufacture. Some of the fabrics made at Glasgow and Paisley are of almost unrivalled beauty and fineness. The first steam-engine for the spinning of cotton erected in Scotland, was constructed so late as 1792. The number of cotton factories in 1837 was 177, all those of considerable size being situated at Glasgow, and in the neighbouring districts, comprehending twenty or thirty miles around Glasgow, excepting five in Aberdeenshire, two in Perthshire, one in Dumfries-shire, and one at Gatehouse, in Kirkcudbrightshire. But, with no exception, all these country mills are connected with Glasgow houses, or the Glasgow trade, at least so far as the raw material is concerned. The number of hands from eight years of age upwards employed in the Scottish cotton manufacture, is 34,418, of whom 13,567 are between thirteen and eighteen years of age, and 1096 between nine and thirteen.

Woollen.

The woollen manufacture of Scotland has never been considerable. It was formerly the custom for the occupiers of land in this country to spin the whole of their wool with the hand in their own houses, and to send the yarn to the village weaver to be woven into a species of coarse cloth called *plaiding;* but this mode, which is indicative of a rude and backward state of society, is now entirely abandoned, having been superseded by machinery. Factories for the making of fine cloth have been established in Aberdeenshire, and in some other counties; but comparatively coarse fabrics still continue to be the staple article of Scotch manufacture. The number of woollen or worsted factories in 1837 was 104, situated chiefly at Aberdeen, in Clackmannanshire, at Hawick, Galashiels, and Jedburgh, Roxburghshire, and in the counties of Stirling, Argyle, and Inverness. Hawick has almost entirely withdrawn from this species of manufacture, and devotes its energies principally to the production of woollen hose, of which it annually produces about 500,000 pairs, with blankets, and flannels. The towns of Stirling and Bannockburn are almost the exclusive seat of tartans. Kilmarnock is chiefly celebrated for its manufacture of carpets and shawls, besides large numbers of night-caps, bonnets, and foraging caps for the army. Bonnets in Scotland, however, have been pretty generally superseded by hats. The woollen factories, in 1837, contained 4339 workers, of whom 1856 were between thirteen and eighteen years of age, and 156 between nine and thirteen.

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[1] Babbage's Economy of Manufactures, p. 5.

[2] Chalmers's Historical View, p. 387.

[3] Chalmers, *ut supra*, p. 390; Macpherson's Annals of Commerce, anno 1760; M'Culloch's Statistical Account, vol. xi. sect. *Commerce.*

[4] The Steam Engine, by Hugo Reid, Edinburgh, 1838, p. 160.

Statistics.

ilk.

The silk manufacture in Scotland is still less considerable than that of woollen. The principal seats of it are at Paisley, Glasgow, and Edinburgh. Broad silks, or manufactured goods of entire silk, sold by the yard, viz. gauzes, Persians, satins, and, in general, all broad silks, plain or figured, are made at these places, particularly the two first. Silk mills were established in Edinburgh so late as the year 1838. Handkerchiefs, such as Bandanas and Barcelonas, are made at Paisley and Glasgow, and a few adjacent places in connexion with these towns. Paisley is celebrated for "mixed goods," that is, all varieties of manufacture in which silk forms a component part. Edinburgh is eminent chiefly for its shawls of the finest fabrics, but perhaps is surpassed even in this its staple silk production by Paisley. The silk factories contain about 1000 workers. The whole of the factories, of all kinds, in Scotland, namely, those of linen, cotton, woollen, and silk, amounted, in 1837, to 462, (of which 102 are situated in Lanarkshire, 94 in Forfarshire, including Dundee, Arbroath, and other manufacturing towns, and 62 in Renfrewshire,) employing 55,159 persons; but the number of both has increased considerably since that time.

oap.

Soap has long been manufactured to a very great extent in Scotland; and the principal seats of the manufacture are Glasgow, Leith, Paisley, Aberdeen, Prestonpans, and Montrose. The quantity made, in 1837, was 12,958,856 lbs., viz. of hard soap, 9,553,855, and of soft, 3,4050,01. The quantity exported was 450,956 lbs., the rest being retained for home consumption. The number of licences issued to soapmakers was twenty-one.

pirits.

The quantity of whisky produced in Scotland cannot be ascertained before the year 1823, because, previously to that time, owing to the high rate of duty, (5s. 6d. per English wine gallon,) smuggling prevailed to a great extent in almost every district of the country, particularly in the Highlands. But in 1823 the duty was reduced to 2s., though subsequently, namely, in 1826 and 1830, it has been successively raised to 2s. 10d. and 3s. 4d. The following table will shew the quantity that paid duty for home consumption since that time:

Year.	Number of gallons.
1824	4,350,301
1831	5,700,689
1833	5,988,556
1835	6,013,935
1838	6,124,035

This is exclusive of the quantity produced for the foreign market. In 1838 there were exported to England, at a duty of 7s. 6d. per gallon, 2,215,329 gallons; and to Ireland, at a duty of 2s. 4d., 861,069 gallons.

Official account of the number of distillers, rectifiers, dealers in, and retailers of, spirits in Scotland in 1833 *and* 1834.

	1833.	1834.
Distillers and rectifiers................	241	209
Dealers in spirits, not being retailers	543	534
Retailers of spirits whose premises are rated under L.10 per annum	11,659	11,494
Retailers at L.10 and under L.20....	4301	4109
—— L.20 — L.25....	259	222
—— L.25 — L.30....	131	133
—— L.30 — L.40....	151	156
—— L.40 — L.50....	64	63
—— L.50 and upwards........	165	166

Statistics.

Ale and beer.

The principal seat of this manufacture is Edinburgh and its neighbourhood; but it prevails extensively in other places. By the following statement it appears that the quantity of strong ale brewed on an average of five years previous to 1830, was 119,551 barrels annually, (the duty being 9s. 10d. per barrel,) and of table beer, on an average of the same time, 250,698 barrels, the duty being 1s. 11½d. But the duty being repealed in 1830, there are no later accounts of the quantity brewed. The duty on malt is 20s. 8d. per quarter, and on hops 2d. per lb. The following table gives the number of brewers in Scotland in 1833 and 1834.

	1833.	1834.
Brewers of strong beer, not exceeding 20 barrels......................	145	154
Ditto above 20 and not above 50.....	43	45
—— 50 —— 100.....	43	33
—— 100 —— 1000.....	209	204
—— 1000..............................	103	116
Brewers of table beer..................	62	52

Kelp.

The manufacture of kelp, which was formed by the incineration of the common sea-wrack, has altogether ceased; but during the late war it was prosecuted to such an extent, particularly on the shores of the Highlands and Islands, that the total amount produced in Scotland was about 20,000 tons, which usually brought about L.10 per ton, or L.200,000 yearly. At some periods it brought L.20, at others it was as low as L.4 per ton. But since the reduction of the duty on barilla and salt, the manufacture has altogether ceased.

Scotland has long been famous for its fisheries, which were for a time the subject of bounties and premiums on the part of government; but it is questionable whether such factitious encouragement was productive of any real or permanent good. Boards for protecting, extending, and encouraging the fisheries were instituted in 1749, 1786, and 1808. But all bounties and premiums have now ceased; and the branch of industry in question is now thriving at least as well as when encumbered with factitious aid. The salmon fishery of Scotland has long been very considerable. The fishery in the Tweed is the most important, not only in Scotland, but in the empire, though there has of late years been a great decline in the quantity caught. About the end of the late war, the Tweed fishery yielded a rental of from L.15,000 to L.18,000 a-year; but owing to the falling off in the quantity caught, it does not now yield above L.4000 a-year. In addition to the Tweed, the other most valuable salmon fisheries are in the Forth, Tay, Dee, Don, Findhorn, Spey, Ness, Conon, and other rivers throughout Scotland. The London market is supplied with salmon chiefly by Scotland. The total value of the salmon caught in Scotland has been estimated at L.150,000 a-year.[1] Salmon fisheries north of the Tweed and Solway, but not these rivers themselves, are to be shut from the 14th of September to the 1st of February. In the Tweed and its tributary streams, the taking of salmon with the net is prohibited between the 15th of October and 15th February, or with the rod between 7th of November and 15th February. The Solway fisheries, according to the act of Parliament, include all streams that fall into the Solway Firth, embracing the Piltanton, the Luce, and the Bladenoch in Wigtonshire; the Cree, Fleet, Dee, and Urr in the Stewartry of Kirkcudbright; as well as the Nith and other rivers in Dumfries-shire. The close season with all of these rivers begins on the 25th of September, and terminates with Piltanton, Luce, Bladenoch, and Cree, as early as the 31st of December; with the Fleet and the Dee on the 1st of February; and on the Solway Firth itself, properly so called, including the Urr and the other streams that enter it, it extends to the 10th of March. The penalties for transgressing any of these regulations are heavy.[1] The herring fishery has long been extensively cultivated, and much capital has been invested in it. The chief seat is the east of Scotland, of which Wick, and its suburb, Pultneytown, in Caithness, are important stations. Pultneytown, indeed, has, owing to this circumstance, grown up with something like the rapidity of a manufacturing village. During the fishing season, from 1500 to 2000 boats, each averaging a crew of five men, rendezvous here. Of these about 500 belong to the town; the rest resort thither from all quarters of the kingdom. Of 436,098 barrels of herring cured in the year ending the 5th of April 1834, no fewer than 134,738, or between a third and a fourth of the whole, were cured at Wick. The following table contains an account of the total number of barrels of herring which were cured in Scotland in the year just referred to, distinguishing the stations where landed or cured:

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[1] Loudon's Encyclopedia of Agriculture. General Report of Scotland, iii. 327.

Stations.	Number of barrels cured.
Ayr, Irvine, and Saltcoats	3,158
Campbelton	3,394½
Dumfries and Stranraer	3,343
Fort William	2,259
Glasgow	8,946½
Greenock	12,817½
Inverary	3,931
Loch Broom	1,054
Dunvegan and Loch Carron	953½
Lochgilphead	656
Lybster	34,712
Orkney, north isles	3,196
Orkney, south isles	10,560
Port-Gordon	6,215
Shetland	36,855
Stonehaven	59½
Loch Shildag	1,124
Rothsay	20,561½
Stornoway	398
Tobermory	1,968
Anstruther	1,134¾
Banff	19,956
Burntisland	184½
Cromarty	10,318
Eyemouth	3,093
Findhorn	6,520
Fraserburgh	58,275
Helmsdale	27,432
Leith	41½
Thurso	8,890
Tongue	9,353
Wick	134,738½
Total	436,098¼

About an eighth part of the whole was cured at sea, and the remainder on shore. About the same proportion was cured ungutted; the rest were gutted, and generally within twenty-four hours after the fish were caught. In addition to the herring, the Scottish coast abounds with various kinds of white fish, such as haddock, cod, ling, and the like, as also oysters, flounders, and other flat fish. The persons who carry on the white fishing reside in the sea-ports, or the numerous villages on the coast. They use lines and nets, but principally the former; and their business can be carried on throughout the year. Steam navigation gives them a readier and a wider command of a market than they formerly enjoyed. In 1834 the herring, cod, and ling fisheries employed 9,263 boats, decked and undecked, 48,700 fishermen and boys by whom the boats were manned, 1893 coopers, and 28,645 in gutting, packing, &c; the total number of persons employed in these fisheries being 79,238.

Banks.

This article would not be complete if it did not refer, however briefly, to the system of banking for which Scotland has become so celebrated. The Scottish banks are joint-stock establishments with large constituencies, the National bank having no fewer than 1238 partners, and the North of Scotland bank 1418; and, except in the case of chartered banks, each partner is responsible to the extent of his private fortune. With the chartered banks the responsibility is limited; but then the charter guarantees a certain amount of capital. For example, the capital of the bank of Scotland is L.1,500,000, for which sum the shareholders are responsible; and of it two-thirds, or L.1,000,000, has been actually paid up. These establishments, based on wide constituencies, with unlimited responsibility on the part of the shareholders, or, if chartered, with large capitals paid up or guaranteed, enjoy the perfect confidence of the public. Besides, they are severally under the management of a body of Directors chosen by the partners out of their own body, and directly and periodically responsible to their constituents; and under their superintendence the banking business is carried on in these establishments on the most judicious and approved principles. Nor is this all. The different banks periodically exchange notes with each other; in Edinburgh, twice weekly, and in the country generally once a-week. Over-issuing is thus completely checked, for if any one bank has, after an exchange is made, an overplus of the notes of any other, this latter must redeem those notes either by a payment in specie, or in Exchequer bills, or an order on the bank of England. For any of these institutions to become insolvent or bankrupt seems next to be impossible. Indeed, no joint-stock bank, of any importance, ever did become insolvent; but in cases when, in provincial towns, such banks have suspended payment, (which has happened only in a very few instances, and these originating in ignorance or fraud,) the public, or the holders of their notes, have suffered no loss, each partner being responsible to the amount of his private fortune. The Scotch banks receive sums as low as L.10, or sometimes lower, as deposits, and allow interest on them at about one, or one and a half per cent, below the market rate. The system of "cash accounts" is peculiar to the Scottish mode of banking. A cash account is a credit given by a bank to an individual with two or more collateral securities, for a certain sum, which he may draw out wholly or partially as he pleases, replacing it in the same way, being charged interest only on the portion he withdraws. The act prohibiting the circulation of small notes in England did not extend to Scotland; so that the currency consists almost exclusively of paper, namely, notes of the value of L.1 and upwards. Indeed, there is very little gold in circulation. The Scotch banks draw on London at twenty days date. The Bank of Scotland, the oldest banking establishment in Scotland, was established in 1695, and issued notes for L.1 as early as 1704. The Royal Bank of Scotland was founded in 1727; and the British Linen Company in 1746. The total number of joint-stock banks at present in Scotland is 25, having altogether 306 branches. There are also seven private banking establishments. The aggregate amount of the sums deposited in the different Scottish banks was calculated to be in 1826 about L.20,000,000 or L.21,000,000; and it must have since increased considerably. The circulation is supposed to be between L.3,000,000 and L.4,000,000, seldom exceeding the latter sum.[2]

As in the progress of this article we have minutely referred to the authorities on which the truth of the statements depends, except when we spoke from our own personal knowledge, we have thought it unnecessary to give a collected list of such authorities in this place; but we cannot conclude without stating, that the Geological part was contributed by Mr. Alexander Rose, Lecturer on Geology, and that the article Judicial Establishments was furnished by James Stark, Esq., advocate.

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[1] Burton's Manual of the Law of Scotland, pp. 257—60.

[2] House of Commons' Report of 1826, on Scottish and Irish Banks.

cott, John || Scott, Thomas.

SCOTT, JOHN, an eminent English divine, was born in 1638, and became minister of St Thomas's in Southwark. In the year 1684 he was collated to a prebend in the cathedral of St Paul's. Dr Hickes tells us, that, after the revolution, "he first refused the bishopric of Chester, because he would not take the oath of homage; and afterwards another bishopric, the deanery of Worcester, and a prebend of the church of Windsor, because they were all places of deprived men." He published several excellent works, particularly the Christian Life, and died in the year 1695. He was eminent for his humanity, affability, sincerity, and readiness to do good; and his talent for preaching was extraordinary.

SCOTT, *Thomas*, an eminent divine of the Church of England, was born on the 16th of February 1747. His father was a grazier in Lincolnshire, in humble circumstances, with thirteen children, of whom Thomas was the tenth. The father was ambitious that one of his sons should belong to a learned profession, and with this view sent the subject of this memoir, when about fifteen years of age, to be apprentice to an apothecary and surgeon at Alford. In this situation he conducted himself so improperly, that after a short time he was dismissed by his master, and sent home in disgrace. His father, mortified and vexed by the conduct of his son, treated him with great harshness, and employed him only in the lowest and most laborious drudgery about the farm. For nine years after his return home in disgrace, he was exposed to great hardships, associated with persons in the lowest stations of society, and often joined in their riotous and abandoned pursuits. Conceiving himself used with unjust severity by his father, his temper was soured, and he became exceedingly irritable and discontented.

His employment of tending the sheep left him often in solitude. At these seasons his mind was filled with bitter reflections on the past, and gloomy anticipations of the future; and although his education had been very superficial, yet he had acquired so much as awakened in him an insatiable longing after the pleasures and distinctions of literature; and every thing conspired to disgust him with his present employment.

When about twenty-five years of age, to the astonishment of every one, he declared his resolution of entering into the church. This scheme was strongly opposed by his father, treated as chimerical by his friends, and ridiculed by his neighbours. At length, however, his unconquerable fortitude and patient perseverance overcame every obstacle, and he was admitted to priest's orders in the year 1773, and shortly thereafter was appointed curate of Weston Underwood, with a salary of L.50 a year. While here, he applied with indefatigable zeal and industry to the study of sacred and profane literature. His sentiments at first were decidedly Socinian; but a candid and diligent study of the Scriptures gradually opened his eyes to the fallacy and the dangers of the doctrines which he had espoused; and being in the neighbourhood of John Newton, the friend of Cowper, who was strongly evangelical and Calvinistic in his views, his acquaintance with that eminent individual may have contributed to this change in his religious sentiments. In the year 1779 he published a small autobiography, entitled the Force of Truth, in which he gave a candid statement of the change in his opinions, and the steps by which he was gradually led to adopt the orthodox and evangelical creed. This publication made a great sensation at the time, and has gone through many editions since. He married, in 1774, Jane Kell, who proved a valuable helpmate to him in his future struggles. In 1780 he succeeded John Newton at Olney, and in 1785 he accepted the situation of lecturer at the Lock Hospital, with a salary of L.80 a year. This, with small sums for occasional lectureships, furnished but a scanty allowance for the support of an increasing family; and when, a few years afterwards, a proposal was made to him by a London bookseller to write a Commentary on the Bible, to be published in numbers, the offer of a guinea a week, as remuneration for his writings, decided him to engage in the undertaking.

This valuable work was well received by the public, and, under proper management, ought to have been a very profitable speculation; but, owing to the bankruptcy of the bookseller, Mr Scott not only received no remuneration for his labour, but lost all his little savings, and was involved in considerable debt. The first edition, of two thousand copies, commenced in 1802, and was finished in 1809; a second of two thousand copies, in 1807–11; the third, of three thousand copies, in six volumes 4to, 1812–14. The fourth was stereotyped, and sold to a great extent. He published a volume of Essays in 1793–94. He also published, in two volumes 8vo, Remarks on the Bishop of Lincoln's Refutation of Calvinism; and Sermons on various subjects, from time to time. His Theological Works were collected and edited by his son, the Reverend John Scott, and published in ten volumes 8vo, in 1823.

In 1803 he left London for the rectory of Aston, Sandford, where he died on the 16th of April 1821. He was a man of eminent piety, somewhat eager and impetuous, but of great sincerity, and sterling honesty of character; of a vigorous intellect, indefatigably diligent in his studies, and a useful and practical preacher.

Scott, Sir Walter.

SCOTT, *Sir Walter*, was born at Edinburgh on the 15th of August 1771. "My birth," says he, "was neither distinguished nor sordid. According to the prejudices of my country, it was esteemed *gentle*, as I was connected, though remotely, with ancient families, both by my father's and mother's side." His paternal great-grandfather was a cadet of the border family of Harden, which has been ennobled within the last few years, and sprung in the fourteenth century from the great house of Buccleuch; his grandfather became a farmer in Roxburghshire, and married a lady who was a relation of his own; and his father, Walter Scott, was a writer to the signet in the Scottish capital. The poet's mother, Anne Rutherford, who was likewise of honourable descent, was the daughter of one of the medical professors in the university of Edinburgh.

Neither Scott's poetical turn nor his extraordinary powers of memory seem to have been inherited from either of his parents. His early years displayed as little precocity of talent as did the steady development of his mind in riper days; and the uneventful tenor of his childhood and youth, although their impressions can now be traced vividly in his works, must have seemed, but for these, as little calculated as possible to awaken in his mind a love of the imaginative or romantic.

Delicacy of constitution, accompanied by a lameness which proved permanent, exhibited itself before he had completed his second year, and caused soon afterwards his removal to the country. There, at his grandfather's farmhouse of Sandyknowe, situated beneath the crags of a ruined baronial tower, and overlooking a tract of many miles studded with spots famous in border-history, the poet passed his childhood till about his eighth year, with scarcely any interruption but that of a year spent at Bath. From this early period there are related some interesting anecdotes of his sympathy with the grandeur and beauty of nature. The tenacity of his infantine recollections gave promise of what was afterwards so remarkable a faculty in his mind; and the ballads and legends, which were recited to him amidst the scenes in which their events were laid, co-operated in after-days with family and national pride to decide the bent of the border-minstrel's fancy.

His health being partially confirmed, he was recalled home; and from the end of 1779 until 1783 his education was conducted in the High School of Edinburgh, with the assistance of a tutor resident in his father's house. In the years immediately preceding this change, he had shewn decided activity of intellect, and strong symptoms of its diversion towards literary pursuits; but now, introduced with imperfect preparation into a large and thoroughly trained class, and thrown, for the first time in his life, among a crowd of boisterous boys, his childish zeal for learning seems to have been quenched by ambition of another kind. His memory, it is true, was still remarkable, and procured for him from his master the title of historian of the class; while he produced some school-verses, both translated and original, which were at least creditable for a boy of twelve. Even his intellectual powers, however, were less active in the proper business of the school than in enticing his companions from their tasks by merry jests and little stories; and his place as a scholar scarcely ever rose above mediocrity. But his reputation stood high in the play-ground, where, possessed of unconquerable courage, and painfully eager to defeat the scorn which his physical defects excited, he is described as performing hazardous feats of agility, and as gaining pugilistic trophies over comrades who, that they might have no unfair advantage over the lame boy, fought, like him, lashed face to face on a plank. At home, his tutor, a zealous Presbyterian, initiated him, chiefly by means of conversation, in the facts of Scottish history, political as well as ecclesiastical, though without being able to shake those opinions which the boy had already taken up as an inheritance descending from his Jacobite ancestors; and he pursued with eagerness, at every interval which could be stolen from the watchfulness of his elders, a course of reading utterly miscellaneous and undigested, and embracing much that to most minds would have been either useless or positively injurious. “I left the High School,” says he, “with a great quantity of general information, ill arranged, indeed, and collected without system, yet deeply impressed upon my mind, readily assorted by my power of connexion and memory, and gilded, if I may be permitted to say so, by a vivid and active imagination.”

His perusal of histories, voyages, and travels, fairy tales, romances, and English poetry, was continued with increasing avidity during a long visit which, in his twelfth year, he paid to his father's sister at the village of Kelso, where, lying beneath a noble plane-tree in an antique garden, and beholding around him one of the most beautiful landscapes in Scotland, the young student read for the first time, with entranced enthusiasm, Percy's Reliques of Ancient Poetry. This work, besides the delight which was imparted by the poems it contained, influenced his mind by giving new dignity, in his eyes, to his favourite Scottish ballads, which he had already begun to collect from recitation, and to copy in little volumes, several of which are still preserved at Abbotsford. “To this period, also,” he tells us, “I can trace distinctly the awaking of that delightful feeling for the beauties of natural objects, which has never since deserted me. The romantic feelings which I have described as predominating in my mind, naturally rested upon and associated themselves with the grand features of the landscape around me; and the historical incidents or traditional legends connected with many of them gave to my admiration a sort of intense impression of reverence, which at times made my heart feel too big for its bosom. From this time the love of natural beauty, more especially when combined with ancient ruins, or remains of our fathers' piety or splendour, became with me an insatiable passion, which, if circumstances had permitted, I would willingly have gratified by travelling over half the globe.”

In November 1783, Scott became a student in the university of Edinburgh, in which, however, he seems to have attended no classes but those of Greek, Latin, and logic, during one session, with those of ethics and universal history at a later period, while preparing for the bar. At college the scholastic part of his education proceeded even more unprosperously than it had previously done. For science, mental, physical, or mathematical, he displayed no inclination; and in the acquisition of languages, for which he possessed considerable aptitude, he was but partially industrious or successful. Of Greek, as his son-in-law and biographer admits, he had in later life forgotten the very alphabet. He had indeed entered on the study with disadvantages similar to those which had formerly impeded his progress in Latin; he had, as he informs us, petulantly resolved on despising a study in which he found himself inferior to his competitors; and Professor Dalziel, irritated not only by his carelessness, but by an essay in which he maintained that Ariosto was a better poet than Homer, solemnly pronounced of him, “that dunce he was, and dunce would remain.” His knowledge of Latin does not appear to have ever extended farther than enabling him to catch loosely the meaning of his author; although we are informed that for some writers in that tongue, especially Lucan, Claudian, and Buchanan, he had in after life a decided predilection. About the time now under review, he also acquired French, Italian, and Spanish, all of which he afterwards read with sufficient ease; and the German language was learned a few years later, but never critically understood.

It was some time between his twelfth and his sixteenth year that his stores of romantic and poetical reading received a vast increase, during a severe illness which long confined him to bed; and one of his schoolfellows has given an interesting account of excursions in the neighbourhood of the city, during this period, when the two youths read poems and romances of knight-errantry, and exercised their invention in composing and relating to each other interminable tales modelled on their favourite books. The vocation of the romance-writer and poet of chivalry was thus already fixed. His health likewise became permanently robust. The sickly boy grew up into a muscular and handsome youth; and the lameness in one leg, which was the sole remnant of his early complaints, was through life no obstacle to his habits of active bodily exertion, or to his love for out-of-door sports and exercise.

The next step in his life did not seem directed towards the goal to which all his favourite studies pointed. His father, a formal though high-spirited and high-principled man, whose manners are accurately described in his son's novel of Redgauntlet, designed him for the legal profession; and, although he always looked wishfully forward to his son's embracing the highest department of it, considered it advisable, according to a practice not uncommon in Scotland, that he should be prepared for the bar by an education as an attorney. Accordingly, in May 1786, Scott, then nearly fifteen years old, was articled for five years as an apprentice to his father, in whose chambers he thenceforth continued, for the greater part of every day, to discharge the humble duties of a clerk, until, about the year 1790, he had, with his father's approbation, finally resolved on coming to the bar. Of the amount of the young poet's professional industry during those years of servitude we possess conflicting representations; but many circumstances in his habits, many peculiarities in the knowledge he exhibits incidentally in his works, and perhaps even much of his resolute literary industry, may be safely referred to the period of his apprenticeship, and show satisfactorily that at all events he was not systematically negligent of his duties. Historical and imaginative reading, however, continued to be prosecuted with undiminished ardour; summer excursions into the Highlands introduced him to the scenes, and to more than one of the characters, which afterwards figured in his most successful works; while in the law-classes of the university, as well as in the juvenile debating societies, he formed, or renewed from his school-days, acquaintance with several who became in manhood his cherished friends and his literary advisers. In 1791 the Speculative Society made him acquainted with Mr Jeffrey and those other young men whose subsequent celebrity has been to a small extent reflected on the arena of their early training.

Scott's attempts in poetry had now become more ambitious; for, it is said, about the completion of his fifteenth year, he had composed a poem in four books on the Conquest of Granada, which, however, he almost immediately burned, and no trace of it has been preserved. During some years after this time, we hear of no other literary compositions than essays for the debating societies.

In July 1792, being almost twenty-one years of age, he was called to the bar. Immediately after his first circuit, he commenced that series of " raids," as he playfully called them, or excursions into the secluded border-districts, which in a few years enabled him to amass the materials for his first considerable work. His walks on the boards of the Parliament House, the Westminster Hall of Scotland, if they gained him for a time few professional fees, speedily procured him renown among his fellow-lawyers as a storyteller of high excellence; his father's connections and his own friendships opened for him a ready admission into the best society of the city, in which his cheerful temper and his rich store of anecdotes made him universally popular; and his German studies produced, in 1796, his earliest poetical efforts that were published, namely, the translations of Burger's ballads, Lenora and the Wild Huntsman. The same year witnessed the disappointment of a long and fondly-cherished hope, by the marriage of a young lady, whose image, notwithstanding, clung to his memory through life, and inspired some of the tenderest strains of his poetry.

In the summer of 1797, however, on a visit to the watering-place of Gilsland, in Cumberland, he became acquainted with Charlotte Margaret Carpenter, a young lady of French birth and parentage, whose mother, the widow of a royalist of Lyons, had escaped to England, and there died, leaving her children to the guardianship of their father's friend the Marquis of Downshire. A mutual attachment ensued; and, after the removal of prudential doubts, which had arisen among the connections on both sides, Scott and Miss Carpenter were married at Carlisle in December of the same year.

The German ballads, which, though they met with very little sale, had been justly praised by a few competent critics, served as the translator's introduction to the then celebrated Matthew Gregory Lewis, who enlisted him as a contributor to his poetical Tales of Wonder; and one cannot now but smile to hear of the elation with which the author of Waverley at that time contemplated the patronising kindness extended to him by the author of The Monk. Early in 1788 was published Scott's translation of Goethe's Goetz von Berlichingen, which, through Lewis's assistance, was sold to a London bookseller for twenty-five guineas; but, though favourably criticised, it was received by the public as coldly as the preceding volume. In the summer of 1799, the poet wrote those ballads which he has himself called his " first serious attempts in verse;" the Glenfinlas, the Eve of St John, and the Grey Brother.

After Scott's marriage, several of his summers were spent in a pretty cottage at Lasswade near Edinburgh, where he formed, besides other acquaintances, those of the noble houses of Melville and Buccleuch. The influence of these powerful friends, willingly exerted for one whose society was agreeable, whose birth connected him, though very remotely, with the latter of those titled families, and who in politics was decidedly and actively devoted to the ruling party, procured for him, in the end of the year 1799, his appointment as sheriff-depute of Selkirkshire, an office which imposed very little duty, while it gave him a permanent salary of L.300 per annum. His father's death had recently bestowed on him a small patrimony; his wife had an income which was considerable enough to aid him greatly; his practice as a lawyer yielded, though not much, yet more than barristers of his standing can usually boast of; and, altogether, his situation in life, if not eminent, was at least strikingly favourable when compared with that which has fallen to the lot of most literary men. Scott, however, now twenty-eight years of age, had done nothing to found a reputation for him as a man of letters; and there appeared as yet to be but little probability that he should attach himself to literature as a profession, or consider it as any thing more than a relaxation for those leisure hours which were left unoccupied by business and the enjoyments of polite society.

In 1800 and 1801 those hours were employed in the preparation of the Border Minstrelsy, the fruit of his childish recollections, and of his youthful rambles and studies. The first two volumes appeared in the beginning of the next year, and the edition, consisting of eight hundred copies, was sold off before its close. This work, however, the earliest of his which can be said to have given him any general fame, yielded him about eighty pounds of clear profit; being very far less than he must have expended in the investigations out of which it sprang. In 1803 it was completed by the publication of the third volume. Besides the value which the Minstrelsy possesses in itself, in the noble antique ballads, so industriously, tastefully, and yet conscientiously edited, in the curious and spiritedly-used information which overflows through all the prose annotations, and in those few original poems which gave the earliest warning of that genius which as yet had lurked unseen, the work has now a separate value and interest, as forming the most curious of all illustrations for the history of its editor's mind and of his subsequent works. " One of the critics of that day," remarks Mr Lockhart, " said that the book contained ' the elements of a hundred historical romances;' and this critic was a prophetic one. No person who has not gone through its volumes for the express purpose of comparing their contents with his great original works, can have formed a conception of the endless variety of incidents and images, now expanded and emblazoned by his mature art, of which the first hints may be found either in the text of those primitive ballads, or in the notes which the happy rambles of his youth had gathered together for their illustration."

But before the publication of the Border Minstrelsy, the poet had begun to attempt a higher flight. " In the third volume," says he, writing to his friend George Ellis in 1803, " I intend to publish a long poem of my own. It will be a kind of romance of border chivalry, in a light-horseman sort of stanza." This border romance was the Lay of the Last Minstrel, which, however, soon extended in plan and dimensions, and, originating as a ballad on a goblin story, became at length a long and varied poem. The first draught of it, in its present shape, was written in the autumn of 1802, and the whole history of its progress has been delightfully told by the author himself, and is well illustrated by his biographer.

In 1803, during a visit to London, Scott, already familiarly acquainted with Ellis, Heber, and other literary men, and now possessing high reputation himself in virtue of the Minstrelsy, was introduced to several of the first men of the time; and thenceforth, bland as he was in manner, and kind in heart, indefatigable and successful in his study of human character, and always willing to receive with cordiality the strangers whom his waxing fame brought about him, it is not surprising to find, that not to know personally Walter Scott, argued one's self unknown. The toleration and kindliness of his character are illustrated by the fact, that firm as his own political opinions were, and violently as excitement sometimes led him to express them, not only did he always continue on friendly terms with the chief men of the opposite party in Edinburgh, but several of them were his intimate friends and associates; and he even was for some years an occasional contributor to the Edinburgh Review.

In 1804 was published his edition of the ancient poem of Sir Tristrem, so valuable for its learned dissertations, and for that admirable imitation of the antique which appears as a continuation of the early minstrel's work.

During that year and the preceding, the Lay was freely communicated to all the author's friends, Wordsworth and Jeffrey among the rest; and after undergoing various changes, and receiving enthusiastic approval in several quarters from which commendation was wont to issue but sparingly, it was at length published, in the first week of 1805. The poet, now thirty-three years of age, took his place at once as a classic in English literature. Its circulation immediately became immense, and has since exceeded that of any other English poem.

But exactly at this culminating point of the poet's life, we must turn aside from the narrative of his literary triumphs, to notice a step of another kind, which proved the most important he ever took. In one of those interesting communications of 1830, which throw so much light on his personal history, he has told us, that from the moment when it became certain that literature was to form the principal employment of his days, he determined that it should at least not constitute a necessary source of his income. Few literary men, perhaps, have not nourished a wish of this sort; but very few indeed have possessed, like Scott, the means of converting the desire into an effectual resolution. In 1805, as his biographer tells us, he was, "independently of practice at the bar and of literary profits, in possession of a fixed revenue of nearly, if not quite, L.1000 a year." To most men of letters this income would have appeared affluence; but Scott has frankly avowed, that he did not think it such. The truth is, that his mind was already filled with the feeling which speedily became its master-passion, namely, the ambition, not of founding a new family (for that was too mean an aim for his pride of birth to stoop to), but of adding to his own ancestral pretensions that claim to respect which ancient pedigree does not always possess when it stands alone, but which belongs to it beyond challenge when it is united with territorial possessions. The fame of a great poet, now within his reach, if not already grasped, seemed to him a little thing, compared with the dignity of a well-descended and wealthy Scottish landholder; and, while neither he nor his friends could yet have foreseen the immensity of those resources which his genius was afterwards to place at his disposal for the attainment of his favourite wish, two plans occurred and were executed, which promised to conduct him far at least towards the goal.

The first of these was the obtaining of one of the principal clerkships in the Scottish Court of Session, offices of high respectability, executed at a moderate cost of time and trouble, and remunerated at that time by an income of about L.800 a year, which was afterwards increased to L.1300. This object was attained early in 1806, through his ministerial influence, aided by the consideration paid to his talents; although, owing to a private arrangement with his predecessor, he did not receive any part of the emoluments till six years later.

The second plan was of a different sort, being in fact a commercial speculation. James Ballantyne, a schoolfellow of Scott, a man possessing a good education, and considerable literary talent of a practical kind, having become the editor and printer of a newspaper in Kelso, had been employed to print the Minstrelsy, and acquired great reputation by the elegance with which that work was produced. Soon afterwards, in pursuance of Scott's advice, he removed to Edinburgh, where, under the patronage of the poet and his friends, and assisted by his own character and skill, his printing business accumulated to an extent which his capital, even with pecuniary aid from Scott, proved inadequate to sustain. An application for a new loan was met by a refusal, accompanied, however, by a proposal, that Scott should make a large advance, on condition of being admitted as a partner in the firm, to the amount of a third share. Accordingly, in May 1805, Walter Scott became regularly a partner of the printing-house of James Ballantyne and Company, though the fact remained for the public, and for all his friends but one, a profound secret. "The forming of this commercial connexion was," says his son-in-law, "one of the most important steps in Scott's life. He continued bound by it during twenty years, and its influence on his literary exertions and his worldly fortunes was productive of much good and not a little evil. Its effects were in truth so mixed and balanced during the vicissitudes of a long and vigorous career, that I at this moment doubt whether it ought, on the whole, to be considered with more of satisfaction or of regret."

From this time we are to view Scott as incessantly engaged in that memorable course of literary industry whose toils advancing years served only to augment, and from which neither the duties of his two professional offices of clerk of session and sheriff, nor the increasing claims made on him by society, were ever able to divert him. He now stood deservedly high in the favour of the booksellers, not merely as a poet and man of genius, but as one possessed of an extraordinary mass of information, and of such habits as qualified him eminently for turning his knowledge to account. He was therefore soon embarked in undertakings, not indeed altogether inglorious, but involving an amount of drudgery to which, perhaps, no man of equal original genius has ever condescended. The earliest of these was his edition of Dryden, which, entered upon in 1805, was completed and published in 1808.

But the list of works in which his poetical genius shone forth continued rapidly to increase amidst his multiplicity of other avocations. From the summer of 1804 till that of 1812, the spring and autumnal vacations of the court were spent by him and his family at Ashestiel, a small mansion romantically overhanging the Tweed some miles above Melrose, and rented from one of the poet's kinsmen. In this beautiful retreat, at intervals during twelve months, was chiefly composed the magnificent poem of Marmion, which was published in the beginning of 1808. At the same place, likewise, in 1805, were composed the opening chapters of a novel which, on the disapproval of one of the author's critical friends, was thrown aside and not resumed for years.

Scott's commercial engagements must now again be adverted to. In the year 1808 he took a part, perhaps as suggester, certainly as a zealous promoter, of a scheme which terminated in the establishment of the Quarterly Review in London, as a political and literary counterpoise to the Edinburgh Review, the advocate of Whig opinions. But the poet had other than political grounds for embarking in this opposition. He had seriously quarrelled with the firm of Constable and Company, the publishers of the Edinburgh Review, and of several of his own earlier works; and his wish to check the enterprising head of that house in his attempts to obtain a monopoly of Scottish literature, is openly avowed, in Scott's correspondence at the time, as one of his principal motives for framing another scheme. His plan, as far as it was explained either to the public or to his own friends, amounted only to this: That a new publishing house should be set up in Edinburgh, under the management of John Ballantyne, a younger brother of James; and that this firm, with the acknowledged patronage of Scott and his friends, should engage in a series of extensive literary undertakings, including, amongst others, the annual publication of a historical and literary Register, conducted on Tory principles. But, unfortunately both for Scott's peace of mind, and ultimately also for his worldly fortunes, there was here, as in his previously-formed connection with the same family, an undivulged secret. The profits of the printing-house had been large; Scott's territorial ambition had been growing faster than his prospect of being able to feed it; and these causes, inextricably mixed up with pique towards Constable, and kindliness for his Kelso protégés, led him into an entanglement which at length ruined both himself and his associates. By the contract of the publishing house of John Ballantyne and Company, executed in May 1808, Scott became a secret partner to the extent of one third. The unhappy issue of this affair will force itself on our notice at a later stage.

In the mean time we see him prosecuting for some time his career of poetical success. The Lady of the Lake, published in 1810, was followed by the Vision of Don Roderick in 1811; by Rokeby in 1812; and by the Bridal of Triermain, which came out anonymously in 1813. His poems may be said to have closed in 1815 with the Lord of the Isles and the Field of Waterloo; since Harold the Dauntless, in 1817, appeared without the writer's name, and the dramatic poems of 1822 and 1830 are quite unworthy of him. In the midst of these poetical employments he made his second and last great appearance as an editor and commentator of English classics, by publishing in 1814 his edition of Swift.

But from 1815 till 1825, Scott's name ceased almost entirely to be before the public as an avowed author; and for those who chose to believe that he was not the writer of the Waverley Novels it must have been a question not a little puzzling, if it ever occurred to them, how this man, who wrote with such ease, and seemed to take such pleasure in writing, was now occupying his hours of leisure. A few articles in the Quarterly Review, such works as Paul's Letters, and annotations in occasional editions of ancient tracts, accounted but poorly for his time during ten years.

About 1813 and 1814 his popularity as a poet was sensibly on the decline, partly from causes inherent in his later poems themselves, and partly from extraneous causes, among which a prominent place belongs to the appearance of Byron. No man was more quicksighted than Scott in perceiving the ebb of popular favour; and no man better prepared to meet the reverse with firmness. He put in serious execution a threat which he had playfully uttered to one of his own family even before the publication of the Lady of the Lake. "If I fail now," said he, "I will write prose for life." And in writing prose his genius discovered, on its first attempt, a field in which it earned triumphs even more splendid than its early ones in the domain of poetry.

The chapters of fiction begun at Ashestiel in 1805, which had already been resumed and again thrown aside, were once more taken up, and the work was finished with miraculous rapidity; the second and third volumes having been written during the afternoons of three summer weeks in 1814. The novel appeared in July of that year, under the title of Waverley, and its success from the first was unequivocal and unparalleled. Although we cannot here give a catalogue of Scott's works, yet in truth such a list of the novels and romances does in itself present the most surprising proof, both of his patient industry, and of the singularly equable command which he had at all times over his mental resources. In the midst of occupations which would have taken away all leisure from other men, the press poured forth volume after volume, in a succession so rapid as to deprive of some part of its absurdity one of the absurd suppositions of the day, namely, that more persons than one were concerned in the novels. Guy Mannering, the second of the series, in 1815, was followed in 1816 by the Antiquary and the First Series of the Tales of My Landlord. Rob Roy appeared in 1817; the Second Series of the Tales in 1818; and in 1819 the Third Series and Ivanhoe. Two romances a-year now seemed to be expected as the due of the public. The year 1820 gave them the Monastery and the Abbot; 1821, Kenilworth and the Pirate; the Fortunes of Nigel, coming out alone in 1822, was followed in 1823 by no fewer than three works of fiction, Peveril of the Peak, Quentin Durward, and St Ronan's Well; and the comparatively scanty number of novels in 1824 and 1825, which produced respectively only Redgauntlet and the Tales of the Crusaders, is accounted for by the fact that the author was engaged in preparing a large historical work.

It is impossible even to touch on the many interesting details which Scott's personal history presents during these brilliant years; but it is indispensable to say, that his dream of territorial acquisition was realized with a splendour which, a few years before, he himself could not have hoped for. The first step was taken in 1811, by the purchase of a small farm of a hundred acres on the banks of the Tweed, which received the name of Abbotsford, and in a few years grew, by new purchases, into a large estate. The modest dwelling first planned on this little manor, with its two spare bed-rooms and its plain appurtenances, expanded itself in like manner with its master's waxing means of expenditure, till it had become that baronial castle which we now reverentially visit as the minstrel's home. The hospitality of the poet increased with his seeming prosperity; his mornings were dedicated to composition, and his evenings to society; and from the date of his baronetcy in 1820 to the final catastrophe in 1826, no mansion in Europe, of poet or of nobleman, could boast such a succession of guests illustrious for rank or talent, as those who sat at Sir Walter Scott's board, and departed proud of having been so honoured. His family meanwhile grew up around him; his eldest son and daughter married; most of his early friends continued to stand by his side; and few that saw the poet in 1825, a hale and seemingly happy man of fifty-four, could have guessed that there remained for him only a few more years (years of mortification and of sorrow), before he should sink into the grave, struck down by internal calamity, not by the gentle hand of time.

And yet not only was this the issue, but, even in the hour of his greatest seeming prosperity, Scott had again and again been secretly struggling against some of the most alarming anxieties. On details as to his unfortunate commercial engagements we cannot here enter. It is enough to say, that the printing company of which he was a partner, which seems to have had considerable liabilities even before the establishment of the publishing house, was now inextricably entangled with the concerns of the latter, many of whose largest speculations had been completely unsuccessful; that, besides this, both firms were involved to an enormous extent with the house of Constable; and that large sums, which had been drawn by Sir Walter as copyright-money for the novels, had been paid in bills which were still current, and threatening to come back on him.

In the beginning of 1826, Constable's house stopped payment; and the failure of the firm of Ballantyne, for a very large sum, followed instantly and of course. Probably even the utter ruin which this catastrophe brought upon Scott, was not more painful to him than the exposure which it necessarily involved, of those secret connections, the existence of which even his most confidential friends could till now have at most only suspected. But if he had been imprudent, he was both courageous and honourable; and in no period of his life does he appear to such advantage, as when he stood, as now, beggared, humbled, and covered with a load of debt from which no human exertions seemed able to relieve him. He came forward without a day's delay, and refused to be dealt with as an ordinary bankrupt, or to avail himself of those steps which would have set him free from the claims of his creditors, on surrendering his property to them. He insisted that these claims should, so far as regarded him, be still allowed to subsist; and he pledged himself that the labour of his future life should be unremittingly devoted to the discharge of them. He did more than fulfil his noble promise; for the gigantic toil to which, during years after this, he submitted, was the immediate cause that shortened his life. His self-sacrifice, however, effected astonishingly much towards the purpose which it was designed to serve. Between January 1826 and January 1828, he had realized for the creditors the surprising sum of nearly L.40,000; and soon after his death the principal of the whole Ballantyne debt was paid up by his executors.

We have now briefly to describe the efforts by which this result was accomplished. After spending at Abbotsford, in 1826, a solitary summer, very unlike its former scenes of splendour, Scott, returning to town for his winter duties, and compelled to leave behind him his dying wife (who survived but till the spring), took up his residence in lodgings, and there continued that system of incessant and redoubled labour which he had already maintained for months, and maintained afterwards till it killed him. Woodstock, published in 1826, had been written during the crisis of his distresses; and the next fruit of his toil was the Life of Napoleon, which, commenced before the catastrophe, appeared in 1827, and was followed by the First Series of Chronicles of the Canongate; while to these again succeeded, in the end of the same year, the First Series of the Tales of a Grandfather. The year 1828 produced the Second Series of both of these works; 1829 gave Anne of Geierstein, the first volume of a History of Scotland for Lardner's Cyclopædia, and the Third Series of the Tales of a Grandfather. The same year also witnessed the commencement of that annotated publication of the collected novels, which, together with the similar edition of the poetical works, was so powerful an instrument in effecting Scott's purpose of pecuniary disentanglement. In 1830 came two Dramas, the Letters on Demonology, the Fourth Series of the Tales of a Grandfather, and the second volume of the History of Scotland. If we are disappointed when we compare most of these works with the productions of younger and happier days, our criticism will be disarmed by a recollection of the honourable end which the later works promoted; and as to the last productions of the mighty master, the volumes of 1831, containing Count Robert and Castle Dangerous, no one who is acquainted with the melancholy circumstances under which these were composed and published, will be capable of any feeling but that of compassionate respect.

The dejection which it was impossible for Scott not to feel in commencing his self-imposed task, was materially lightened, and his health invigorated, by an excursion to London and Paris in the course of 1826, for the purpose of collecting materials for the Life of Napoleon. In 1829 alarming symptoms appeared, and were followed by a paralytic attack in February 1830, after which the tokens of the disease were always more or less perceptible to his family; but the severity of his tasks continued unremitted, although in that year he retired from his clerkship, and took up his permanent residence at Abbotsford. The mind was now but too evidently shaken, as well as the body; and the diary which he kept contains, about and after this time, melancholy misgivings of his own upon this subject. In April 1831 he had the most severe shock of his disease that had yet attacked him; and having been at length persuaded to abandon literary exertion, he left Abbotsford in September of that year, on his way to the Continent, no country of which he had ever yet visited, except some parts of France and Flanders. This new tour was undertaken with the faint hope that abstinence from mental labour might for a time avert the impending blow. A ship of war, furnished for the purpose by the Admiralty, conveyed Sir Walter, first to Malta, and then to Naples; and the accounts which we have, both of the voyage and of his residence in Italy, abound with circumstances of melancholy interest. After the beginning of May 1832, his mind was completely overthrown; his nervous impatience forced his companions to hurry him homeward from Rome through the Tyrol to Frankfort; in June they arrived in London, whence Sir Walter was conveyed by sea to Edinburgh; and, having reached Abbotsford on the 11th of July, he there continued to exist, with few intervals of consciousness, till the afternoon of the 21st of September, when he expired, having just completed the sixty-first year of his age. On the 26th he was buried in the beautiful ruins of Dryburgh Abbey.

In the article Romance, observations have been made on Scott's prose works of fiction. It remains here to add a very few words on the character of his poetry. It would be rash for any who have lived only in the same age with a great poet, and still more rash for those whose earliest conceptions of poetical celebrity and poetical beauty are inseparably associated with his name and his writings, to pronounce peremptorily on the rank which may probably be assigned to him by posterity, among the classics of his native language. But without venturing on such ground as this, there are points of comparison with himself and others, which may warrantably be applied to the illustration of his genius.

In regard to the spirit which animates the poetry of Scott, he stands entirely alone in his age; separated indeed so far from the tendencies of the time, that his universal popularity seems at the first glance to have in it something unaccountable. The passionate intenseness and moody self-inquisition of Byron, the calm thoughtfulness and universal sympathies of Wordsworth, and the wildness of Coleridge's lyrical dreams, are in their several kinds allied to those impulses which have widest sway in these generations of our race; while other poets, Campbell with his gentle pathos, Crabbe with his melancholy anatomy of life, and Moore with his overflow of voluptuous imagery, appeal to emotions which are not so much distinctive of particular periods in the history of mankind, as common to the mind in all its ages. But the world which Scott reproduced in the midst of us, the world of feudalism and chivalry, the transition-stage in the annals of Christian Europe, is one with which the men of modern times have very little communion or fellow-feeling; and the boldness with which he chose his themes was even exceeded by that of the tone in which he ventured to treat them; neither jesting with his own fancies, like Pulci or Ariosto, nor, like Tasso, overlaying the essential substance of the chivalrous life with a garniture of poetry and of delicate feeling which left the genuine light of elder times but few openings to glimmer through; but grappling with his materials in the believing and lofty devotion of an historical poet, and painting for us a picture in which the fierce and fiery spirit of martial adventure inspires the leading groups, and gives the outlines of the piece, while interesting local superstitions and the ascetic religion of Catholicism, the absorbing love of country and the anomalous devotedness of feudalism, form, singly or united, the colouring which is spread over different portions of the composition.

For, in essentials, this character of historical truth does belong to the poetry of Scott; not indeed that his view of the old world is one which could have presented itself to those who lived nearer to the times he depicts; but that it is almost as near to truth as consists with the united requirements made by the purposes of his art and the temper of his age, and probably nearer to the truth than any similar attempt which has been made in modern times. Doubtless there are many instances in which he does not preserve this fidelity to the claims of his subject; but it is surprisingly preserved in his best works, and the inferiority of the others is in no small degree owing to their deficiency in it. Indeed he goes even farther than this; for he not only presents to us the scenes of old, but he invests them in a dress substantially the same as that in which they would have been clothed by poets contemporary, or nearly succeeding them, if these, for their metrical romances or their ballads of love and war, had possessed equal appliances, in a formed language, and in extended views as to the principles of the poetical art.

The Lay of the Last Minstrel is really a long border-ballad; and, inspired by the poet's early recollections and studies, and nourished not only by those copious sources of illustration of which the Border Minstrelsy furnishes abundant specimens, but by affectionate familiarity with the landscapes of his story, this work possesses, both in spirit and in details, at once a fervour and a unity superior to any of his others. Very little indeed, either of incident or character, would require to be withdrawn from it, as foreign to its essence. Marmion is pitched in another key, but is still antique, and, though less rich in characteristic details of the olden time, and rather less free from modern admixtures, is pervaded almost throughout by the chivalrous spirit, while that spirit blazes forth at several points with a splendour which the poet elsewhere never equalled. The poem is a metrical romance of history; the full development of a species of composition in which Barbour had but faintly traced the design. The Lady of the Lake cannot be so readily referred to any one class of our old national poems; in which, indeed, that moving panorama of gorgeous landscapes, amidst which the personages exist, is, as a prominent feature, quite unknown. But this very feature, and the placidly romantic air which breathes through most of the adventures, at once determine its type as a kind of pastoral romance (instanced more frequently in foreign literature than in our own), and diffuse over the work a singular charm, which hides from us much vagueness, both in the characters and in the historical details of manners and ideas. Rokeby, the next in the list, is confessedly the weakest of its author's larger poems, as it is also that in which he has removed himself farthest from his ordinary models. Defective alike in unity of spirit and in historical fidelity, it would, but for some poetical gems which sparkle through, deserve no higher name than that of a novel in verse. In the Lord of the Isles we behold a return to the poet's higher sources of inspiration; for we have here another metrical chronicle, a second Marmion, every way inferior to the first.

It is abundantly evident that the task which Scott has thus performed, of creating anew the scenes and characters of a fierce and chaotic stage of society, allowed him ample room for arousing some of the strongest emotions which poetry can awaken. Sometimes, indeed, he errs by applying himself to the excitement of feelings which, though strictly within his limits, are not broadly enough impressed on the minds of most men to found any lively sympathy. Such are the feelings of superstitious awe and delight in supernatural invention, feelings which are chiefly addressed in his two anonymous poems, and to whose prevalence these works, equal in some points to any thing in verse he ever wrote, mainly owe their want of general interest and popularity. But he far oftener throws himself on those principles which are universally sympathized with and appreciated, not indeed arousing all of them with equal skill, but compounding, out of the use he makes of all, a representation which is at once sufficiently true and widely attractive. That which was really the master-feeling of the times he delineates, the love of warlike adventure, is the path in which he has been by far most successful. In tenderness or passion he does not stand by any means first among the poets of our day; and even in those exhibitions of chivalrous generosity and lofty feeling which are so closely consonant to his stories and their actors, he is, although often delightfully felicitous, yet by no means without his equals; but there is no poet of our times, and very few in any age or country, who have portrayed with such admirable force and fire the soldier's thirst for battle, and the headlong fury of the field of slaughter. Throughout all his works there occur bursts of this sort, which would of themselves have placed him high among poets of the class, even though he had never written his noblest passages of warfare, the knightly combat of Fitzjames and Roderick, or the magnificent battle-piece which closes Marmion. His clear and cheerful, yet delicately sketched and poetically elevated descriptions of natural scenery, less strong in their outlines than some poetry of a similar kind, and less vivid in their colouring and chiaroscuro than others, but always pleasing and original, and often far more, may probably be said to be, after their warlike temper, the most distinctive feature of his poems.

If the moral tone of Scott's poetry is not high, it must be at least admitted that it is uniformly inoffensive; and if most passages excite us less violently than those of some other poets, there is none whose works leave on the mind a more pleasing expression of content and hopefulness. Perhaps, in his views of human society, the only thing which can at all jar on the feelings of any, is that tendency to aristocratic hauteur, which, not indeed shrinking from contact with the lower orders, and willingly recognising and esteeming many of their virtues, yet considers them strictly as the dependents of higher men, and is silent on every other relation they can be supposed to hold. This feeling, so palpable both in his poetry and in his romances, is, it must be remarked, quite in keeping as a feature of the times he describes in the former class of writings; and even as an element in modern poetry, there doubtless are, after all, many who will esteem the sentiment a just one.

In skill of execution, as respects both ease of expression and melody of versification, there is in the poems an exceedingly observable progress, not at all corresponding to their respective degrees of real merit. Both in diction and in music there is a very wide distinction between the first few stanzas of the Lay and the most finished passages in Rokeby or the Lord of the Isles. Not less noticeable are the variations in point of poetical ornament, a thing very different from genuine poetical force or beauty. In the Lay, the most poetically conceived of all the works, there are wonderfully few passages of the kind that furnish showy quotations, though those of this class that do occur are of a very high order. Marmion, except in the Introduction, scarcely contains more; the Lady of the Lake possesses such far more abundantly; while Rokeby overflows with couplets poetically sententious; and the Lord of the Isles again returns towards the earlier manner.

There is one point of view in which the poems offer a very interesting subject of consideration, not for their own sake, but in their relation to those more celebrated and certainly higher works which succeeded them. They may be regarded as in some sense preparations, or, in the artist's phrase, studies, for the novels and romances. The field of speculation which is thus presented may furnish some intelligent inquirer with extremely apt materials for illustrating the poet's genius; but the mine is too wealthy to be here so much as opened. It may be remarked, however, that while the latter poems in their spirit approach far nearer to the prose romance than the earlier ones, thus in some degree indicating the operations which were going on in the author's mind, yet it is from the earlier that the romances have derived by far the most plentiful hints and materials. In the slightly sketched personages of the poems we may frequently discover elements which were expanded into the finished characters of the prose works, and this not only in the dignified and poetical, but even in the comic, as one instance of which may be cited the Friar John of Norham as the first outline of Robin Hood's Tuck. In incident, the borrowings from the poems are less direct and palpable ; and the most obvious are the obligations which, both in this and the other particular, the Monastery owes to the Lay, and Ivanhoe to Marmion. The Lady of the Lake, also, both in its scenery and its draughts of Highland character, may be considered as the preface to Waverley. (B. L.)

SCOUGAL, Henry, the second son of Patrick Scougal, bishop of Aberdeen, was born in June 1650, at Salton, in East Lothian, where his father, the immediate predecessor of Bishop Burnet, was rector. At the age of fifteen he entered the university, where he behaved with great modesty, sobriety, and diligence. No sooner had he finished his course of education, than he was promoted to a professorship in the university of Aberdeen, where he conscientiously performed his duty in training up the youth under his care in such principles of learning and virtue as might render them ornaments to church and state. Having been professor of philosophy for four years, he was at the age of twenty-three ordained a minister, and settled at Auchterless, a small village about twenty miles from Aberdeen. About the twenty-seventh year of his age he fell into a consumption, which by slow degrees wasted him away. Upon the twentieth day of June 1678 he died, in the greatest calmness, in the twenty-eighth year of his age, and was buried in the King's College church in Old Aberdeen. His principal work is a small treatise entitled the Life of God in the Soul of Man. This book is not only valuable for the sublime spirit of piety which it breathes, but for the purity and elegance of its style ; qualities for which few English writers were distinguished before the revolution.

SCOUTS, in a military sense, are generally horsemen sent out before, on the wings of an army, at the distance of a mile or two, to discover the enemy, and to give the general an account of what they see.

SCREW, one of the six mechanical powers, is a cylinder cut into several concave surfaces, or rather a channel or groove made in a cylinder, by carrying on two spiral plains the whole length of the screw, in such a manner that they may be always equally inclined to the axis of the cylinder in their whole progress, and also inclined to the base of it in the same angle.

SCRIBE, in Hebrew ספר, *sepher*, is very common in Scripture, and has several significations.

It signifies, first, a clerk, writer, or secretary. This was a very considerable employment in the court of the kings of Judah, in which the Scripture often mentions the secretaries as the first officers of the crown. Seraiah was scribe or secretary to King David (2 Sam. viii. 17). Shevah and Shemaiah exercised the same office under this prince (2 Sam. xx. 25). In Solomon's time we find Elihoreph and Ahia secretaries to that sovereign (1 Kings iv. 4) ; Shebna under Hezekiah (2 Kings xix. 2) ; and Shaphan under Josiah (2 Kings xxii. 8). As there were but few in those times that could write well, the employment of a scribe or writer was very considerable.

Secondly, a scribe is put for a commissary or muster-master of an army, who makes the review of the troops, keeps the list or roll, and calls them over. Under the reign of Uzziah king of Judah, there is found Jeil the scribe, who had under his hand the king's armies (2 Chron. xxvi. 11) ; and at the time of the captivity, it is said the captain of the guard, among other considerable persons, took the principal scribe of the host, or secretary at war, which mustered the people of the land (2 Kings xxv. 19).

Thirdly, scribe is put for an able and skilful man, a doctor of the law, a man of learning that understands affairs. Jonathan, David's uncle by the father's side, was a counsellor, a wise man, and a scribe (1 Chr. xxvii. 32). Baruch, the disciple and secretary to Jeremiah, is called a scribe (Jer. xxxvi. 26) ; and Ezra is celebrated as a skilful scribe in the law of his God (Ezra vii. 6). The scribes of the people, who are frequently mentioned in the Gospel, were public writers and professed doctors of the law, which they read and explained to the people. Some place the original of the scribes under Moses ; but their name does not appear until under the judges. It is said that, in the wars of Barak against Sisera, “ out of Machir came down governors, and out of Zebulun they that handle the pen of the writer” (Judges v. 14). But others think that David first instituted them when he established the several classes of the priests and the Levites. The scribes were of the tribe of Levi ; and at the time that David is said to have made the regulations in that tribe, we read that six thousand men of them were constituted officers and judges (1 Chr. xxiii. 4), among whom it is reasonable to think that the scribes were included. For in 2 Chr. xxiv. 6, we read of Shemaiah the scribe, one of the Levites ; and in Chr. xxxiv. 13, we also find it written, “ Of the Levites that were scribes and officers.”

The scribes and the doctors of the law, in the Scripture phraseology, mean the same thing. And as the whole religion of the Jews at that time consisted chiefly in pharisaical traditions, and in the use that was made of them to explain the Scripture, the greatest number of the doctors of the law, or of the scribes, were Pharisees ; and we almost always find them joined together in Scripture. Each of them valued themselves upon their knowledge of the law, and upon their studying and teaching it (Mat. xxii. 52). They had the key of knowledge, and sat in Moses's chair (Mat. xxiii. 2). Epiphanius, and the author of the Recognitions imputed to St Clement, reckon the scribes among the sects of the Jews ; but it is certain that they formed no sect by themselves, and were only distinguished by their study of the law.

SCRIMZEOR, or Scrimgeour, *Henry*, an eminent restorer of learning, was born at Dundee in the year 1506. He traced his descent from the ancient family of the Scrimzeours of Dudhope, who obtained the office of hereditary standard-bearers to the kings of Scotland in 1057.

At the grammar-school of Dundee our author acquired the Greek and Latin languages in an uncommon degree of perfection, and that in a shorter time than many scholars of his age. At the university of St Andrews, his successful application to philosophy gained him great applause. The next scene of his studies was the university of Paris, and their more particular object the civil law. Two of the most famous civilians of that age, Eguinard Baron and Francis Duaren,[1] were then giving lectures to crowded audiences at Bourges. The fame of these professors occasioned his removal from Paris ; and for a considerable time he prosecuted his studies under their direction. At Bourges he had an opportunity of becoming acquainted with the celebrated James Amiot, Greek professor in that city, well known in the learned world by his translation of Plutarch's Lives, and distinguished afterwards by his advancement to great honours in the church, and finally to the rank of cardinal. Through the recommendation of this eminent person, Mr Scrimzeor engaged in the education of two young gentlemen of the name of Bucherel, whom he instructed in the belles lettres, and other branches of literature calculated to qualify them for their station in life.

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[1] “ Francis Duaren was the first of the French civilians who purged the chair in the civil law schools from the barbarisms of the Glossaries, in order to introduce the pure sources of the ancient jurisprudence. As he did not desire to share that glory with any one, he looked with an envious eye on the reputation of his colleague Eguinard Baron, who also mixed good literature with the knowledge of the law. This jealousy put him upon composing a work, wherein he endeavoured to lessen the esteem that people had for his colleague. The maxim, *Pascitur in vivis livor ; post fata quiescit*, was verified remarkably in him ; for after the death of Baron, he showed himself most zealous to eternize his memory, and was at the expense of a monument to the honour of the deceased.” (See the Translation of Bayle's Dictionary, of 1710, p. 1143-4.)

This connection introduced him to Bernard Bornetel, bishop of Rennes, a person famed in the political world for having served the state in many honourable embassies. Accepting an invitation from this prelate to accompany him to Italy, Mr Scrimzeor greatly enlarged the sphere of his literary acquaintance, by his conversation and connection with most of the distinguished scholars of that country. The death of Francis Spira[1] happened during his visit to Padua; and as the character and conduct of this remarkable person engaged at that time the attention of the world, Mr Scrimzeor is said to have collected memoirs of him in a publication entitled The Life of Francis Spira, by Henry of Scotland. This performance, however, does not appear in the catalogue of his works.

After he had stored his mind with the literature of foreign countries, and satisfied his curiosity as a traveller, it was his intention to revisit Scotland. He might without vanity have entertained hopes, that the various knowledge which he had treasured up would win him a partial reception among his countrymen. An ambition of being usefully distinguished among them as a man of letters is justly supposed to have been the principal motive of his return; but the most sanguine projects of life are often strangely diverted by accident, or rather perhaps are invisibly turned by Providence from their natural course. Mr Scrimzeor, on his journey homewards, had to pass through Geneva. His fame had long forerun his footsteps. The syndics and other magistrates, on his arrival, requested him to set up the profession of philosophy in that city, promising a compensation suitable to the exertion of his talents. He accepted the proposal, and established the philosophical chair.

After he had taught for some time at Geneva, a fire broke out in the neighbourhood, by which his house was consumed, and he himself reduced to great distress. His pupils, the Bucherels, however, had not forgotten their obligations to him, and sent a considerable sum of money to his relief.

At this time flourished at Augsburg the famous mercantile family of the Fuggers. Ulric Fugger was then its representative; a man possessed of prodigious wealth, passionately fond of literature, a great collector of books and manuscripts, and a munificent patron of learned men. Being informed, by means of his literary correspondence, of the misfortune which had befallen Mr Scrimzeor in the burning of his house, he immediately sent him a pressing invitation to accept an asylum beneath his roof until his affairs should be re-established. Mr Scrimzeor gladly availed himself of such hospitable kindness, and lost no time in repairing to Germany.

Whilst residing at Augsburg with Mr Fugger, he was much employed in augmenting his patron's library, by vast collections purchased from every corner of Europe. Codices of the Greek and Latin authors were then of inestimable value, and seem to have been more particularly the object of Mr Scrimzeor's researches.

When his manuscripts were ready for the press, he was desirous of returning to Geneva to print them. His patron, Fugger, recommended him for that purpose to the learned Henry Stephens, one of his pensioners, and at that time the most celebrated printer in Europe.

Immediately on his arrival at Geneva, 1563, he was earnestly solicited by the magistrates to resume the chair of philosophy. Notwithstanding his compliance, and consequently the dedication of much of his time to the study of physics, he, two years afterwards, instituted a course of lectures in the civil law, and had the honour of being its first founder and professor at Geneva.

As soon as he had settled again in this city, he hoped, amidst his other occupations, to prosecute the great object of his literary fame, the printing of his various works. But a suspicion which Henry Stephens entertained, that it was his intention to set up a rival press at Geneva, occasioned great dissensions between them; and the result of the quarrel was, that the republic of letters, during Scrimzeor's life, was deprived of his valuable productions. At his death most of them fell into the hands of Isaac Casaubon, who has been accused of publishing considerable portions of them as his own.

Some account of Mr Scrimzeor's several performances will serve to convey an idea of his extensive erudition.

He wrote critical and explanatory notes upon Athenæus's *Deipnosophists*, or Table Conversations of Philosophers and Learned Men of Antiquity, having first collated several manuscripts of his author. This work Casaubon published at Leyden in 1600, but without distinguishing his own notes from those of Scrimzeor.

A Commentary and Emendations of the Geography of Strabo were among our author's literary remains. These were published in Casaubon's Parisian edition of Strabo in 1620. Henry Stephens, from an idea of justice due to Scrimzeor's literary fame, notwithstanding the violent animosity which had subsisted between them, reproaches Casaubon for adopting, without acknowledgment, the Scottish critic's lucubrations on Strabo. Dempster assures us, that Scrimzeor, in his manuscript letters, mentions his design of publishing this performance; and hence it is probable that his work appeared to himself of considerable consequence, and had taken up much of his attention. Although Casaubon, in his ample notes exhibited at the foot of Strabo's text, makes no confession of having derived any thing from Scrimzeor, it must not be concealed, that in an epistle to Sir Peter Young, the nephew of the critic through whom the Commentary and Emendations of Strabo came into his hands, Casaubon acknowledges how very useful to him they might be made; for, speaking there of his intended edition of Strabo, he says, "It cannot be expressed how much assistance I may obtain from your notes of Scrimzeor."

Edward Herrison, a Scottish author, in his Commentary on Plutarch's Book concerning the Inconsistencies of the Stoics, informs us that Scrimzeor collated different manuscripts of all the works of Plutarch. This undertaking appears sufficient to occupy half the life of an ordinary critic. Every one knows how voluminous an author was the philosopher, the historian, and the orator of Chæronea. Whether the learned critic meant to publish an edition of Plutarch's works is not known; but such an intention seems higly probable, from this laborious enterprise of collating them.

The ten books of Diogenes Laertius on the Lives, Opinions, and Apophthegms of the Philosophers, were collated from various manuscripts by Scrimzeor. His corrected text of this author, with notes full of erudition, came also into Casaubon's possession, and is supposed to have contributed much to the value of his edition of the Grecian biographer, printed at Paris in 1593.

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[1] Francis Spira was a lawyer of great reputation at Cittadella, in the Venetian state, about the beginning of the sixteenth century. He had imbibed the principles of the Reformation, and was accused before John de la Casa, archbishop of Benevento, the pope's nuncio at Venice. He made some concessions, and asked pardon of the papal minister for his errors. But the nuncio insisted on a public recantation. Spira was exceedingly averse to this measure; but at the pressing instances of his wife and friends, who represented to him that he must lose his practice and ruin his affairs by persisting against it, he at last complied. Shortly afterwards he fell into a deep melancholy, lost his health, and was removed to Padua for the advice of physicians and divines. But his disorders augmented, and the recantation, which he said he had made from cowardice and interest, filled his mind with continual horror and remorse, insomuch that he sometimes imagined that he felt the torments of the damned. No means being found to restore either his health or his peace of mind, in 1548 he fell a victim to his miserable situation. See Collyer's Dictionary, art. *Spira.*

The works of Phornutus and Palæphatus were also among the collations of Mr Scrimzeor. To the latter of these authors he made such considerable additions, that the work became partly his own. These are two ancient authors who explain the fables of the heathen deities. The former wrote *De Natura Deorum, seu de Fabularum Poeticarum Allegoriis Speculatio*, On the Nature of the Gods, or the Allegorical Fictions of the Poets. The latter entitled his book *De Falsis Narrationibus*, concerning False Relations. These works were printed at Basil in 1570, but whether in Greek or Latin is uncertain. They have been published since that time in both languages. The manuscripts of them were for some time preserved in the library of Sir Peter Young, after that of his uncle Scrimzeor, which was brought into Scotland in 1573, had been added to it. What became of this valuable bequest at the death of the former is uncertain. Our learned philologer also left behind him, in manuscript, the orations of Demosthenes, Æschines, and Cicero, and the Ecclesiastical History of Eusebius, all carefully collated.

Among his literary remains was a collection of his Latin epistles. The men of letters in the fifteenth and sixteenth centuries seem to have kept their republic, as it is called, more united and compact than it is at present, by an epistolary intercourse in the Latin language, then the universal medium of literature and science.

Of the many performances which had exercised his pen, it does not appear that any were immediately published by himself but his Translation of Justinian's Novels into Greek. This was printed at Paris in 1558, and again with Holoander's Latin version at Antwerp in 1575. This work has been highly extolled, both for the purity of its language and the accuracy of its execution, and is likely, according to some, to hold its estimation as long as any use or memory of the civil law shall exist.

A Latin translation of the *Basilica*, or Basilics as they are called by the civilians, is the last we have to mention of this author's performances. This is a collection of Roman laws, which the eastern emperors Basil and Leo, who reigned in the fifth century, commanded to be translated into Greek, and which preserved their authority until the dissolution of the eastern empire. The Basilics comprehend the institutes, digests, code, and novels, and some of the edicts of Justinian and other emperors. Of sixty original books, however, forty-one only remain. Mr Scrimzeor collated them with various manuscripts, probably before he commenced his translation.

Different years have been assigned for the time of his death; but it appears most likely, from a comparison of the different accounts of this event, that it happened very near the expiration of 1571, or at the beginning of the succeeding year, about the sixty-sixth year of his age. He died in the city of Geneva. The characteristic features of Scrimzeor are few, but they are prominent and striking. His industry and perseverance in the pursuit of knowledge and erudition were equalled only by the exquisite judgment which he displayed in his critical commentaries on the errors and obscurities of ancient books and manuscripts.

SCRIPTURE, HOLY.

Under this title are commonly designated the sacred books of the Jews and the Christians, in which are contained the revelation of God's will to mankind, and the principles of that religion which he has inculcated upon us. In other parts of this work the reader will find articles elucidatory of the claims preferred and of the doctrines taught in these books (see especially Inspiration, Miracle, Prophecy, and Theology). In the present article it is proposed to furnish an outline of what may be denominated *the historico-critical knowledge of these books*. In treating of this we have to do with the composition, the history, the reputation, and the literary characteristics of the sacred writings viewed simply as remains of ancient literature.

This department of investigation is comparatively of recent date. In the earlier ages of the church the same necessity for such inquiries did not exist as now, in consequence especially of the efforts which have been made in more recent times to impugn the authenticity of the sacred documents; nor is it probable that the early fathers, from the views which they entertained of the sole agency of the Holy Spirit in the composition of these, would have deemed any inquiry into their peculiarities, as the products at the same time of human agency, other than impious and absurd (1). Since the time, however, when Spinoza issued his attack upon the authenticity of the Pentateuch and the general inspiration of the Scriptures (1670), and Richard Simon, a presbyter and fellow of the oratory at Paris, followed with his acute, learned, and liberal investigations into the critical history of the Old Testament (1678), this subject has occupied the attentive study of critics and theologians of all confessions, and may now be said to have reached the dignity of a *science* (2).

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1. The prevailing notion among the Jews and the early Christians respecting Inspiration was, that the faculties of the person inspired were completely suspended and superseded during the afflatus, so that the only parts of him actively engaged in the work of composition were his hands and his eyes. Philo speaks of God as "using the organs of the prophets for the manifestation of his will" (Θεου καταχρωμενου τοις ἐκεινων ὀργανοις προς δηλωσιν ὧν ἂν ἐθελησῃ, *De Monarch.* lib. i. ed. Mangey, t. ii. p. 222); Justin Martyr compares them to the strings of a lyre, which produce sounds just as they are touched by the hand of the player (*Cohort. ad Græcos*, c. 8); and Augustin frequently speaks of the Scriptures as the "Chirograph of Deity," and of their writers as "the stylus or pen of the Holy Spirit." The influence of such exclusive views in discouraging any inquiries of a historico-critical nature is seen in the following sentence of Gregory the Great: "Quis librum Job scripserit, valde superflue quæritur, cum tamen auctor libri Spiritus Sanctus fideliter eredatur. Ipse scripsit, qui et in ejus opera inspirator extitit et per scribentis vocem imitandam ad nos facta transmisit." (*Moral. in Job.* t. i. p. 7.) Ideas of a similar kind are found in the writings of several of the older divines subsequent to the Reformation. For the opinions most generally received among Protestant divines in the present day, see Henderson's Lectures on Inspiration, London, 1836, the latest and best book upon this subject.

2. Spinoza's work is entitled "Tractatus historico-politicus, continens dissertationes aliquot, quibus ostenditur, libertatem philosophandi non solum salva pietate et reipublicæ pace posse concedi; sed eandem nisi cum pace reipublicæ ipsaque pietate tolli non posse," Hamburgi, 1670, 4to. Simon's "Histoire critique du Vieux Testament" appeared in one vol. 4to, in 1678 at Paris; but a fuller and more correct edition was published at Rotterdam in 1685, superintended, in all probability, by the author. It produced numerous replies and strictures, from the pens both of Catholic and Protestant divines, of which the most important were those of Spanheim (*Lettre sur l'Hist. Crit. du V. T. du R. Simon*); Du Pin (*Dissert. prelim. ou Prolégomènes sur la Bible*); and Le Clerc (*Sentimens de quelques Théologiens d'Holland sur l'Hist. Crit. du V. T. composée par le D. R. Simon*). Both Du Pin and Le Clerc, but especially the latter, whilst reproving Simon, indulged certain speculations of their own, which were considerably too free for the age in which they lived, and which drew down upon them, along with the object of their strictures, the censures of the acute and ingenious Bossuet (*Divers Traités contre Mr R. Simon, Du Pin, et autres. Œuvres Posthumes*, t. ii. 1753). In more recent times the scholars of Germany have chiefly distinguished themselves in this department of inquiry. Their most valuable works are those of Carpzov (*Introductio ad libros canonicos V. T. omnes*, 4to, Lips. 1721): Eichhorn (*Ein-*

leitung in das A. T. 4te aufl. 5 bde. 8vo, Gött. 1820–24; *In die Apocryphischen Schriften des A. T.* 8vo, Leipz. 1795; *In das N. T.* 5 bde. 8vo, Leipz. 1804–1827); Michaelis (*Einl. in die Göttl. Schriften des A. Bundes*, 4to, Hamburg, 1784; *In die Göttl. Schriften des N. B.* 2 bde. 4to, Gottingen, 4te aufl. 1788 [translated by Bishop Marsh, in six vols. 8vo, with considerable additions, third ed. Camb. 1818]); Bertholdt (*Histor. Kritische Einl. in sämmtliche Kanonische und Apocryphische Schriften des A. und N. T.*, 6 bde. 8vo, Erlangen, 1812–19); Jahn (*Einl. in die Göttl. Bücher des A. Bundes*, 3 bde. 8vo, 2te aufl. Wien. 1802–3; *Introductio in Bibl. Sacr. V. T. in epitomen redacta*, ed. 2da, Vien. 1814, 8vo): Haenlein (*Handbuch der Einleit. in d. Schriften des N. T.* 3 theile 2te aufl. Erlangen, 1801); Hug (*Einl. in die Schriften des N. T.*, 2 thle. 3te aufl. Stuttgart und Tübingen, 1827 [translated by the Rev. D. G. Wait, LL. D. 2 vols. 8vo, 1827, and with much greater accuracy by D. Fosdich junior, Andover, U. S. 1837]); and Schott (*Isagoge Hist. Critica in libros N. T. sacros*, Jenæ, 1830, 8vo). The most valuable works by English scholars are Walton's *Prolegomena in Biblia Polyglotta*, Lond. 1657, of which a separate edition was published, with a preface by J. A. Dathe, at Leipzig, in one vol. 8vo, 1777, and republished with many improvements and additions by Archdeacon Wrangham, in two vols. 8vo, Cambr. 1828; Mill's *Prolegomena in Novum Testamentum*, Oxon. 1707, folio; Harwood's Introduction to the Study and Knowledge of the New Testament, 2 vols. 8vo, London, 1767–1771; Gray's Key to the Old Testament, 8vo, new edit. 1829; Percy's Key to the New Testament, 12mo, 3d edit. London, 1779; and, above all, Horne's Introduction to the Critical Study and Knowledge of the Holy Scriptures, 4 vols. 8vo, 8th edit. Lond. 1839. Many valuable treatises upon separate portions of the general subject are extant in different languages, but these it would be out of place to attempt to enumerate here. See the Bibliographical Appendix to Horne's Introduction; Orme's *Bibliotheca Biblica*; and Winer's *Handbuch der Theologischen Litteratur*.

This subject divides itself into two parts, a *general* and a *special;* the former having reference to the sacred volume as a whole, the latter to the separate books of which it is comprised. In the present article we shall confine ourselves to the former of these, and offer a few general observations on the collected scriptures, as such.

SECT. I.—*The Name.*

Various designations have been affixed to the sacred volume. The Jews called their part of it by such terms as עשרים וארבעה, i. e. *Four-and-twenty*, with reference to the number of separate books; כתב or מכתב, i. e. *Writing*, a term borrowed from Exod. xxxii. 16; ספרי הקדש, i. e. *Books of Holiness;* תורה נביאים וכתובים, i. e. *Law, Prophets, and Hagiographa.* In the Apocrypha they are styled ὁ νομος, και οἱ προφηται, και τα ἀλλα πατρια βιβλια, *Jesus Sirac. Proleg. sub init.* So also in the New Testament, νομος και προφηται, Matt. v. 17; νομος, προφηται, και ψαλμοι, Luke xxiv. 44; frequently ἡ γραφη and αἱ γραφαι; τα ἱερα γραμματα, 2 Tim. iii. 15. At an early period of the Christian era, the term διαθηκη began to be affixed to the Scriptures as the documents unfolding God's *covenant;* and their two great divisions to be designated as ἡ παλαια διαθηκη and ἡ καινη διαθηκη respectively. This usage seems to have been drawn from the language of Paul, 2 Cor. iii. 6 and 14, though it is only in the writings of Origen that it makes its appearance for the first time. The Latins rendered the word διαθηκη by *Testamentum*, according to its primary meaning, though not that in which it is employed by Paul, who uses it evidently in the sense of *Fœdus;* and from this we have the appellation employed by almost all the versions of modern Europe.

Horne's Introduction, vol. i. p. 30; Michaelis, *Einleit.*, bd. i. s. 1; and in Marsh's Translation, vol. i. p. 1; Augusti, *Grundriss einer Histor. Kritischen Einleitung ins Alte Testament*, s. 16, 2te. aufl.

SECT. II.—*Languages of the Scriptures.*

The greater part of the Old Testament Scriptures is composed in pure Hebrew, the most ancient language of which we have any specimen extant. This language belongs to a class of tongues formerly called, by way of eminence, the *Oriental*, but now more appropriately discriminated by the term *Semitic* or *Shemitic*, from Shem, the great progenitor of the races by which they are spoken (1). This class embraces three leading tongues, corresponding in general character and relation to the geographical situations of the respective nations by which they were used; the *Aramaic* abounding in combinations of consonants, and consequently marked by considerable harshness of pronunciation, employed by the nations of the northern and more mountainous districts of Syria, Mesopotamia, and Babylonia; the *Arabic*, remarkable for richness, melifluousness, and the preponderance of vowels, spoken by the inhabitants of the warm and open plains of Arabia and Ethiopia; and the *Hebrew*, the language of the middle district, possessing an intermediate character between the other two, richer than the Aramaie, poorer and harsher than the Arabic (2). The opinion that Hebrew was the original language of the world, and the mother of all the other Semitic tongues, is now generally relinquished by scholars, who content themselves with the more moderate hypothesis, that it is the oldest daughter of the primeval tongue, and that which retains the most striking resemblances to the mother speech of the antediluvian period (3). In the earliest books of the Bible, those of Moses, this language appears in its greatest purity; nor did it sustain any decided deterioration till after the Babylonian captivity. The attempts of some Hebraists to divide its history into a golden, a silver, a brazen, and an iron age, are by the most accurate scholars rejected, as much more fanciful than sound (4). The Hebrew of the Scriptures is the pure classical Jerusalem Hebrew, the language of the temple and of the court. That there were dialects more or less corrupt in the provinces, is attested by the sacred writers themselves. Thus they tell us that the Ephraimites could not distinguish between the שׁ and the ס in pronunciation (Judges, xii. 6); Nehemiah was indignant that part of the people should speak "in the speech (dialect) of Ashdod, of Ammon, and of Moab" (Nehem. xiii. 23–25); and the dialect of Galilee is mentioned in the New Testament (Matt. xxvi. 73) (5).

1. The first to use this term seems to have been Nicolas Fuller, in his *Miscellanea Sacra.* He was followed by Eichhorn, and ultimately by nearly all the orientalists of Germany.

2. Ewald's Hebrew Grammar, translated by Nicolson, p. 1; Gesenius, *Grammatik*, § 1.

3. Morinus *De Lingua Primæva.* Jahn, *Einleitung*, i. th. s. 244.

4. "As the language appears to us at present in the Scriptures of the Old Testament, there are only two distinct periods characteristically discriminated, the one comprehending the books written before, and the other those written during and subsequent to the exile." Gesenius, *Geschichte der Hebr. Sprache und Schrift.* s. 21.

5. Compare Horne's Introd. vol. ii. p. 2–13, and the works referred to by him.

The portions of the Old Testament not in pure Hebrew are Ezra, iv. 8,—vi. 18, and vii. 12–26; Jer. x. 11; and Daniel, ii. 4,—vii. 28. These are in Chaldaic or Eastern Aramaic, and have reference chiefly to the history of the captivity, and the events following its close.

On the Biblical Chaldaic, see Walton's *Prolegomena*, chap. xii. § 2, 3; L. Hirzel, *De Chaldaismi biblici origine et auctoritate Comment. crit.* Lips. 1830; F. Dietrich *De Sermonis Chaldaici proprietate*, Lips. 1839; Rigge's Manual of the Chaldee Language, Boston, Mass. 1832.

The language of the New Testament is the κοινη διαλεκτος of the classical Greek, with many Aramaic words and idioms interspersed, and a few Latinisms.

Horne's Introd. vol. ii. p. 13–30; Schott, *Isagoge Hist. Crit.* p. 495–517; Stuart's Grammar of the New Testament Language; Winer's *Gramatik des N. Testamentlichen Sprachidioms;* Michaelis, Introd. vol. 1. p. 97 (Eng. Tr.), &c.

SECT. III.—*Genuineness and Authenticity of the Sacred Volume.*

As ancient literary documents, the Scriptures lay claim to be regarded as both *genuine* or *authentic*, and *credible.*

A book is *genuine* when it really is what it professes to be, as the composition of a particular individual, or as produced under particular circumstances, and at a certain place and time; as opposed to a book which appears under a *forged* title. A book is *credible* when the statements it contains are physically true; as opposed to a book the contents of which are *false* or *fictitious*. Both these qualities may meet in the same work, or they may exist separately in separate works. Thus the book of Genesis may be the composition of Moses, and yet be fabulous; or it may be true in all its statements, and yet not be the work of Moses; or it may be, as it is generally believed to be, both the production of Moses and true, both genuine and credible.

The genuineness and credibility of the sacred books form matter of separate investigation and proof. At the same time, they are so connected, that the proof of the one paves the way for the proof of the other; for, in the case of such works, it is highly improbable that truth would be issued under a forged name, or that such men as Moses, Samuel, or the Evangelists, would or could issue fictitious narratives as true. It is not, however, matter of indifference which of them we establish first. Before we can set ourselves to prove their credibility, we must be in circumstances to show their genuineness; for unless we can do this, a preliminary difficulty will lie in the way of the former, from the suspicion that these books appear with a falsehood, or at least what has not been shown to be a truth, upon their front; a work of supposititious authorship being always *prima facie* less credible than one which is the genuine production of the writer to whom it is ascribed.

The proof of the genuineness of the Sacred Scriptures rests upon the following considerations:

1. There is no antecedent impossibility that they should be genuine. It cannot be shown that it was impossible for Moses to have written the Pentateuch, Isaiah and the other prophets their prophecies, the Evangelists their gospels, the Apostles their epistles, or for the books which are anonymous to have been composed under the circumstances which they profess; nor that, being composed, it was impossible for them to have been preserved and handed down from generation to generation.

2. Circumstances were favourable to the preservation of these books, supposing them written. The Old Testament books professedly form the national literature, as well as the sacred documents of the Jews, and would naturally be carefully preserved by them. The New Testament books constitute the religious archives and statute-books of the Christian church, and would from their first publication be sacredly conserved by those for whom they were so deeply interesting.

3. It is matter of undeniable history, that both Jews and Christians did possess certain sacred books, which they regarded with the utmost reverence, and preserved with the greatest care. The only question, then, is, Are the books which we possess the same as those thus reverenced and preserved? And, *first*, with respect to those of the Old Testament.

i. These are the books which were recognised in the early church as the sacred books of the Jews. This is placed beyond doubt by the early versions of Scripture, and by the catalogues of Athanasius, Epiphanius, Jerome, Origen, and Melito bishop of Sardis. Lardner, Works, vol. iv. p. 290, 8vo ed.

ii. The books of the Old Testament which we possess must have been extant *at the commencement* of the Christian era. This is evident from the allusions to them, and the quotations from them, in the New Testament, but especially from the testimony of Philo, an Egyptian Jew, who at the latest was contemporary with the apostles, and also of Josephus, himself a priest of the Jews, and consequently accurately informed on all matters relating to their sacred books, and who lived in the latter part of the first century of the Christian era. Philo gives no formal catalogue, but quotes from or refers to nearly all the books of the Old Testament, while no other is mentioned by him as of accredited authority. Josephus, besides frequent quotations and allusions, gives (*Cont. Apion*, lib. i. c. 8) a catalogue of the sacred books of his nation, assigning five to Moses, thirteen to the prophets, and four to the writers of hymns and moral maxims. This, if we regard Judges and Ruth as one book, and add the Lamentations to the Prophecies of Jeremiah, which there is good reason to believe was the case in the days of Josephus, gives exactly the number of the books now extant.

Schmidtii *Historia Antiqua et Vindicatio Canonis Sacri Veteris et Novi Testamenti*, pp, 129–189, Lips. 1775; Ejusdem *Ennarratio sententiæ Flav. Josephi de libris Vet. Test.* Wittenberg, 1787; Hornemanni, *Obss. ad Illustrationem Doctrinæ de Canone Vet. Test. ex Philone*, Hauniæ, 1778; Henderson's Lectures on Inspiration, p. 468, Lond. 1836.

iii. These books must have been written *long before* the Christian era. This is plain from the fact of targums or explanations of them into the Syro-Chaldaic dialect, which was the language of the people, having been made for a long course of years antecedent to the times of Onkelos and Jonathan Ben Uzziel, by whom they were collected in the form now extant, and who lived probably near the days of our Lord; from the allusions to the sacred books of his nation already quoted from the prologue to the work of Jesus the son of Sirach, which was composed about 230 years B. C.; and from the existence of the Septuagint version, which was at least commenced 280 years B. C.

iv. Under such circumstances, the forgery of these books was morally impossible. If such a thing took place, it must have been during the 140 years which elapsed between the death of Malachi, the last of the prophets, and the execution of the Septuagint version. But, first, it is inconceivable that, in so short a period, and in an age when literature was not a trade, a set of men (for the agency of only one man is out of the question) should have appeared in the land of Judæa, all endowed with genius sufficient to share in the composition of such works, and all infected with the spirit of literary dishonesty, so as to act the part of forgers. Secondly, even supposing such a piece of deception attempted, it is inconceivable how it should have succeeded, as, by the holders of this hypothesis, it must be allowed to have done. As the whole nation of the Jews acknowledged these books, we must suppose, either that they were all imposed upon in the matter, or that they all agreed to impose upon the rest of the world. But no ingenuity can suffice to persuade a nation that they have for ages possessed sacred books, when they know they have not; and a national agreement to sanction a forgery and tell the world a lie, is a hypothesis too extravagant to be for a moment entertained. Thirdly, the opinions expressed in these books, the doctrines taught, and the duties enjoined, are so averse from those most cherished by the Jews at the time the supposed forgery must have taken place, and the facts recorded are so little flattering, upon the whole, to the pride of the nation, that it is quite incredible, either that any should have been found to write them, or that, being written, they should have been received by the people with any other feelings than those of execration and abhorrence. The respect in which they were held can be accounted for only on the principle, that it was rendered to the *venerable antiquity* and *indisputable authority* with which they were invested.

v. The force of this conclusion is heightened by the circumstance, that while all testimony is in favour of the genuineness of these books, not one witness can be produced whose evidence is incompatible with this.

vi. When we apply to the contents of these books such tests as are best fitted to try their genuineness, the result is such as to confirm our previous conclusion. 1. They display just such a diversity of talent, style, and character, as we should expect in works composed by different authors at different times. 2. They are written, with a few slight exceptions, in pure Hebrew, a language which we know to have been that of the Jews before the captivity, but the knowledge of which as a vernacular tongue was entirely lost very shortly afterwards. 3. Whilst they use the same language, there are certain grammatical and linguistic differences between the early and the later writers, indicative of such changes as all languages experience in the lapse of time, but less extensive than those found in others of the ancient tongues; which is exactly what might have been expected in the case of persons using, through a long interval, a language which, though exposed to causes of change, was, from the fixed and exclusive habits of those speaking it, less liable to be affected in this way than the languages of more versatile and cosmopolitan nations. 4. The narratives occurring in these books are marked by that minute accuracy and circumstantiality of detail which a forger generally endeavours to avoid, but into which a true witness naturally falls, from having all these details present to his mind as integral parts of the occurrence which he attests, *as it presented itself to his senses.* 5. There is, amidst the greatest elevation of thought and sublimity of conception, a chastened simplicity of language, and, amidst the utmost variety of manner, style, and illustration, an essential unity of doctrine, which comports well with the claims of these books to be regarded as the sacred books of the Jews, and seems strongly incompatible with the supposition that they are forgeries.

For these reasons, it is affirmed that the books which we now possess are the same as those which were always possessed and held genuine by the Jews. We turn, *secondly,* to the New Testament, and inquire whether the same evidence of its genuineness can be furnished.

i. No person doubts the existence of the New Testament books from the close of the *fourth* century of the Christian era downwards, because the fact is so notorious, that to deny it would be to discredit all historical testimony.

ii. As little can it be doubted that they were extant from the *commencement* of that century. Not only are they frequently quoted by writers who lived during that period, but we possess *ten* distinct catalogues of the New Testament books, issued during this century, of which six are identical with our present canon (1), three omit only the book of Revelation (2), and one omits this book and the Epistle to the Hebrews (3), though both are mentioned in other parts of the author's writings.

1. Those of the forty-four bishops at the Council of Carthage (A. D. 397), of Augustin (A. D. 394), of Jerome (A. D. 392), of Rufinus (A. D. 390), of Epiphanius (A. D. 370), and of Athanasius (A. D. 315).
2. Those of Gregory of Nazienzum (A. D. 375), of the bishops at the Council of Laodicea (A. D. 364), and of Cyrill of Jerusalem (A. D. 340).
3. That of Philaster or Philastrius, bishop of Brixia or Brescia (A. D. 380).

Lardner, Works, vol. iv. pp. 280–501, and vol. v. pp. 1–123.

iii. Their existence in the *third* century is placed equally beyond doubt, from the careful and explicit testimony of Eusebius, who wrote A. D. 315; from the references to them in the writings of the apologists Arnobius Afer and Lactantius (cir. A. D. 300); from the testimonies contained in fragments preserved from numerous writers in that century, especially Victorinus bishop of Pettau, in Germany, who refers to nearly every book in the New Testament; from the commentaries upon them and quotations from them of Origen (A. D. 253); from the quotations of Cyprian (A. D. 258); and from references to them in the remains of a number of writers who lived during the first thirty years of the third century.

Lardner, Works, vol. ii. pp. 397–430.

iv. For their existence in the *second* century, we have abundant evidence, in the quotations from them and allusions to them in the writings of Tertullian (A. D. 200), Clement of Alexandria, Athenagoras (A. D. 180), Irenæus (A. D. 170), Justin Martyr (A. D. 150), and Papias (A. D. 113), and in the Harmony of the Gospels by Tatian (A. D. 170).

v. Collateral with these testimonies of the orthodox fathers are those of the early heretics, Cerinthus, the Ebionites, the Basilidians, Marcion, and others, who, by denouncing the writings of the apostles, as containing error, thereby attest the existence and genuineness of these writings; and of the early opponents of Christianity, Celsus, Porphyry, and Julian, who, by the notice they take of these books, show how much in their day their genuineness was matter of public notoriety.

vi. We have thus traced up the existence of these books to the close of the *first* century. To say nothing of the testimony in their favour of the apostolic fathers, Barnabas, Clement of Rome, Hermas, Ignatius, and Polycarp, who flourished during that century, and reached up to the days of the apostles, the supposition of a forgery at that time is clearly absurd. Whilst men were still alive whose fathers were the contemporaries of the evangelists and apostles, how could any one impose upon the community as the production of the latter what was only forged in their name? or whilst the churches at Rome, Colossæ, Corinth, and other places, were still existing, who could have persuaded them to receive as Paul's letters to them what they knew Paul had never sent to them? or how can we conceive that an attempt so audacious would have been allowed to pass, without a single voice being raised in any quarter to denounce the imposture?

vii. The conclusion thus gained by the consideration of external testimony is forcibly confirmed by the contents of the books themselves. The *language* in which they are written is exactly such as a Jew of the first century would naturally fall into in attempting to write Greek, and such as could hardly have been thought of or imitated by a later writer. The *style* of composition is such as a forger could not possibly have hit upon; it has so much of a prevailing simplicity and earnestness, and at the same time is so suitably diversified in the different books, that it bears every indication of having flowed from the pens of the simple-minded, unambitious, uneducated, and honest men to whom it is ascribed. The *sentiments* are such as we cannot suppose men of sufficiently depraved moral habits to act the part of forgers, to have conceived or inculcated. And above all, the *minute circumstantiality* of the narrative is such as, on the one hand, strikingly indicates the agency of an eye and ear witness in the composition of it, and on the other, affords too many tests of the author's personal familiarity with what he narrates, to have been ventured on by a forger. The striking coincidence of one part of the volume with another may also be mentioned as a further evidence of its genuineness.

For these reasons it is concluded, that the Scriptures of the Old and New Testament are the genuine productions of those to whom they are ascribed. They are reasons which must satisfy every person familiar with such inquiries, that we possess in favour of the genuineness of these books a far larger and more unquestionable body of proof, than we have in favour of the genuineness of any of the ancient classics, and indeed of much even of comparatively modern literature.

See on the whole of this section, Horne's Introduction, vol. i. pp. 35–99; Lardner's Credibility, Works, vols. i.–v. 8vo, i. and ii. 4to; Paley's Evidence of Christianity, and *Horæ Paulinæ;* Michaelis's

Introduction by Marsh, vol. i. p. 4–54; Cook's Enquiry into the Books of the New Testament; Taylor's Essay on the Transmission of ancient books to modern times; Schott, *Isagoge*, p. 518–542.

Sect. IV.—*Integrity of the Sacred Books.*

Closely connected with the question of the genuineness of the Scriptures is the question of their *integrity*, or *uncorrupted preservation*. Infidels have often asserted, that extensive and important changes have been made upon the original documents, especially upon those of the Old Testament. But,

1. Of this there is no proof. It is a mere unsupported assertion on their part, resting upon nothing but certain *a priori* conclusions to which they profess to have come, as to the *probability* of such a thing. To prove it, we should require some competent historical testimony to the fact, or an articulate comparison of the alleged interpolations with the original text.

2. Such interpolations could have been perpetrated only by universal consent on the part of all possessing these documents. Had one man altered his own copy, and published his alterations, the only result would have been certain discrepancies between the readings of that family of manuscripts of which his copy was the parent, and those of other families, unless he could have persuaded the whole nation of the Jews, or the entire body of the Christians, as the case might be, to adopt his innovations,—a supposition plainly impossible.

3. Had extensive alterations taken place, the harmony of Scripture would have been destroyed. A number of separate books are written by different persons, for the purpose of unfolding under different aspects and modifications one harmonious system of truth. The result is a harmonious work. But some person, for purposes of his own, sets about interpolating these books. Is it conceivable that this should have been accomplished with such exquisite skill and adroitness, that the original harmony of the work should have been preserved, and all vestiges of a spurious intermixture concealed?

4. It is morally certain, that previous to the Christian era, the Jews did not alter their sacred books. For this we have sufficient security in the habits and circumstances of the people. The Bible was their national statute-book; on it the whole of their civil economy, and all their political and judicial procedure, rested. They were in the habit of giving the utmost publicity to its contents; kings were required to study it continually, priests were appointed to teach it to the people, and fathers were enjoined to inculcate it upon their children, so that the idea of connivance among the members of any class in the community for the purpose of falsifying it is entirely precluded. Their law contains a solemn prohibitory statute against any, the slightest, alterations of these books, Deut. v. 2, xii. 32. The rival sects which arose among them after their return from Babylon served the same purpose, by acting as mutual checks upon each other. And, finally, in the absence of any censure by our Lord upon the Jews, whose crimes he faithfully exposed, for their treatment of the sacred text, and in his continual references to the Old Testament in the state in which it was then extant, as containing an accurate record of God's will, we have the best assurance that no liberty affecting its perfect integrity had been taken with it previous to his advent.

5. Since the commencement of the Christian era, it is equally certain that no intentional corruption of the Old Testament Scriptures can have taken place. The *Jews* have not corrupted them, for they have ever shown too deep a reverence for every word and letter of these books to have done so; they have been too much scattered and disunited to have agreed upon any such attempt; they would not have left so many statements condemnatory of themselves and favourable to Christianity had they set about altering their own Scriptures; and they have since that time been so much under the eye of Christians, that any such attempt on their part would immediately have been detected and denounced by the latter. *Christians* have not done it; for, to say nothing of the fact, that hardly any Christian has been sufficiently master of the Hebrew language to execute skilfully any such alterations, the attempt on their part to do such a thing would have been immediately discovered and exposed by the Jews.

6. As impossible is it that any corruption has taken place in the Christian Scriptures. It is plain that this could not have occurred during the lives of their authors, nor whilst the autographs of their works were extant. But in some cases before, and in others immediately after, the death of the inspired writers, copies of their writings were multiplied to a great extent, and disseminated over the whole Christian world. It could only therefore have been by the general consent of all Christians, that any material alterations could have been made on these writings; for if one sect or party had interpolated their copies, this could not have affected the copies of others, and would have been detected and denounced by them. But the idea of a general consent of Christians in all parts of the world to falsify their own documents, is one too extravagant to be admitted.

7. The agreement of versions and of manuscripts, both of the Old Testament Scriptures and of the New, is a corroborative evidence of their integrity. The number of early versions is considerable, and among them so great a harmony prevails, that it is undeniable they must have been made from a common original, and that that original must have been the same as we now possess. The same conclusion is attested by the agreement of the manuscripts. Of these nearly 1150 containing the whole or parts of the Old Testament, and about 700 containing the whole or parts of the New Testament, have been collated, without any material discrepancy having been elicited (1); a fact which is utterly irreconcileable with the supposition of any designed interpolations having been so much as attempted by any class or party, either of Jews or of Christians (2).

Sect. V.—*Credibility of the Sacred Scriptures.*

That these books, in their narrative parts, contain statements of actual facts, is sufficiently established by various considerations.

1. The things narrated are such as their writers were fully competent to attest. For the most part they were eye and ear witnesses of what they record; and where this was not the case, they were placed in circumstances the most favourable for gaining information from first sources as to the facts they narrate. They are, in fact, with one or two partial exceptions, what very few of the ancient historians are, annalists of their own times.

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[1] Rosenmüller observes respecting the codices of the Old Testament, "Ii qui hodie exstant codices omnes ita inter se conspirant, ut ex aliquot centenis variis lectionibus vix una deprehendatur quæ sensum mutet. Circa unam duntaxat vel alteram litteram, Vocalem vel Accentum versantur. Quod quidem argumento est, Veteris Testamenti libros, prouti eos nunc legimus, ex unius, quam dicunt, recensionis codicibus ad nos transmissos esse, atque omnes codices, antiquiores æque qui perierunt, ac recentiores quos habemus tanquam a communi fonte fluxisse." (*Præf. ad Edit. Stereotypam Hahnii Bib. Heb.* p. iv.) Language no less strong may be justly held regarding the New Testament.

[2] See Horne's Introduction, vol. i. pp. 100–108; Michaelis's Introduction, vol. i.; Walton, *Prolegom.* vii.; Nolan's Inquiry into the Integrity of the Greek Vulgate, London, 1815; [Bentley's] Remarks on Freethinking by Philoleutherus Lipsiensis, No. xxxi.–xxxiii; Dr J. Pye Smith's Answer to the Manifesto of the Christian Evidence Society, 4th ed., and Rejoinder to Taylor, 2d ed. London, 1830; Ernesti's Principles of Biblical Interpretation, translated by Charles H. Terrot, vol. ii. pp. 1–24, Edin. 1833.

2. The matters which they record were such as they could not possibly be deceived about. They are such as any man with the use of his senses, and an ordinary portion of discrimination, was as fully competent to judge of as the most profound philosopher. The passage of the Red Sea, for instance, or the re-appearance of our Lord after his death, was a fact respecting which no man in his senses could be deceived. Unless the sacred writers were the wildest enthusiasts (of which, however, no trace is discoverable in any other part of their conduct, but the contrary), they could not have been misled into the belief that they had seen such things, if they had not seen them.

3. The blameless character and disinterested fidelity of these witnesses show that they were not themselves deceivers. The mind of man is subject to certain laws, upon which we may calculate with the same security as upon the laws of matter; and one of these is, that no man of generally irreproachable character will deliberately and pertinaciously propagate a falsehood, save under the influence of very strong temptation. Now the sacred writers were men of blameless character, so that if their narrative be false, it can only have been under the stress of very urgent necessity or sinister inducement that they can be supposed to have promulgated it. But where was this stress in their case? What evil had they to shun, what prodigious advantage to gain, by falsehood? On the contrary, did not their adherence to their story expose many of them to the severest privations and the cruelest sufferings, even to death itself? Do men, then, ever so fall in love with falsehood as to consecrate their lives to its propagation, and willingly to endure every species of contumely, persecution, and oppression, rather than relinquish it? Would not such a thing be a moral miracle, infinitely more incredible than any of those which the sacred writers narrate, because, unlike theirs, performed not only without the affirmation of divine agency, but in direct opposition to the law of the God of truth?

4. Their narratives were published at a time when the events they record were so recent that it outrages all probability to suppose, either that they would have had the audacity to publish what was false, or that their falsehoods would have been allowed to descend to posterity uncontradicted. Who can for a moment imagine, that had the Israelites not crossed the Red Sea in the manner described by Moses, he could have persuaded them to believe that they had? or that the facts of our Lord's history could have been palmed upon the world when there were so many still alive both interested in and competent for their refutation, had they not really occurred?

5. These histories account satisfactorily for numerous undeniable facts that are otherwise unaccountable, such as the existence and present state of the Jews, the existence and propagation of Christianity, and the prevalence of certain rites and ceremonies among Jews and Christians, such as circumcision in its religious aspect, the weekly Sabbath, the Lord's Supper, &c. They further tally with the testimony of profane history, in as far as the field is common to both. They "interweave themselves," as Dr Channing has well observed, "with real history so naturally and intimately, as to furnish no clue for detection, as to exclude the appearance of incongruity and discordance, and as to give an adequate explanation, and the only explanation, of acknowledged events of the most important revolutions in society." That such narratives should be fictitious, the same writer justly concludes, "is a supposition from which an intelligent man at once revolts, and which, if admitted, would shake a principal foundation of history." Discourse on the Evidences of Revealed Religion, p. 34, 4th (English) edition, Liverpool, 1831.

6. The credibility of the sacred historians is strikingly confirmed by the traditions and histories of all the ancient nations, by many facts of natural history, and by numerous monuments of human art which are still existing, such as coins, medals, and inscriptions.

See Faber's *Horæ Mosaicæ*, vol. i.; Bryant's Antient Mythology, three vols. 4to, 1774; Edwards on the Truth and Authority of Scripture, vol. i.; Gray's Connection of Sacred and Profane Literature; Lardner's Credibility, and Jewish and Heathen Testimonies, &c. Works, vol. i.-viii.; Redford's Lectures on the Divine Authority of the Bible, as confirmed by Science, History, and Human Consciousness, 1837; Horne's Introduction, vol. i. 116–20.

SECT. VI.—*Canon of the Sacred Scriptures.*

The Greek word *ϰανων* signifies originally a *straight line* or *rod;* hence tropically a *rule*, and hence a *list* or *catalogue*, as that which contains the rule or order of the things contained in it.

In this last sense it is applied to the Scriptures, but with a different reference, according as it is used in inquiries of a dogmatical or in inquiries of a historico-critical nature. In the former, it means the list of books deemed *inspired;* in the latter, the list of books recognised as *genuine* by Jews and Christians. In either case, such books are opposed to those that are *apocryphal* (ἀποκρυφα, "ea scripta quibus *publice* ecclesia non utebatur, sed *privatim* habebat legebatque qui vellet." *Ludovicus Vives ad Augustin. de Civ. Dei*, l. xv. c. 23.).

In regard to the sacred writings, both these lists are so far identical, that all the books which are found in the former are found also in the latter.

An ancient and not improbable tradition represents Ezra as the person who formed the Jewish canon in its present state; but this can only mean that he made it up as far as the books composing it were written in his day. It is generally supposed that Nehemiah, who is said to have collected a βιβλιοθηκη of the sacred books (2d Macc. ii. 13), and Malachi, the last of the prophets, closed the canon by adding to it their own writings; though some affirm that the list was not finally made up until about the time of the Syrian invasion under Antiochus Epiphanes, in the third century B. C. Certain it is that by that time all the books now extant had been composed and arranged in their present order, as they not only were then translated into Greek, but are spoken of by Jesus Siracides, who lived about two hundred years B. C., as divided into three classes, and as of considerable antiquity.

At what time the canon of the New Testament was made up we have not the means of accurately determining. We are sure, however, that from a very early age these writings were collected, and were referred to in their collected character, as the received documents of the Christian community. Tertullian does so repeatedly in his writings, denominating them sometimes "the New Testament," and sometimes "the Divine Instrument," in the singular number. The collection was doubtless made gradually; and from what we learn from Eusebius respecting a distinction between books ὁμολογουμενα and books ἀντιλεγομενα (*Hist. Ecclesias.* lib. iii. c. 25, ed. Heinichen, vol. i. p. 244), it would appear that the claims of every book were carefully weighed before its canonicity was admitted.

See Cosin's Scholastical History of the Canon of the Holy Scripture, London, 1672; Jones's New and Full Method of Settling the Canonical Authority of the New Testament, Oxford, 1798; Alexander' Canon of the Old and New Testaments Ascertained, London, 1828; Ch. F. Schmidtii *Historia Antiqua et Vindicatio Canonis Veteris et Novi Testamenti*, Lipsiæ, 1775; Haenlein's *Einleitung in die Schriften d. N. T.*, bde. i. s. 341, Erlangen, 1801; Henderson's Lectures on Inspiration, lect. ix.

The apocryphal books of Scripture may be divided into two classes, the one containing those that are simply dogmatically, the other those that are both dogmatically and historico-critically apocryphal. To the former belong the books of Maccabees, Wisdom, Ecclesiasticus, and perhaps those of Tobit and of Judith, which are genuine, though not inspired; to the latter all the rest of the apocryphal books, both of the Old Testament and the New, none of which are inspired, or can be shown to be genuine.

Horne's Introduction, vol. i., Appendix, p. 457; Rainold, *Censura Librorum Veteris Testamenti Apocryphorum*, 1611; Bretschneider, *De Libri Sapientiæ*, &c. 1804; Josephus, *Cont. Apionem*, i. 8; Hieronymi, *Præfat. in libb. Salomonis, et in Judith et Tobiam*

SECT. VII.—*History of the Original Text of the Old Testament Scriptures.*

The history of the Hebrew text may be divided into three great epochs. The *first* of these reaches from the completion of the Alexandrian Greek version to the times of Origen, Jerome, and the Talmud, B. C. 300—A. D. 500. During this period the use of the Greek version had very much superseded, even in Palestine, the original Hebrew; but ample compensation for this has been rendered by the aid which the existence of this and of other versions has afforded the critic in settling the Hebrew text. Important service was rendered by Origen's critical revision of the Greek, and Jerome's revision of the Latin versions. Nor were the Jews behind the Christians in this respect, for we find from the Talmud evidence that already had various readings begun to be collected by them.

In the *Talmud, Hierosol. Tract. Thaanit.* fol. lxviii., it is said of certain various readings, that "they have come down from the times when the temple was yet standing." Capelli *Critica Sacra*, tom. i. p. 444-458; Waltoni *Prolegom.* viii. § 20–28; Kennicott, *Dissert. Generalis*, p. 275; Horne's Introduction, vol. ii. p. 35, 36.

The *second* epoch reaches from the times of Jerome and the Talmud to that of Ben-Asher and Ben-Naphthali, that is, from the sixth to the eleventh century. About the commencement of this period the Masorah, or collection of traditionary observations, orthographical, critical, grammatical, and exegetical, which had been accumulating for upwards of three centuries among the Jewish rabbin, was made by a college of learned Jews at Tiberias in Palestine. To this mass of scholia additions were continually made, as well as corrections proposed on it, by the *Lords of the Masorah* (בעלי המסורה), as they were called, until the time of Jacob Ben Ha-yim, by whom the whole was completed and printed along with the Hebrew text in the year 1526. The commencement of the eleventh century is memorable in the history of the Hebrew text, from the circumstance of two recensions having been issued by the heads of two celebrated Jewish academies; by Aaron Ben Asher, principal of the academy of Tiberias, and Jacob Ben Naphthali, principal of the academy of Babylon. These have given rise to the various readings denominated the occidental and the oriental respectively. By them also the last hand was put to the pointing of the Hebrew text.

Capelli *Crit. Sacra*, t. i. p. 439–443; Simon, *Histoire Critique*, ch. i. p. 24–26; Kennicott, *Dissertationes*, ii. p. 279; Buxtorf, *Tiberias*, 1610; Marsh's Lectures, lect. viii. ed. 1828; Walton, *Prolegom.* viii.; Horne, vol. ii. p. 39, 40.

The *third* epoch reaches from the beginning of the eleventh century to the middle of the eighteenth. About the year 1040 many learned Jews, banished from the east, took refuge in Europe, and brought with them their Scriptures and their critical learning. Maimonides, Jarchi, Ebenezra, Kimchi, and others, rendered additional service as to the interpretation, so also to the criticism, of the sacred text. In the thirteenth and fourteenth centuries Todrosius, Menachem, and Sal. Norzi, collected various readings. In 1477 the first scriptural book in Hebrew, in 1488 the entire Hebrew Bible for the first time, was printed; the latter at Soncino, the former at some place unknown. Of great importance is the so-called *Rabbinical Bible*, printed at Venice in 1526, and edited by Ben Ha-yim. Among Christian editors, Sebastian Münster was the first who issued an edition of the Hebrew Bible, with various readings, Basil, 1535. The editions of Jablonski, Berlin, 1699, and of Van der Hooght, Amsterdam, 1705, are worthy of notice as critical editions. John Henry Michaelis published his edition at Halle in 1720, for which he collated five manuscripts and nineteen editions. In 1753, at Paris, appeared the edition of Charles Francis Houbigant, for which twelve manuscripts were collated, but the value of which is greatly impaired by the editor's propensity to conjectural emendation, and by his attaching such undue importance to the readings of the Septuagint. The splendid work of Kennicott (Oxford, t. i. 1776, ii. 1780) presents the largest mass of various readings yet collected; but the want of scientific discrimination as to their relative value has impaired the usefulness of the collection. The same may be said of the various readings collected by De Rossi, Parma, 1784–1788.

Marsh's Lectures, lect. ix.; Horne, ii. p. 41, 42; Augusti, *Einleitung*, s. 85–92.

SECT. VIII.—*History of the Original Text of the New Testament Scriptures.*

In regard to the *Greek* text of the New Testament, the first thing to be considered is the variety of opinion among critics respecting the different *recensions*, as they have been termed, or *classes* of documents containing the original text. Of these documents, some more, and others less, closely resemble each other as respects the nature and selection of their readings, and not unfrequently traces of a common origin in the older codices and versions are apparent. This has led to the idea of arranging these into *classes*, or *families*, or *recensions*, an idea first started by Bengel and Semler (1), and which has been carried out by several more recent inquirers. Bengel concluded that there are two families of manuscripts, the African and Asiatic, of the former of which the Alexandrian manuscript is the sole representative (with which agree the Ethiopic, the Coptic, and the ancient Latin versions), whereas the latter is very numerous. After Bengel came Griesbach (2), who contended for a threefold recension, the Western, the Alexandrian or Eastern, and the Constantinopolitan or Byzantine. Of these, the two former are the oldest, and are by him attributed to the same age. They differ, in that the Western text is more replete with Hebraisms, with explanatory additions, and with occasional substitutions of a perspicuous formula for one more difficult; whilst the Eastern prefers those readings that are accommodated to the classic Greek, corrects phrases that are less pure, and is less deformed by errors of the transcriber, though particles and synonyms are occasionally omitted through haste. The Constantinopolitan has arisen from the mingling of the readings of the other two. It properly consists of *two* recensions; a senior (fourth century), even more fond of pure Greek forms, and richer in glosses, than the Alexandrian itself; and a junior (fifth or sixth century), which appears to have been formed after a new collation of the senior with the Eastern and Alexandrian recensions, by the labours of some learned men of the Syrian Church. Griesbach defends his system with great learning and ingenuity; but it is open, as Schott observes, to the following objections: 1*st*, His positions respecting the origin assigned to both recensions are destitute of a solid basis; 2*dly*, Many reasons concur to prevent our admitting that any state of the text of the New Testament peculiar to the Western Church, such as could from its singular character be entitled to the name of a recension, existed (3); 3*dly*, The features of the text followed by the very ancient Peschito version cannot well be accounted for on the principles of Griesbach; and, in fine, all who seek accurately to arrange codices, versions, and extracts found in the fathers, according to different recensions, labour under this difficulty, that none of those documents of the New Testament which are of great age exhibits any such pure and perfect recension (4).

1. Bengel, *Apparatus Criticus ad Novum Test.* p. 425, Tubingæ 1763; Ejusdem *Introductio in Crisin N. T.* § 26, &c., p. 385, Tubingæ, 1734; Semler, *Vorbereitungen zur Hermeneutik*, Halle, 1760–1769.

2. Griesbach, *Opuscula Academica*, ed. Gabler, vol. i.

3. From the writings of the fathers of the second century, we learn that those various readings which are said to be peculiar to the western and to the eastern texts respectively, do not, as respects their *origin*, belong to different recensions. (See Eichhorn, *Einl.* bde. iv. p. 265 and 269, &c.) Nor is it probable that the doctors of the Western Church, who were but little skilled in Greek, should have thought of preparing a recension of the New Testament.

4. Schott, *Isagoge*, p. 562–565.

A different theory of recensions has been adopted by Hug. He thinks that the text which we find in those early codices which Griesbach referred to the Western recension, in the oldest Latin versions, in the Sahidico-Coptic version, in the quotations of the fathers till the time of Origen, and in Origen himself, was the κοινὴ ἔκδοσις, or common edition, conformed to no recension in particular, and containing various readings of different sorts and of different origins mingled together, especially such as serve to explain the text. At the same time those codices which were written in Syria and other parts of the east (the inhabitants of which understood better than most others the Hebræo-Greek dialect of the New Testament) preserved the primitive text more correctly; and hence it happened that the oldest Syriac version, though upon the whole belonging to this common edition, not unfrequently dissents from the readings of the other documents of the same edition. About the middle of the third century, Hesychius, an Egyptian bishop, first set about correcting the errors of the recension of the common edition used in Egypt, purging out all interpolations and glosses, restoring words that had been omitted, but aiming too much at producing a text that should be remarkable for its Greek purity and elegance. Almost at the same time, Lucian, a presbyter of Antioch, in Syria, revised the common edition as it appeared in the Peschito version, following chiefly the authority of this version, but at the same time comparing other codices found in Syria, and produced a text differing from that of Hesychius in this, that it showed less desire to amend the Greek of the New Testament. Besides these, a third recension was undertaken by Origen in Palestine, based upon the common edition used by the Christians there, which conformed in some respects to that of Hesychius, in others to that of Lucian, whilst frequently it differed from both, and which subsequently became the one commonly used in Palestine and the adjoining districts. Of these recensions none is preserved in any of those documents which we now possess, as the transcribers frequently compared their recension with the common edition and with other recensions. Hug's theory rests so far on an historical basis, that it appears certain that Hesychius and Lucian did undertake some such labour as he ascribes to them; but that codices of their recensions were either very numerous or very widely disseminated, cannot be shown. The labour attributed to Origen is more than doubtful.

Hug, *Einleitung*, bd. i. s. 126 (Eng. Trans. vol. i. p. 134, &c.); Schott, *Isagoge*, p. 566; Horne, ii. p. 56

Matthæi thinks that no recensions of the text of the New Testament were anciently made, and he prefers dividing the documents from which the text is to be determined, into, 1*st*, *Codices textus perpetui*, in which there are neither scholia nor commentaries, and which excel all the others in the purity of the text they exhibit; 2*d*, *Lectionaria*, which contain the lessons read in churches, and exhibit a text less free from scholiary interpolation than the preceding; 3*d*, *Codices mixti*, which contain scholia and interpretations partly on the margin, but chiefly interpolated. Matthæi thought the Moscow manuscripts, which he had himself diligently collated, the best; and this perhaps led him to a very unjust estimate of the worth and authority of many other documents of the text of the New Testament.

Schott, *Isagoge*, p. 570; Horne, ii. p. 50.

Scholz, the most recent editor of the Greek New Testament, adopts neither the opinion of Griesbach nor that of Hug. He concludes that there are two classes of critical witnesses for the text of the New Testament, the Alexandrian and the Constantinopolitan; to the former of which belong all the codices executed in Egypt and western Europe, the most of the Coptic and Latin versions, the Ethiopic version, and the quotations by ecclesiastical writers of these districts; and to the latter all the codices written in Asia Minor, Syria, Palestine, and eastern Europe, the Philoxenian Syriac version, the Gothic, the Georgian, the Sclavonian, the quotations by the fathers living in these regions, and all printed editions. To manuscripts of the latter class he attributes superior value, because of their greater harmony, and of their having been more faithfully copied from original documents than those of the former, which often exhibit a text altered at the will of grammarians. A twofold difficulty presses upon this theory of Scholz; for, first, the Western text of the New Testament has a character considerably different from that of the Alexandrian; and, secondly, the text divulged at Constantinople by order of Constantine and Constans was, as Scholz himself admits, collated with the Alexandrian text, so that the readings of both recensions were intermixed. It is, moreover, rather assumed than proved that that form of the text which, during the first three centuries, prevailed in Asia Minor and Greece, was the same which was afterwards divulged principally in the Constantinopolitan codices; nor is it sufficiently clear that Alexandria was the primary seat of the arbitrary corruption of the New Testament text.

Scholz, *Proleg. ad editionem N. T.* vol. i.; Schott, *Isagoge*, p. 570; Horne, ii. 58–66.

The theory of Eichhorn is that which perhaps approaches nearest the truth. He grants, that from a very early age, different readings, derived from various sources, existed, and were vastly augmented in the third century by various efforts of an exegetical nature, so that as early as the second century there were two species of texts, the Asiatic and the African, but neither of them was determined by any very certain critical laws. He denies that Origen was the author of a peculiar recension, but admits the services of Hesychius and Lucian in this respect, although he questions the possibility of ascertaining accurately the primitive character of either recension from ancient documents. There thus arose a threefold text of the New Testament, the African (Alexandrian), the Asiatic (Constantinopolitan), and a Mixed, which had its source from this, that many, notwithstanding the authority acquired by the recensions of Hesychius and Lucian in the churches of Africa and Asia, preferred following the authority of older codices. No change of a critical kind took place upon the text thus formed until editions of the New Testament began to be printed. No opinion so fully accords with what may be regarded as best ascertained as this of Eichhorn, though it is still doubtful whether the efforts of Hesychius and Lucian exerted a very wide or lasting influence upon the form of the text of the New Testament.

Eichhorn, *Einleitung in das N. T.* bd. iv. s. 183, &c.; Schott, *Isagoge*, p. 572, from which work the above account has been principally taken; Horne, ii. p. 57.

With the exception of some detached portions, the first printed editions of the New Testament were those of the Complutensian Polyglott, 1514, and of Erasmus, Basil,

1516. The next possessing any critical value were those of Robert Stephen,[1] viz. that of 1546, 12mo, commonly called, from the first words of the preface, the "*O Mirificam*" edition, that of 1549, 12mo, and that of 1550, folio. Beza was the first to issue an edition of the New Testament with a copious critical apparatus; and his edition many of the minor editions for several years followed. The beautiful editions of the Elzevirs, which conform partly to the text of Stephen, partly to that of Beza, became so famous that they formed what has been called the *textus receptus*. In 1707 the edition of Mill was published at Oxford, in which not only is there a larger collection of various readings furnished, but also a more scientific discrimination of these aimed at, than in any preceding edition. His example was followed by Bengel in Germany and Wetstein in Holland, both of whom have rendered important service to the text of the New Testament. All these, however, have been outstripped in diligence, learning, and acuteness, by Griesbach, who issued his first edition, which embraced only the historical books of the New Testament, at Halle, 1774–75. In the mean time, the researches of Matthæi, Alter, Birch, and others, had greatly enlarged the mass of materials for a critical revision of the New Testament, and of these Griesbach eagerly and ably availed himself in preparing a critical edition of the whole New Testament. This he published in two volumes large octavo, the former in 1799, and the latter in 1806, at Halle. Subsequent editors have chiefly followed the scheme of this recension, at the same time exercising their own judgment upon the readings it supplies; but recently Professor Scholz of Bonn has issued a new recension, for which he has subjected most of the manuscripts already used to a new collation, and collated some not hitherto examined. It appeared in two vols. 4to, in 1830–36, at Leipzig. A beautiful and exceedingly useful edition of the New Testament has been recently issued in this country by Dr S. T. Bloomfield, formed upon a careful collation of all previous critical recensions; the third edition, two vols. 8vo, appeared at London in 1839.

Marsh's Lectures, lect. iii.–vii.; Schott, *Isagoge*, pp. 631–642; Horne's Introduction, vol. ii. part ii. pp. 11–35; Michaelis, Introduction, by Marsh, vol. ii. p. 159 and 429; Ernesti's Principles of Interpretation, vol. ii. p. 47.

Sect. IX.—*Manuscripts of the Sacred Text.*

Hebrew manuscripts are of two classes, *the rolled* and *the square*; the former prepared for the use of the synagogues, and written only on parchment; the latter for private use, and written sometimes on parchment and sometimes on paper. In all the ancient manuscripts the words are written continuously without any division, and in the square Chaldaic character. They are divided by De Rossi into three classes, viz. 1. *The more ancient*, or those written before the twelfth century; 2. *The ancient*, or those of the thirteenth and fourteenth centuries; 3. *The more recent*, or those written at the end of the fourteenth or beginning of the fifteenth century. The number of manuscripts collated by Dr Kennicott was about 630, and by De Rossi 479.

Kennicott, *Dissert. Generalis*; Tychsen, *Tentamen de variis Codd. Heb. MSS.* 1772; Horne, vol. ii. p. 76–90.

Manuscripts of the Greek New Testament were written first on Egyptian papyrus, and then, as this was found too subject to decay, on skins. Subsequent to the twelfth century, silk paper was used for this purpose, until the thirteenth century, when common (linen) paper came into use (1). For the first eight centuries the manuscripts were written in uncial letters, large, erect, and not united either by strokes or hooks. From the beginning of the ninth century the cursive letters were employed, which are smaller, more inclined, and united with strokes; they have, moreover, the iota subscribed (2). At first all the words were written without any diacritical marks or separations; but as this was found inconvenient, and productive of mistakes, especially in the public reading of the New Testament, a plan was introduced to remedy it by Euthalius, then a deacon at Alexandria, in the fifth century, which consisted in so arranging those words that make one sense, as that they should compose one stich (στιχον) or line (3). To save room, subsequent transcribers, instead of arranging these in distinct lines, marked the conclusion of each by a colon or point; and thus by degrees arose a complete grammatical punctuation, which is presented in manuscripts from the tenth century downwards, though it was not till the sixteenth century that it was subjected to fixed rules in the editions then printed. From a very early period the custom prevailed of dividing the text into sections (κεφαλαια), but until the time of Euthalius no uniform order was observed in this respect. About the middle of the third century, Ammonius of Alexandria, in preparing a Diatesseron or Harmony of the Evangelists, divided the text into a number of very short sections; and these having been adopted with slight variations by Eusebius (4) (whence they are frequently denominated κεφαλαια *Ammoniano-Eusebiana*), they were in many manuscripts conjoined with the Euthalian divisions. In the sixth century, some finding use for a division of the text into larger portions, introduced the arrangement by τιτλοι or *breves*; but in the course of time these two modes led to so much confusion, that in the thirteenth century Hugo de Santo Caro, a Spanish cardinal, introduced as a remedy the division into chapters and verses, which was afterwards perfected by Robert Stephen into that now in use. Besides these divisions, there was another for church purposes into περικοπαι, ἀναγνωσεις, or ἀναγνωσματα, containing the sections of the New Testament appointed for lessons in the public service of the church on Sundays and festivals. The commencement of each of these was marked with an α (ἀρχη), and the close with a τ (τελος) (5).

1. Montfaucon, *Palæographia Græca*, p. 15.
2. *Ibid.* pp. 151–177, 269, 33, 134.
3. Zacagni *Collectanea Monument. Vet. Eccl. Græcæ*, 1698, tom. i. p. 403, &c.; Eichhorn, *Einleit*, bd. iv. p. 164; Marsh's Notes to Michaelis, vol. i.
4. See Mill's New Testament, p. 181.
5. Marsh's Michaelis, vol. ii. p. 889 et seq.; Horne's Introduction, vol. ii. p. 71; Schott, *Isagoge*, p. 577–584.

These historical facts are of service in determining the age of the New Testament codices. These are very numerous, but the most famous of them alone required to be enumerated. Very few of them contain the whole of the New Testament. They are arranged as follows.

1. *Manuscripts executed before the stichometric mode of writing was prevalent*, viz. the Cod. Alexandrinus (A[2]), Vaticanus (B), Ephræmi (vel Cod. Regius 9, G), Dublinensis rescriptus (Z).

2. *Stichometric Manuscripts*, viz. Cod. Cantabrigiensis (vel Cod. Bezæ, D), Laudianus III. (E), Claromontanus (D, inter Cod. Paulinos), Bœrnerianus (G, inter Cod. Paulinos), Augiensis (F, inter Cod. Paulinos), Coislinianus (H).

3. *Manuscripts written after the disuse of the stichometric method.* These are very numerous. The most valuable

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[1] This is commonly written *Stephens*, but the correctness of this may be questioned. The French *Etienne*, which was the vernacular name of this illustrious family, is equivalent to our *Stephen*, and the proper Latin form of Stephens would be *Stephanius*, and not *Stephanus*.

[2] These letters refer to the nomenclature of the manuscripts adopted by Griesbach and Wetstein.

are the following, viz. Cod. Cyprius (olim Colbertinus, K); Basiliensis, b. vi. 21 (E); Basiliensis, b. vi. 27 (vel Reuchlinianus); Stephani Octavus (L); Winchilseanus (106); Regius (M); Mosquenses Bibliothecæ S. Synodi, iv. v. xliii. xcviii.

Schott, *Isagoge*, p. 591–599; Horne, Introd. vol. ii. p. 111–196; Hug, *Einleit.* [Eng. trans. vol. i.].

SECT X.—*Ancient Versions of the Sacred Scriptures.*

These may be arranged either with respect to their history, as *Immediate* and *Mediate*, according as they have been made directly from the originals or from other translations; or with respect to the languages in which they exist, as *Oriental* and *Occidental*. We shall follow the latter arrangement, as the more convenient; at the same time intimating, when it is possible, what place each version has in the former.

I. ORIENTAL VERSIONS.—1. *Chaldaic Targums.* After the return of the Jews from Babylon they brought with them so much of the language of Chaldæa, that they were unable to understand their own Scriptures. Hence arose the necessity of accompanying the reading of these in the synagogues with an interpretation; a practice first introduced by Ezra (Nehem. viii. 8), and which continued to be followed as long as the Jewish service was maintained. These interpretations were at first merely oral, and confined to a literal version of the original into the popular dialect; but gradually they became more paraphrastic, and the idea naturally arose of committing the more valuable of them to writing. From this sprung the Chaldaic Targums, or paraphrastic versions of the Hebrew Scriptures. The oldest now extant is that of Onkelos on the Pentateuch, composed according to some in the first, and to others in the third century of the Christian era. It is the least paraphrastic, and the most correct, of any we possess. Next in point of age and value is that of Jonathan Ben Uzziel on the Prophets. The Jews make him a disciple of Simeon, who took our Lord in his arms; but the probability is that he was later. His Targum is more diffuse and paraphrastic than that of Onkelos, but contains much that is valuable. Both of these are printed in Walton's Polyglott. The remaining Targums, nine in number, are of comparatively recent date, and of little value. Their renderings are very harsh; and they are filled with idle and foolish fables.

Winer *De Onkeloso ejusque Paraphrasi Chaldaica*, Lips. 1820; Jahn's *Einleitung*, i. § 46, 47; Bauer, *Chrestomathia e Paraphrasibus Chaldaicis et Talmude delecta*, 1792; Horne, vol. ii. p. 198.

2. *Syriac Versions.* Eight versions of the whole or parts of Scripture into the ancient Syriac tongue are known to critics, but of these only two deserve particular notice. These are, 1. *The Peschito*, that is, *right* or *correct*, not later than the third century, probably as early as the second. It contains the whole Bible, is pure in diction and faithful in version, and appears to have been made immediately from the original. 2. *The Philoxenian*, so called from Philoxenus, bishop of Hierapolis, under whose direction it was executed by Polycarp, rural bishop of the same district, A. D. 508. It contains only the New Testament, and is literal to servility; but its renderings are not good. Its chief value is to the critic, in helping him to judge of various readings.

Hirzel *De Pentateuchi Vers. Syr. indole*, Lips. 1825; Michaelis, Introd. vol. ii. p. 4–76; Horne, vol. ii. p. 220.

3. *The Samaritan Pentateuch.* This must not be confounded with "the Pentateuch of the Samaritans," which is merely a copy of the original Hebrew in Samaritan characters; whereas the other is a translation of the Hebrew into the Samaritan dialect. This version bears a strong resemblance to the Targum of Onkelos, and even some have deemed it a translation of that. It is probably, however, from the original, but cannot be dated earlier than the second century.

Winer *De Versionis Pent. Samarit. indole*, Lips. 1817; Horne, ii. p. 42; Gesenius *De Pent. Samarit. origine, indole, et auctoritate*, Halæ, 1815.

4. *Other Oriental Versions.* These are, 1. *The Coptic*, embracing the *Memphitic*, or that in the dialect of Lower Egypt, probably of the third century, published by Wilkins at Oxford in 1716; and the *Sahidic*, or that in the dialect of Upper Egypt, ascribed to the second century, and, with the exception of a part of the Gospel of John, still existing only in manuscript: 2. *The Ethiopic*, ascribed to the fourth century, and printed in Walton's Polyglott, but with many inaccuracies: 3. *The Armenian*, made by Miesrob in the beginning of the fifth century, very faithful, but supposed to be in many places interpolated from the Vulgate: 4. *The Arabic*, comprising the Pentateuch, and Isaiah, translated by Rabbi Saadias Phijumensis, in the tenth century, the Pentateuch in Samaritan-Arabic by Abusaïd, the anonymous version of Joshua in the London Polyglott, and the Acts and Epistles published by Erpenius: 5. *The Persic* version of the Pentateuch, by Jacob Ben Joseph, surnamed Dawusi, a learned Jew of the ninth century. All these are mediate versions from the Septuagint or Syriac.

Horne, vol. ii. p. 226–234; Comp. Walton, *Prolegom.* ix.–xv.

II. WESTERN VERSIONS.—1. *Greek Versions of the Old Testament.* The most important of these is the Septuagint, as it is commonly called, or more properly the Alexandrian. Respecting the origin and early history of this version much uncertainty prevails, of which advantage has been taken to clothe the whole in the mist of fable. The common story of Ptolemy Philadelphus having sent, at the instigation of his librarian Demetrius Phalereus, to Judæa for a correct copy of the Hebrew Scriptures, and for seventy-two men of learning (six out of each of the twelve tribes) to translate these into Greek, of his having shut them up in the Isle of Pharos, apart from each other, and of their having produced versions *verbatim et literatim* the same, is now rejected by all scholars. The opinion commonly held by such embraces the following points: 1*st*, That it is highly probable that the work was commenced during the period when Ptolemy Lagus and his son Philadelphus held the joint sovereignty; 2*d*, that the motive prompting to it was the multitude of Jews in Alexandria and throughout Egypt, who were ignorant of Hebrew, and needed the Scriptures in Greek; 3*d*, that it was undertaken under the auspices of the Alexandrian Sanhedrin or council of the Jews, who probably consulted their brethren in Judæa about it, and from whom, being seventy-two in number, in all likelihood the version took its name; 4*th*, that the different books were executed at different times and by different persons, as is evident from the varieties in point of accuracy and purity which they present, the Pentateuch being that first executed; and, 5*th*, that the translators of the Pentateuch were evidently Egyptian Jews, from their introducing into their version many Coptic words, and rendering many Hebrew expressions, not into their Greek equivalents, but so as to give an Egyptian hue to the idea. The version thus executed soon acquired great vogue, not only in Egypt, but also in Palestine, where, in the days of our Lord and his apostles, it had mostly superseded the use of the original Hebrew. In the Christian church it acquired the same reputation. Few of the Fathers understood Hebrew, and consequently almost all their quotations from the Old Testament are made through the medium of the Septuagint. The best editions of this version are those of Grabe, Oxon. 1707, 1709, 1719, 1720, four vols. folio and eight vols. 8vo, reprinted with the addition of various readings from the Vatican manuscript by Breitinger, Tiguri Helvet., 1730–31–32, four vols. 4to; of Bos, Franequeræ, 1709, 4to; and of Holmes, vol. i. Oxon. 1798, vol. ii.–v. (edited after Holmes's death by J. Parsons), Oxon. 1818–1827, folio.

See Aristeæ, *Historia de Legis Div. ex Heb. Lingua in Græcam Translatione per LXX. Interpretes*, Frankfort, 1610; Van Dale, *Dissert. super Aristeam de LXX.*, Amstelod. 1705; Josephus, *Antiq.*, xii. c. 2; Hody, *De Bibliorum Textibus Original.* Oxon. 1705; Walton, *Prolegom.* ix.; Toepler, *De Pentateuchi Interpret. Alexandrinæ indole*, Halæ, 1830; Horne's Introduction, vol. ii. p. 203.

Of the other Greek versions, eleven in number, we have only fragments or traditionary information. That of Aquila, a proselyte Jew of Sinope, a city of Pontus, was executed in the first century, for the purpose of discrediting the Septuagint, which the Christians were in the habit of quoting against the Jews; it is very literal and Hebraistic. That of Symmachus, an Ebionite, time uncertain, seems to have aimed chiefly at elegance and purity of style; it is very free. Between these stands that of Theodotion, also an Ebionite, and nearly contemporary with Aquila; more elegant and idiomatic than that of Aquila, more literal and correct than that of Symmachus. These, with three anonymous versions, enumerated as *editio quinta*, *sexta*, and *septima* respectively, were included by Origen in his splendid work the Hexapla, a sort of Polyglott, which that distinguished Biblical scholar drew up for the use of those who wished to understand accurately the Old Testament, and which contained in parallel columns the Hebrew in the original character, the same in Greek characters, and the Greek versions above enumerated, including the Septuagint. The versions designated as ὁ ἑβραῖος, ὁ σύρος, τὸ σαμαρειτικόν, and ὁ ἑλληνικός, are known to us only from being occasionally referred to on the margins of manuscripts. The extant fragments of these versions may be found in the sixth volume of the London Polyglott, under the title *Flaminii Nobilii Notæ*, and in the edition of the Septuagint by Bos.

Dathe, *Diss. Phil. Crit. in Aquilæ Reliquias*, Opuscula, p. 1, &c. ed. Rosenmüller, 1796; Walton, *Prolegom.* ix.; Horne, vol. ii. p. 216.

2. *Latin Versions*. Translations of the Scriptures into the Latin tongue began to be executed at a very early period, for the benefit chiefly of the Christians in Africa, and those parts of Europe where that language was used. Some have supposed that, as early as the second century, there was a commonly received or authorized version in the Latin churches, but this opinion is hardly tenable. The name *Itala*, which has been supposed to designate this version, was more probably an appellation including collectively the whole. Towards the close of the fourth century, Jerome set himself to revise and correct these versions, and in pursuance of this design issued revised editions of the Psalter, the books of Chronicles, Job, and the writings of Solomon. Unfortunately, the manuscripts containing his revised copies of the other books were lost, either through negligence or fraud on the part of some one to whom he had intrusted them. Satisfied, however, that something more than a correction of existing versions was necessary, he undertook a new translation from the original; and this he executed at intervals, and in the order in which particular books were requested by his friends. At first his undertaking was viewed with no small jealousy, and even St Augustin sought to discourage it, from a fear that a new translation, especially one from the Hebrew, would shake the faith of the ignorant in the certainty of Scripture; nor was it till the sanction of Gregory the Great had been given to it that the version of Jerome was able entirely to supersede the old Itala (1). This version is that commonly denominated the *Vulgate*, of which the Council of Trent decreed an immaculate edition; a decree which gave rise to a Papal dissension, to which Christians have not been slow to point as fatal to the claims of the supreme pontiff to infallibility (2).

1. Augustin *De Doctr. Christiana*, lib. ii. c. 11, c. 15; Jerome, *Præfat. in Iobum, &c. ad Sophron.* Opp. i. p. 833, *ad Damasum*, ii. 563; Hody, *De Textibus*, &c.; Walton, *Prolegom.* x.; Horne, ii. p. 234–240.

2. See James, *Bellum Papale, sive Concordia Discors Sixti V. et Clementius VIII. circa edit. Hieronymianam*, London, 1600, 4to, 1678, 8vo.

3. *The Gothic Version*. Of this, which was executed by Ulphilas, bishop of the Gothic tribes in Wallachia, about the middle of the fourth century, only the four gospels, part of the Epistle to the Romans, and fragments of the other Epistles, are extant; the first in the famous Codex Argenteus, a manuscript in silver letters of the fifth or sixth century; the second in a Codex Rescriptus belonging to the library of Wölfenbuttel; and the third in certain Codices Rescripti recently discovered by Maio in the Ambrosian Library at Milan. This version appears to have been made from the Greek, and particularly from the Constantinopolitan text, but to have been subsequently altered after the Vulgate. The best edition of the gospels is that of Lye, Oxon. 1750, 4to. The fragments were edited by Knittel, in 1762, 4to, and by Ihre, Upsal, 1763, 4to.

Horne's Introduction, vol. ii. p. 240; Hug's Introduction (Eng. Trans.), vol. i. p. 487; Schott, *Isagoge*, p. 613.

4. *The Anglo-Saxon Versions*. The history of these is by no means accurately known. It appears, that as early as the year 709, the Psalter was rendered into Saxon by Adelme, bishop of Sherborne. A few years later, Aldred, who styles himself "Presbyter indignus et miserrimus," "overglossed in English" the Latin of a copy of the four gospels, which had been written by Eadfrith, bishop of the *church* of Lindisfern, "out-attired, and blazoned as well as he could," by Ethilwold, bishop of the *Land* of Lindisfern, and "smoothed, ornamented, and overgilded," by Billfrith the anchoret (1). Nearly about the same time Beda translated the whole Bible into Saxon-English. About two hundred years after this the Psalter was translated by King Alfred. A Saxon translation of the Pentateuch, Joshua, part of the books of Kings and Esther, is attributed to Ealfric, archbishop of Canterbury, in 995. The entire Anglo-Saxon Bible has never been published. Alfred's Psalter was edited by Spelman in 1640; and a translation of the gospels made from the old Latin of the Itala has been thrice edited (2).

1. See Henshall's Disquisition prefixed to his edition of the Gothic Gospel of St Matthew, with the corresponding English or Saxon, &c. London, 1807, 8vo.

2. Newcome's Historical View of the English Biblical Translations, p. 1, Dublin, 1792; Horne's Introd. vol. ii. p. 246.

5. *The Sclavonic Version*. The authors of this version were Cyrill of Thessalonica, and his brother Methodius, who in the ninth century introduced the gospel among the Sclavonians inhabiting Moravia. It seems to have been made from the Greek, and from manuscripts having the Constantinopolitan text. It embraces the whole Bible, and has been frequently printed.

Henderson's Biblical Researches and Travels in Russia, p. 80–102, Lond. 1826; Horne's Introd. vol. ii. p. 245.

These ancient versions are useful, both to the critic and the exegete; to the former, as supplying not a few various readings which are wanting in all or in most of the codices containing the original text, as serving to determine more accurately the age and country of any particular form of the text, and as helping to confirm or refute particular readings occurring in the Greek codices; to the latter, inasmuch as every faithful version is not only a perpetual interpreter of the sentiments of the original into another tongue, but the authors of these ancient versions, from the time in which they lived, and the locality they inhabited, had peculiar advantages, both philological and historical, for the successful interpretation of the sacred books.

Ernesti's Principles of Interpretation, by Terrot, vol. ii. p. 146.

SECT. XI.—*Quotations by the early Ecclesiastical Writers from the Sacred Scriptures.*

Besides the object to which these have been already applied, as showing the authenticity of the sacred documents, they serve also a useful purpose to the critic, in furnishing him with numerous readings, in assisting to determine the age, origin, and country, of remarkable readings, and in illustrating the whole history of the Greek texts of Scripture. Care, however, must be taken to discriminate between passages quoted freely from memory, or adapted to the construction and sentiment of the writer himself who quotes, and those which are formally cited from the codex. We must also be sure that the work in which the quotation occurs is genuine, and that the common text of the places in which the citation occurs is correct.

Ernesti's Principles of Interpretation, by Terrot, vol. ii. p. 90–113; Schott, *Isagoge*, p. 629.

SECT. XII.—*Laws for the Determination of various Readings.*

1. That reading is to be regarded as true, which is supported by far the greater number of copies and witnesses; but still readings supported by a few books are not entirely to be disregarded, especially when they harmonise with the *usus loquendi* of the author. 2. That reading which the better copies exhibit, unless special reasons prohibit it, is to be preferred to the one which the inferior copies exhibit, although most numerous. Neither the antiquity nor propriety of a reading, solely considered, always proves it to be a true one. 3. That reading which is more harsh, obscure, difficult, unusual, or delicately chosen, if supported by the authority of a proper witness, is preferable to one which is plain, easy, usual, and common. 4. That reading which approaches nearest to the popular and familiar method of speaking, if it be supported by external testimonies, is preferable to one which is more artificial and subtle. 5. The shorter reading, when supported by testimony of importance, and not incongruous with the style and design of the writer, is preferable to a more verbose one. Still there are cases where the more copious reading is to be preferred. 6. That reading which gives the best sense is peculiarly preferable. But to determine this, the nature of the whole passage, and the genius of the writer, not the mere opinions and sentiments of particular interpreters, are to be consulted. 7. The reading which produces an unworthy or incongruous sense is to be rejected. Good care, however, must be taken not to condemn a reading as unworthy or incongruous, which a more correct grammatical and historical investigation would prove to be a true reading, or at least a probable one. 8. A reading which agrees with the *usus loquendi* of the writer, is preferable to that which disagrees with it. It must be remembered in judging here, that the style of an author sometimes varies with increasing age. 9. A reading is to be rejected, in respect to which plain evidence is found that it has undergone a *designed* alteration. Such alteration may have taken place, *first*, from doctrinal reasons, Matthew, i. 18; Mark, viii. 31, xiii. 32: *second*, from moral and practical reasons, Matthew, v. 22: *third*, from historical and geographical doubts, Matthew, viii. 28, comp. Mark, v. 1: *fourth*, from the desire of reconciling passages inconsistent with each other, Mark, viii. 31: *fifth*, from desire to make the discourse more intensive; hence many emphatic readings have originated: *sixth*, from the comparison of many manuscripts, the readings of which have been amalgamated: *seventh*, from a comparison of parallel passages. Corrections of the more celebrated manuscripts have been sometimes detected. 10. Various readings are to be *rejected* which spring from the mere negligence of copyists, and from those errors which are very common in all kinds of books. To these belong, *first*, the commutation of unusual forms for those of the common dialect; the Alexandrine or common form, however, has the preference over others in the New Testament; and this dialect itself also admitted some Attic forms: *second*, the commutation of single letters and syllables, by an error of either the eye or the ear; the former resulting from obscure and compendious methods of writing, or from the similarity of certain letters, such as Α Δ Λ, Ο Θ, &c.; the latter, from copying after the reading of one who was misunderstood, or who read erroneously: *third*, the commutation of synonyms: *fourth*, from transferring into the text words written in the margin of copies, and thus uniting both readings, James, v. 2: *fifth*, from the omission or insertion of a word or a verse, by an error of the sight: *sixth*, from the transposition of words and passages, whence it may have happened that some error has crept into most of our books: *seventh*, from words which ended with the like sound, or appeared alike; and from proximate words, one ending and the other beginning with the same syllable: *eighth*, from incorrectly uniting or separating words, which naturally resulted, in some cases, from the ancient method of *continuous writing:* and, *ninth*, from an erroneous interpunction and distinction of passages. 11. A reading is to be rejected which plainly betrays a gloss or interpretation. This may be a word or a whole passage. Sometimes these glosses are united to the true text, and sometimes they have thrust it out. All interpretations, however, are not spurious glosses; for authors themselves sometimes add them, in order to explain their own language. 12. Readings deduced merely from versions or the commentaries of interpreters are to be rejected.

The above are taken, with a few slight alterations, from Beckii *Monogrammata Hermeneutices, Lib. Nov. Test.* Lips. 1803, as translated by Mr Moses Stuart in his Elements of Biblical Criticism and Interpretation, London (reprinted with additional observations by E. Henderson, D. Ph.), 1827. See also Michaelis, Introd. vol. i. p. 246–389; Ernesti's Principles of Interpretation, by Terrot, vol. ii. p. 114; Marsh's Lectures, lect. iii.; Horne's Introd. vol. ii. p. 251–260.

For remarks upon particular books of the Bible, see the articles in this work under the names of the different books, or their authors, as PENTATEUCH, MOSES, JOSHUA, PAUL, PETER, &c. (N. N. N. N.)

SCRIVENER, one who draws contracts, or whose business it is to place money at interest.

SCROLL, in *Heraldry*. See that article.

SCRUPLE, SCRUPULUS, or *Scrupulum*, the least of the weights used by the ancients, which amongst the Romans was the twenty-fourth part of an ounce, or the third part of a dram. The scruple is still among us a weight, containing the third part of a dram, or twenty grains. Among goldsmiths it is twenty-four grains.

SCRUPLE, in Chaldæan chronology, is the $\frac{1}{1080}$th part of an hour, called by the Hebrews *helakin*. These scruples are much used by the Jews, Arabs, and other eastern people, in computations of time.

SCRUPLES of half Duration, an arc of the moon's orbit, which the moon's centre describes from the beginning of an eclipse to its middle.

SCRUPLES of Immersion or Incidence, an arc of the moon's orbit, which her centre describes from the beginning of the eclipse to the time when its centre falls into the shadow.

SCRUPLES of Emersion, an arc of the moon's orbit, which her centre describes in the time from the first emersion of the moon's limb to the end of the eclipse.

SCRUTINY (*Scrutinium*), in the primitive church, was an examination or probation practised in the last week of Lent, upon the catechumens, who were to receive baptism on Easter-day. The scrutiny was performed with a great many ceremonies. Exorcisms and prayers were made over the heads of the catechumens; and upon Palm Sunday the Lord's Prayer and Creed were given them, which they were afterwards made to rehearse. This custom was more in use in the Church of Rome than anywhere else, though it appears, by some missals, to have been likewise used, at a much later period, in the Gallican church. It is supposed to have ceased about the year 860.

Scrutiny is also used, in the *Canon Law*, for a ticket or a little paper billet, in which, at elections, the electors write their votes privately, so that it may not be known for whom they vote. Among us the term *scrutiny* is chiefly used for a strict perusal and examination of the several votes hastily taken at an election, in order to find out any irregularities committed therein by unqualified voters.

SCRUTORE, or Scrutoir (from the French *escritoire*), a kind of cabinet, with a door or lid opening downwards.

SCRY, in falconry, denotes a large flock of fowl.

SCUDDING, the movement by which a ship is carried precipitately before a tempest. As a ship flies with amazing rapidity through the water whenever this expedient is put in practice, it is never attempted in a contrary wind, unless when her condition renders her incapable of sustaining the mutual effort of the wind and waves any longer on her side, without being exposed to the most imminent danger of being overset.

A ship either scuds with a sail extended on her foremast, or, if the storm is excessive, without any sail at all; which, in the sea-phrase, is called *scudding under bare poles.* In sloops and schooners, and other small vessels, the sail employed for this purpose is called the *square sail.* In large ships, it is either the foresail at large, reefed, or with its goose-wings extended, according to the degree of the tempest; or it is the fore-top sail, close reefed, and lowered on the cap; which last is particularly used when the sea runs so high as to becalm the foresail occasionally, a circumstance which exposes the ship to the danger of broaching to. The principal hazards incident to scudding are generally a pooping sea; the difficulty of steering, which exposes the vessel perpetually to the risk of broaching to; and the want of sufficient sea-room. A sea striking the ship violently on the stern may dash it inwards, by which she must inevitably founder. In broaching to, that is, inclining suddenly to windward, she is threatened with being immediately overturned, and, for want of sea-room, she is endangered by shipwreck on a lee-shore.

SCULPONEÆ, among the Romans, a kind of shoes worn by slaves of both sexes. These shoes consisted only of blocks of wood made hollow, like the French sabots.

END OF VOLUME NINETEENTH.

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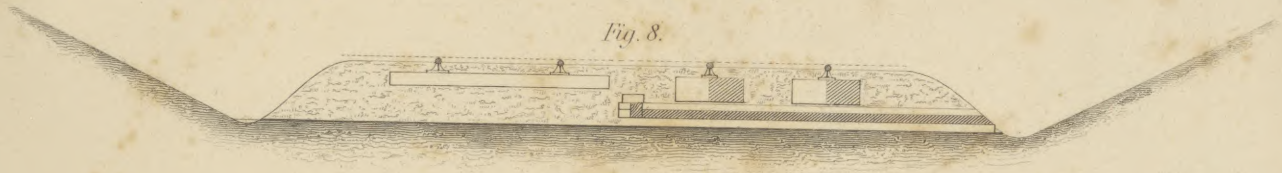
RAILWAY.

PLATE CCCCXX.

Fig. 8.



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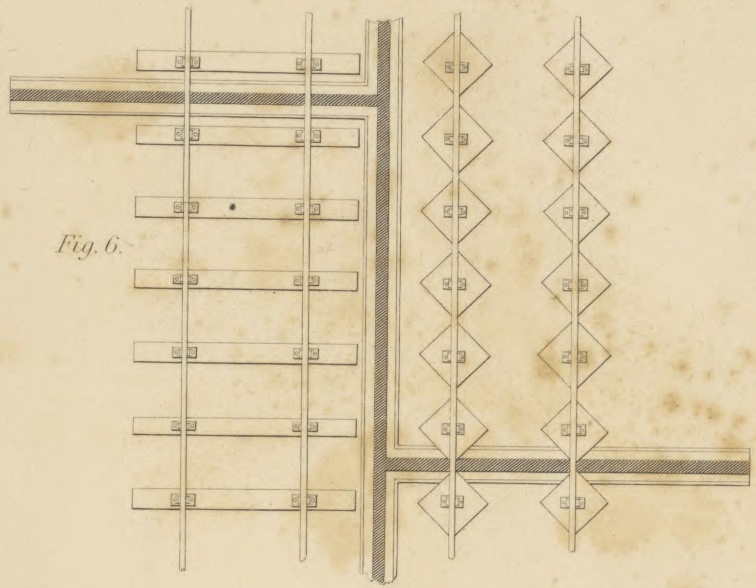

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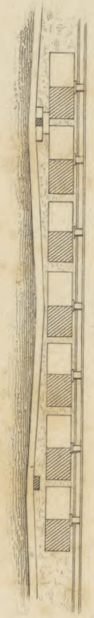

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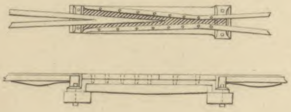

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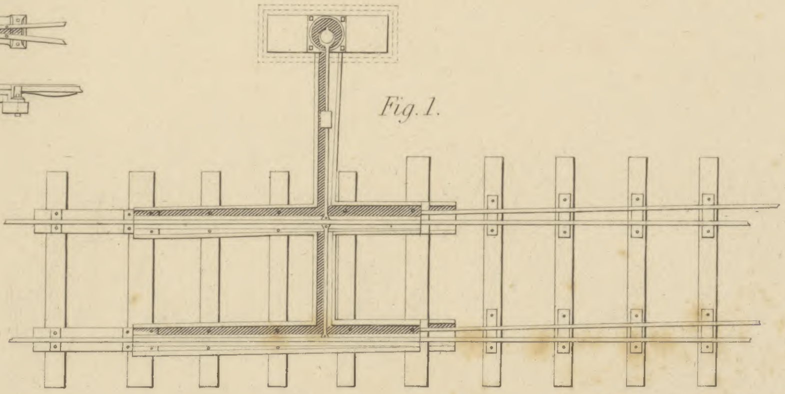

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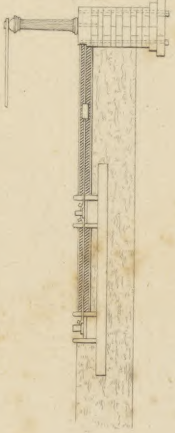

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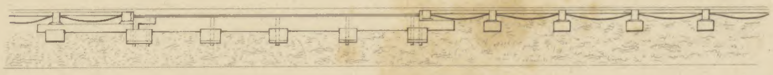

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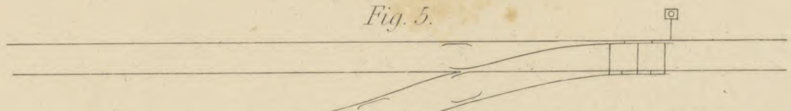

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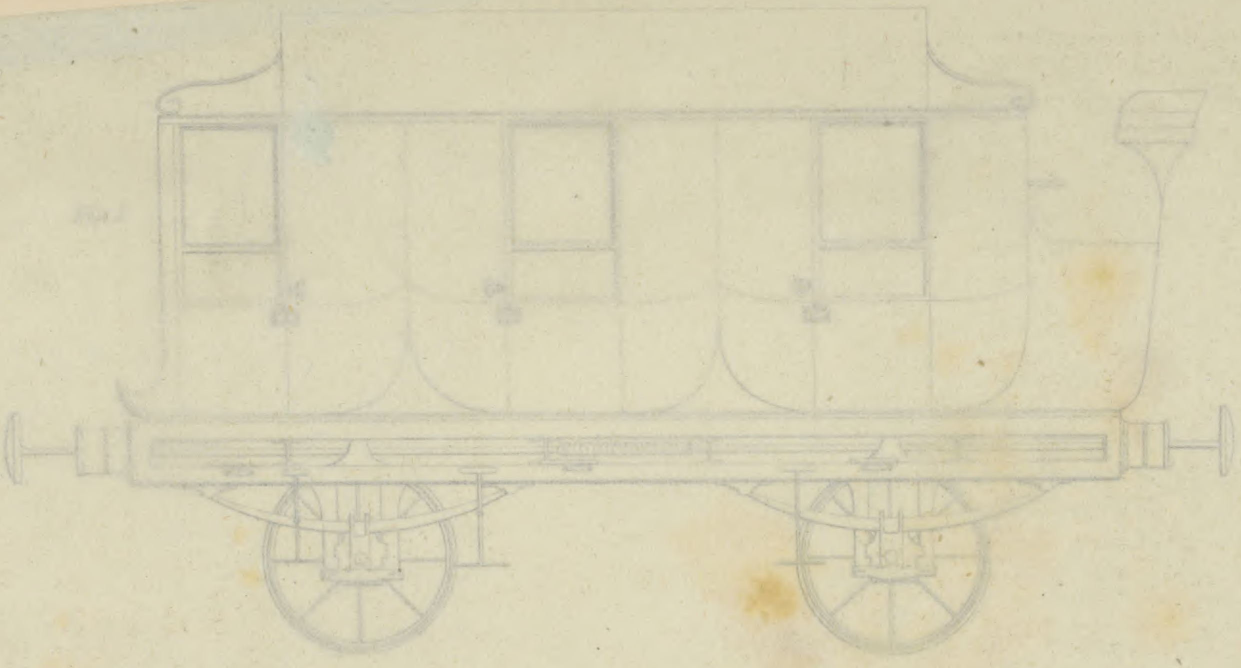

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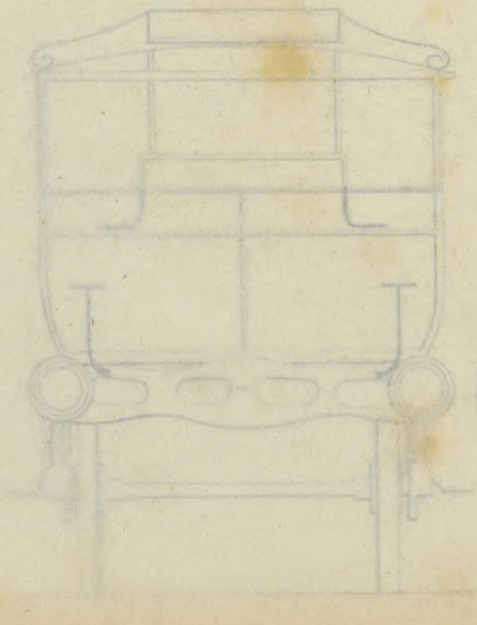

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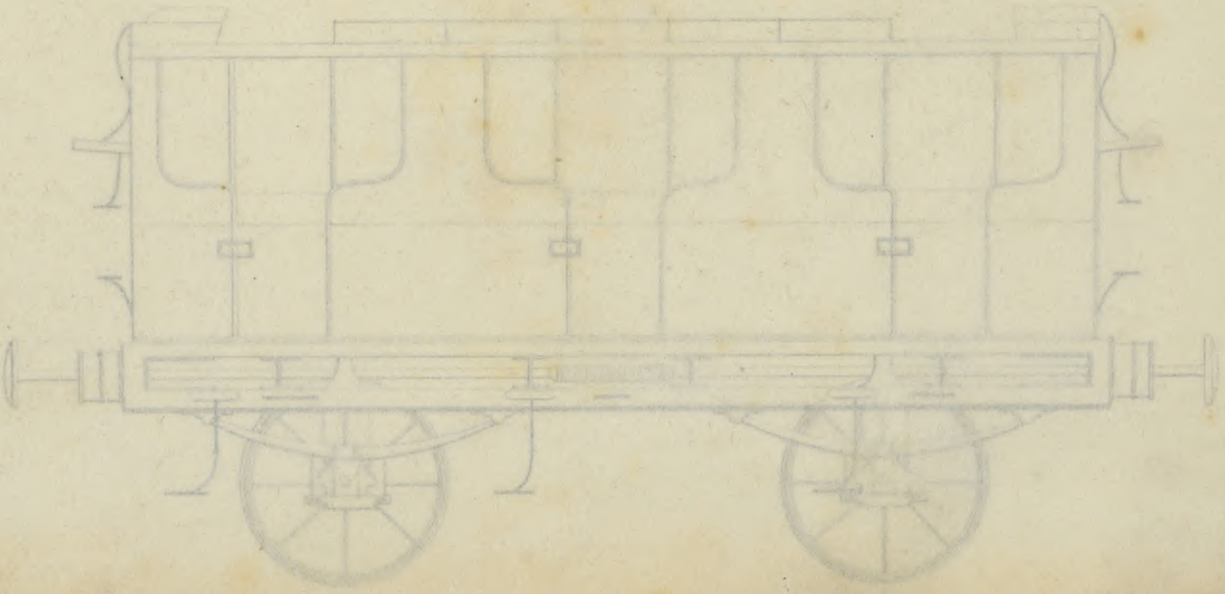

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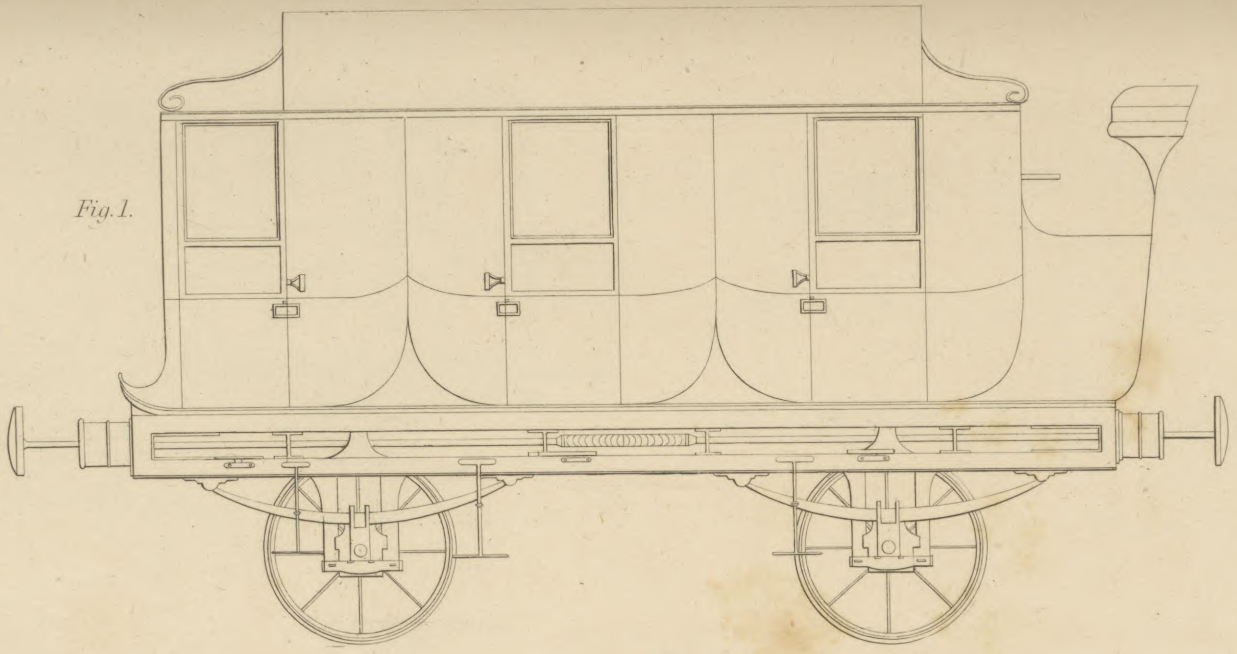

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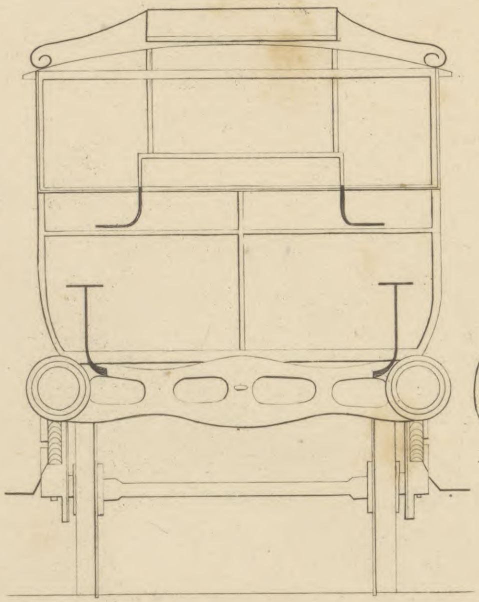

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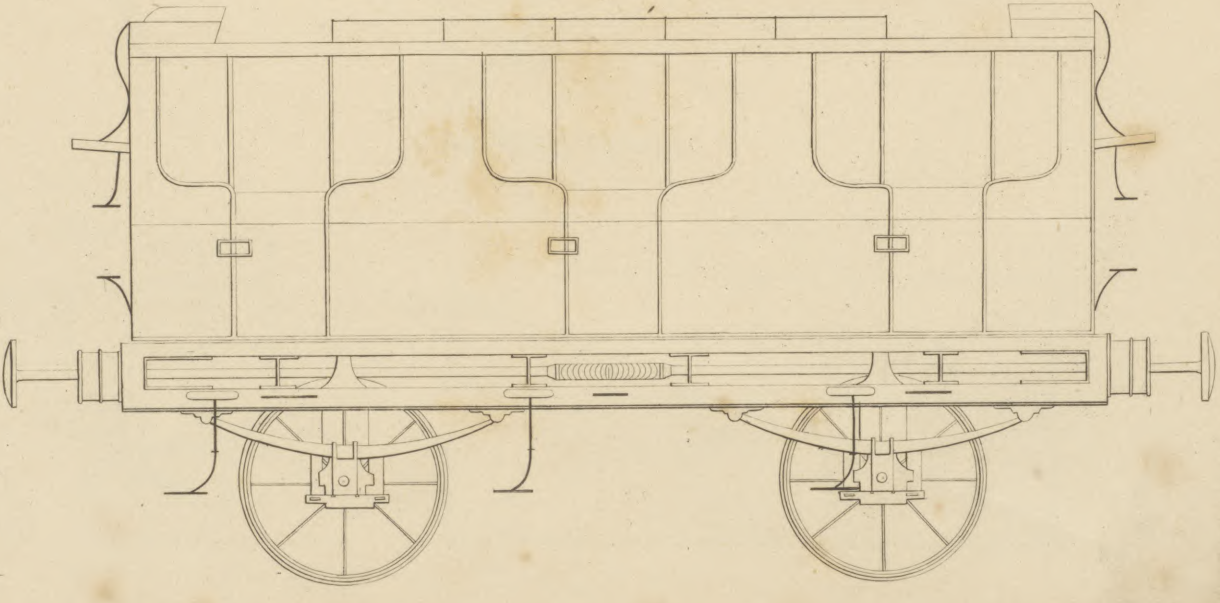

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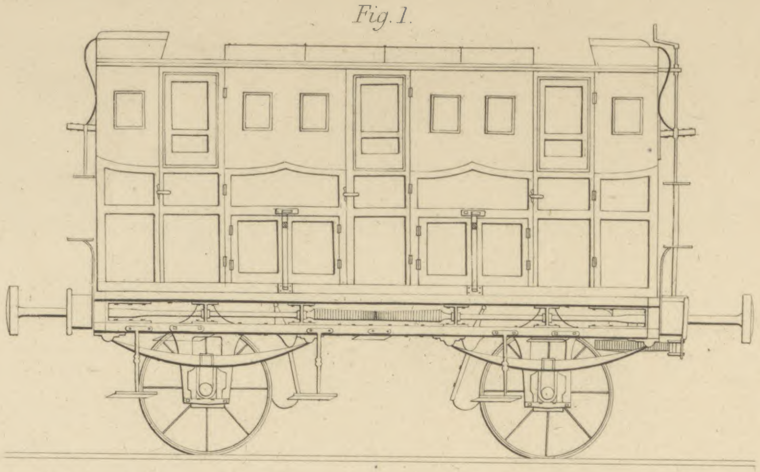

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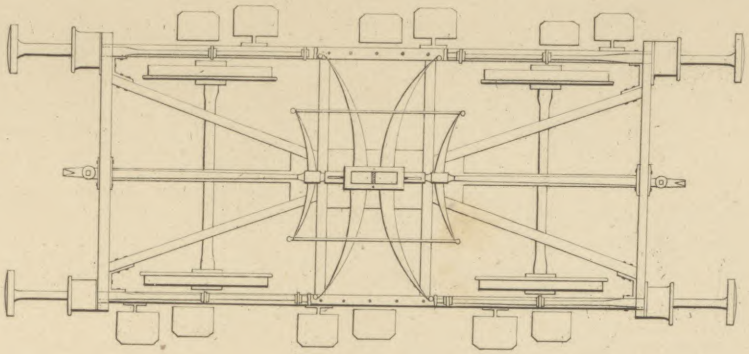

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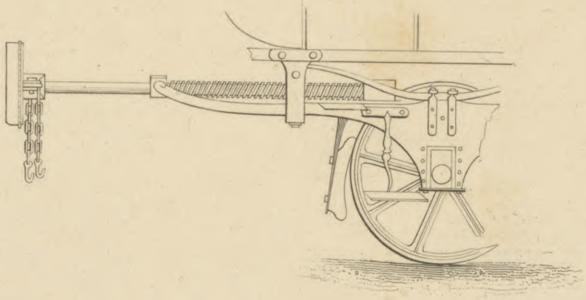

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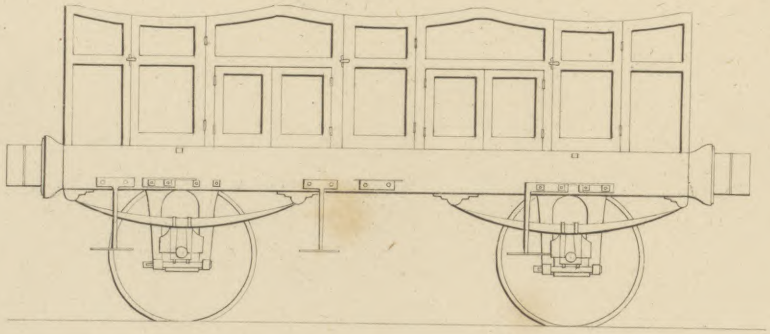

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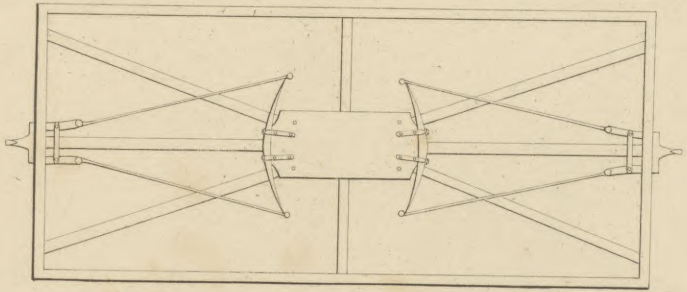

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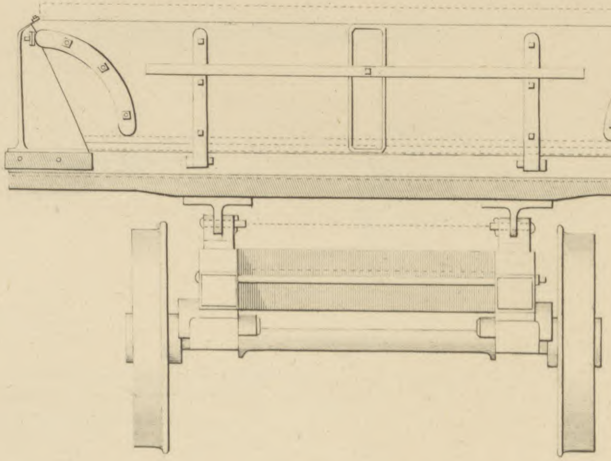

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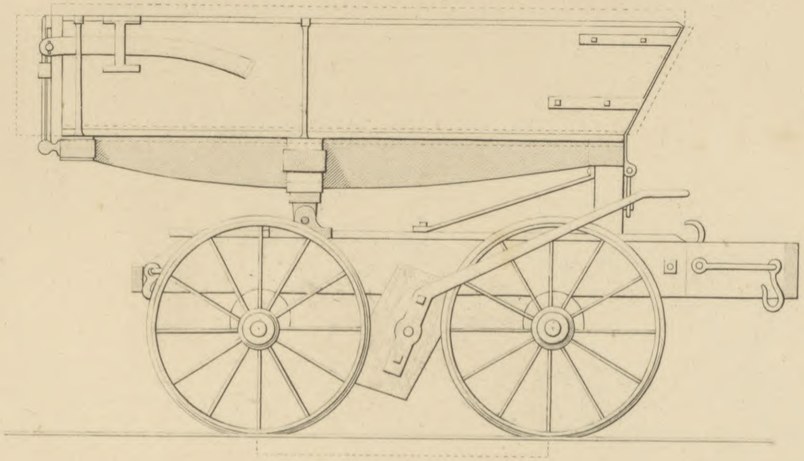

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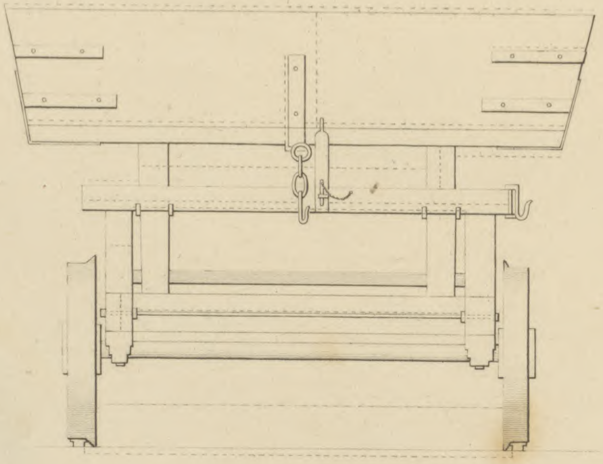

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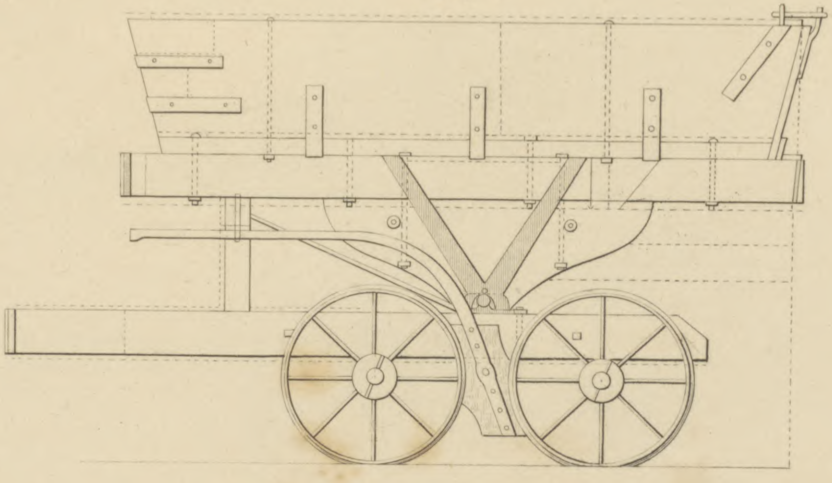


Lt Lecount, R.N. Delt

Geo. Aikman, Sculpt

Henry Rolfe, Del.t

Fig. 4.

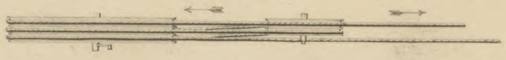


Fig. 5.

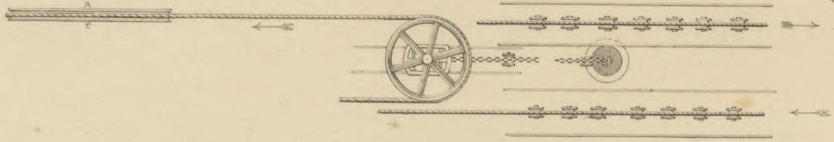


Fig. 3.

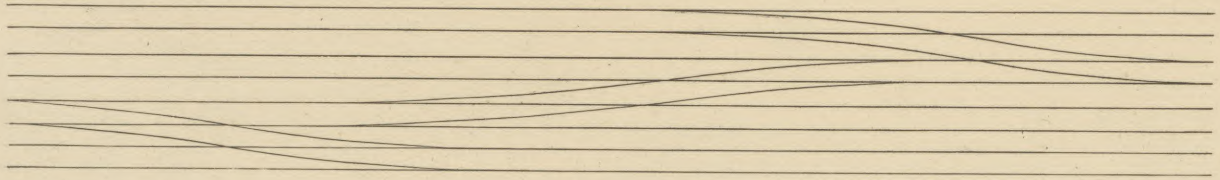
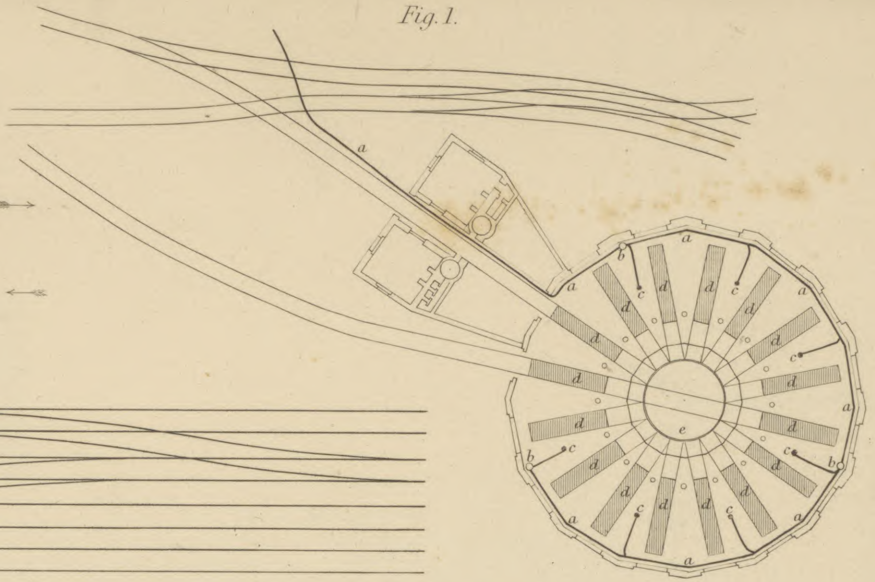


Fig. 1.



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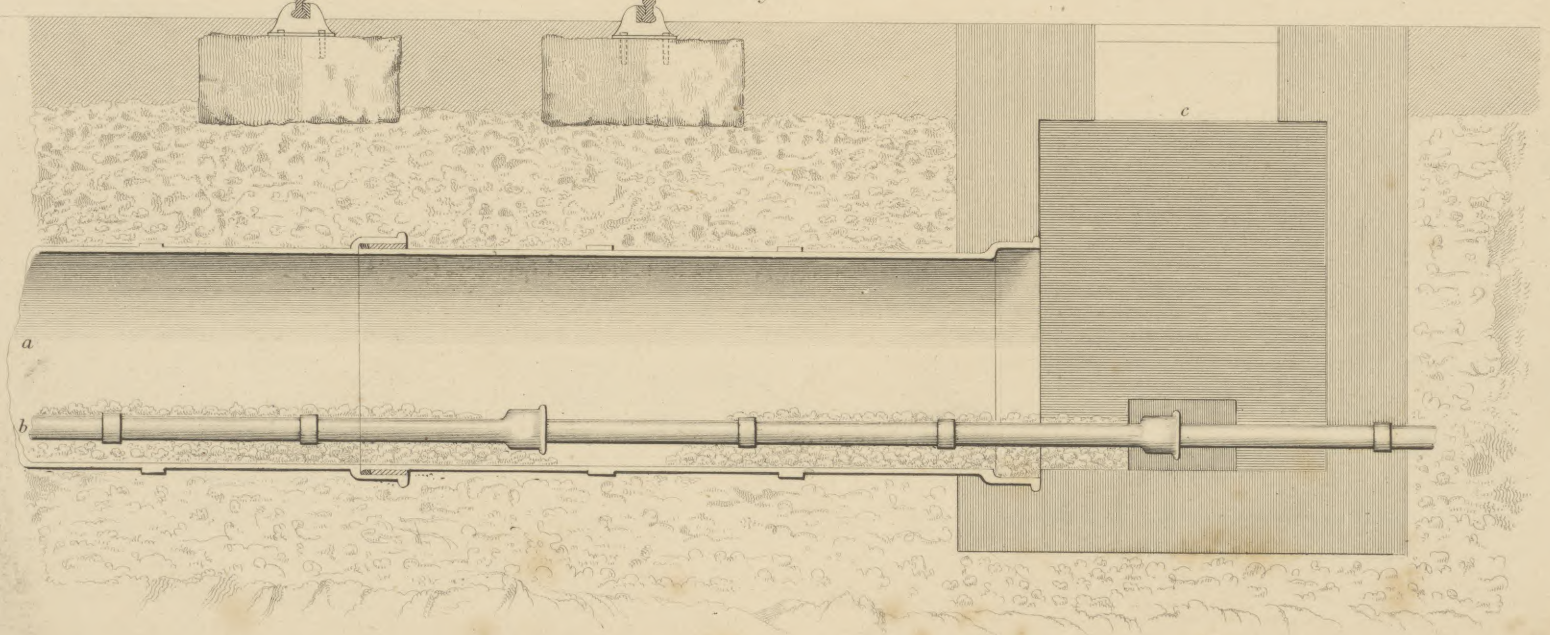
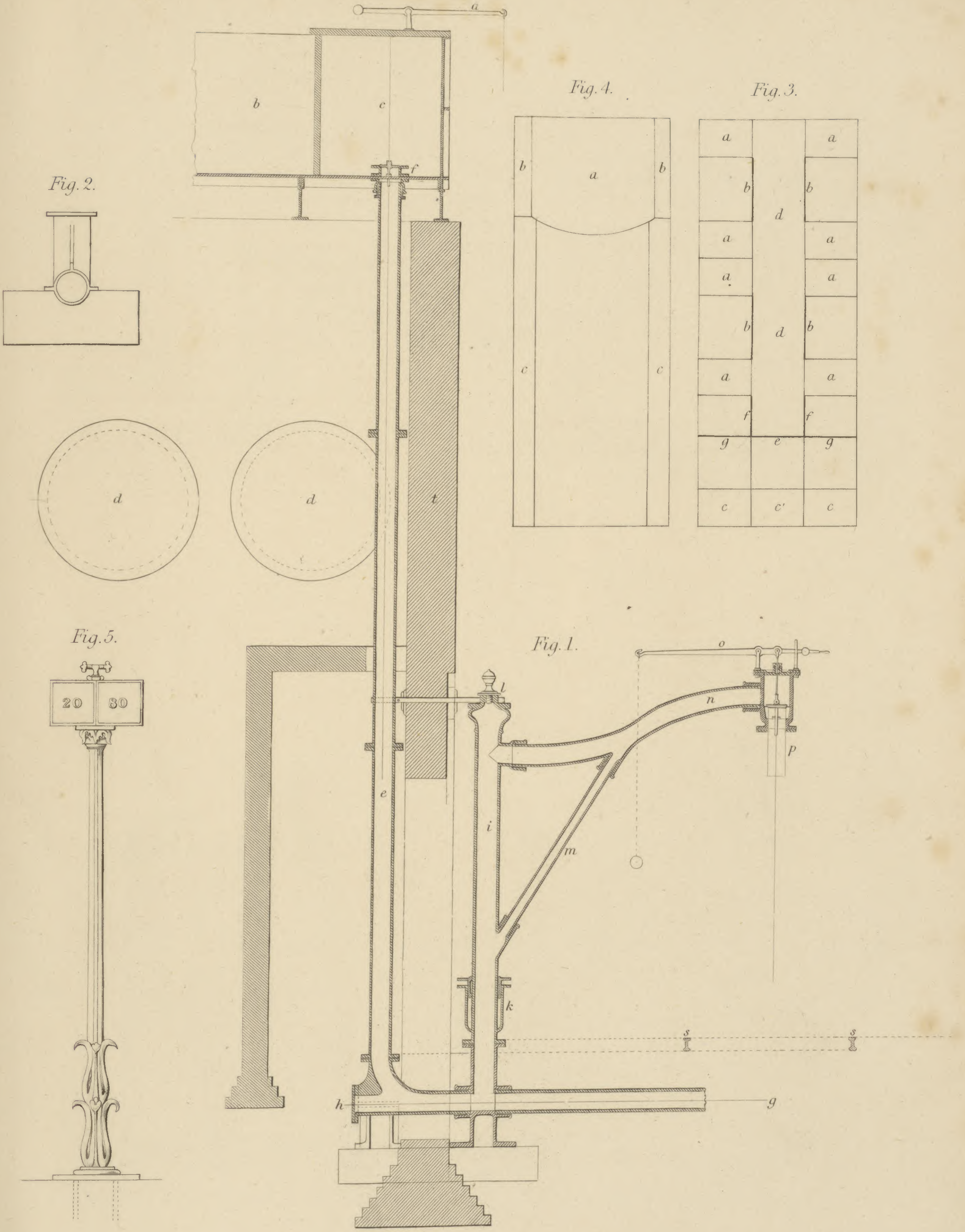


Henry Roſe, Delt

Geo. Aikman, Sculpt



Lecount R.N. Delt
Geo. Aikman, Sculpt

RAILWAY. PLATE CCCCXXVI.

Fig. 2.

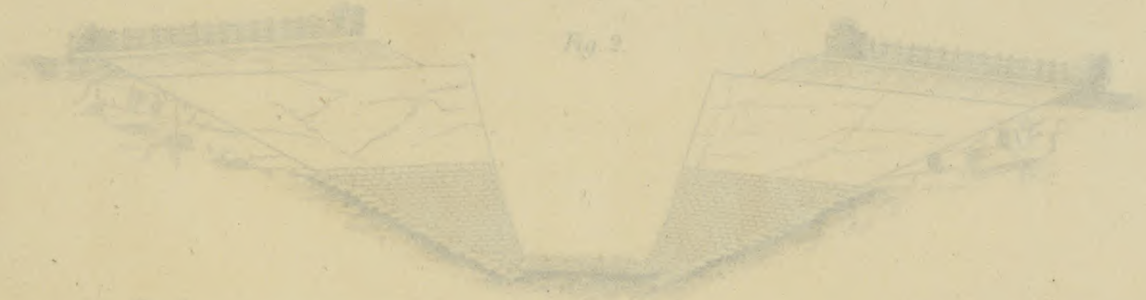
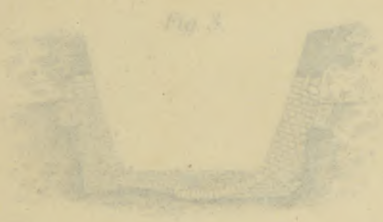


Fig. 3.



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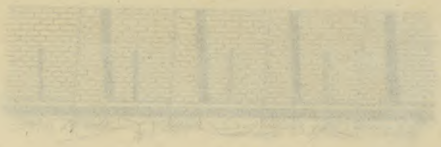

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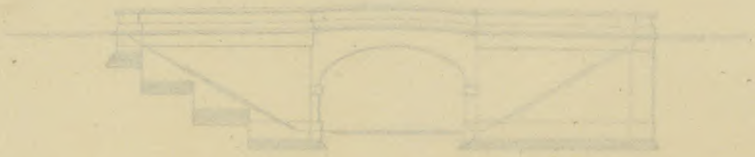

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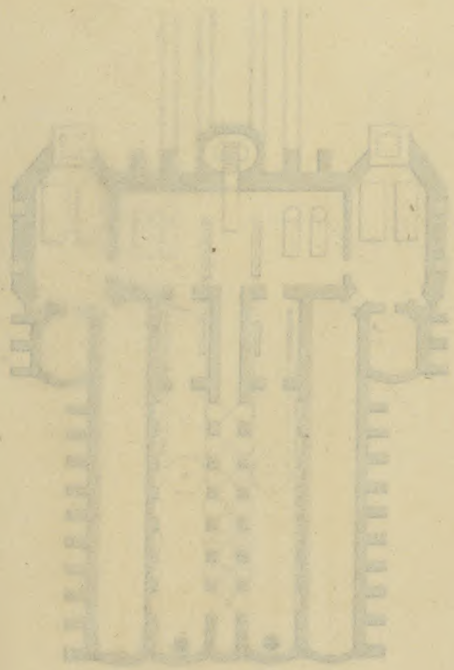
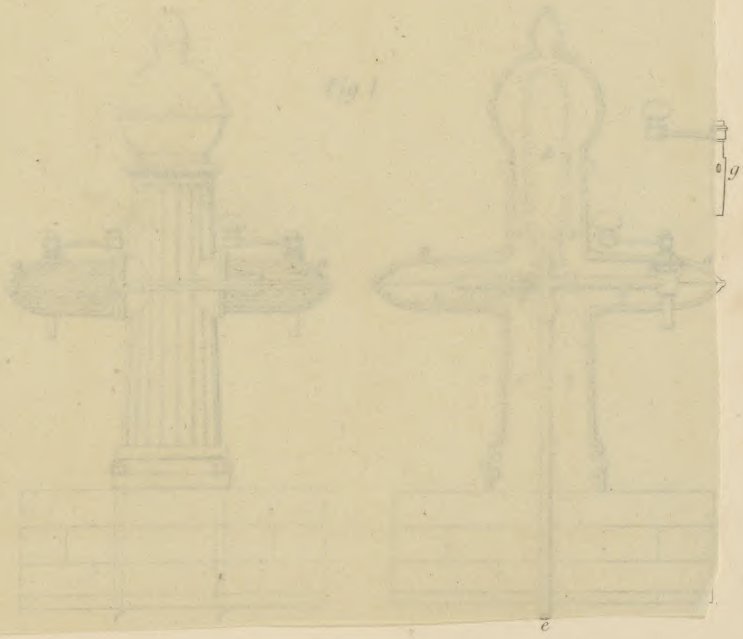


Fig. 1.



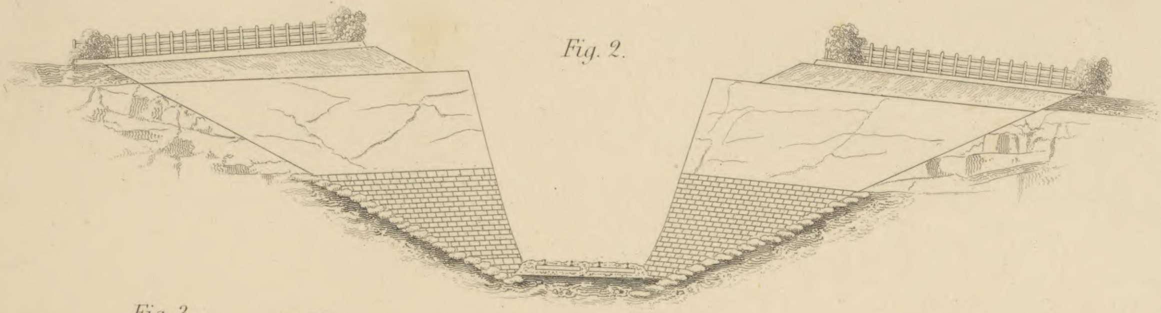
J. Taunton, Delt.

Geo. Aikman, Sculpt.

RAILWAY.

PLATE CCCCXXVI.

Fig. 2.



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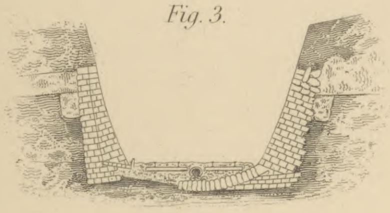


Fig. 4.

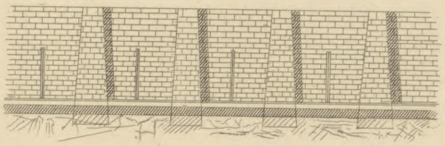


Fig. 5.

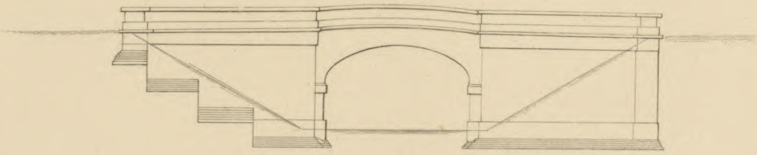


Fig. 6.

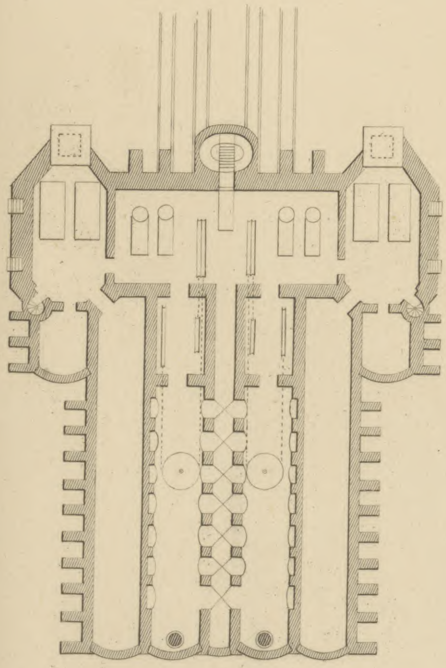
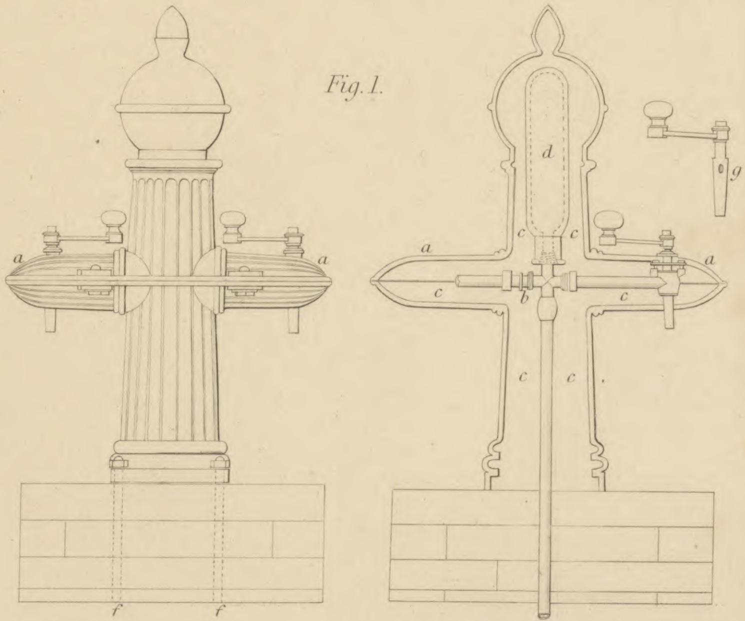


Fig. 1.



unton. Delt.

Geo. Aikman, Sculpt.

Fig. 2.

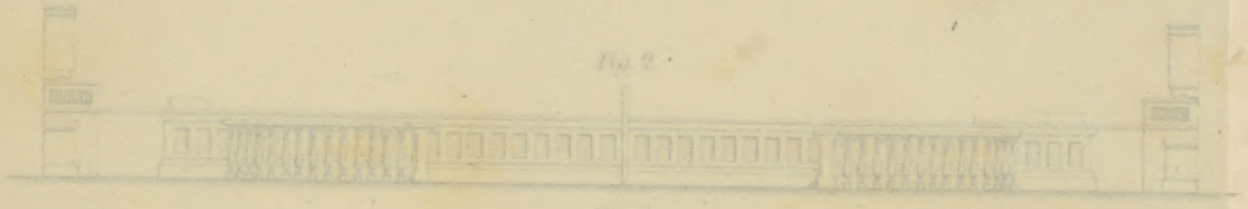


Fig. 3.

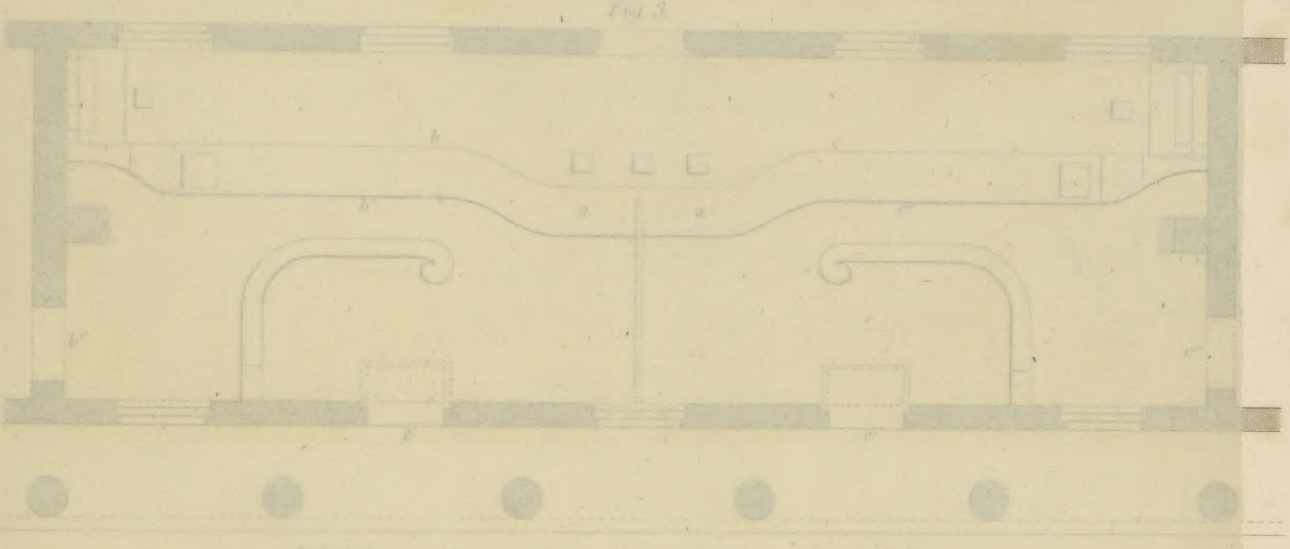


Fig. 4.

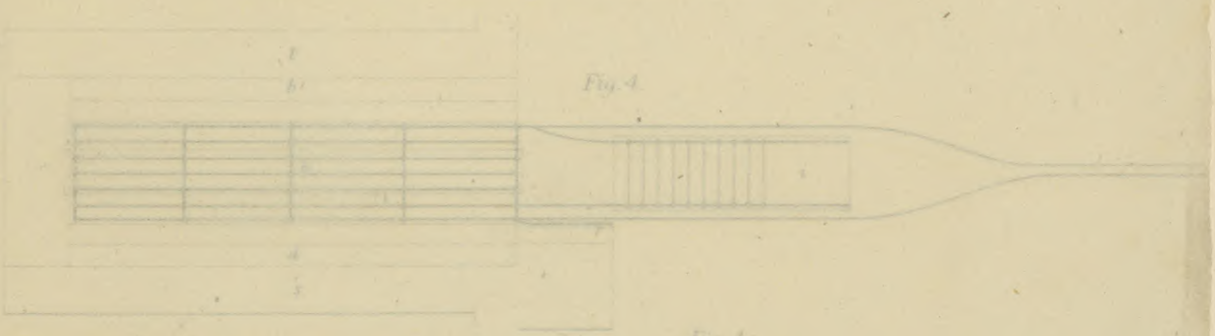
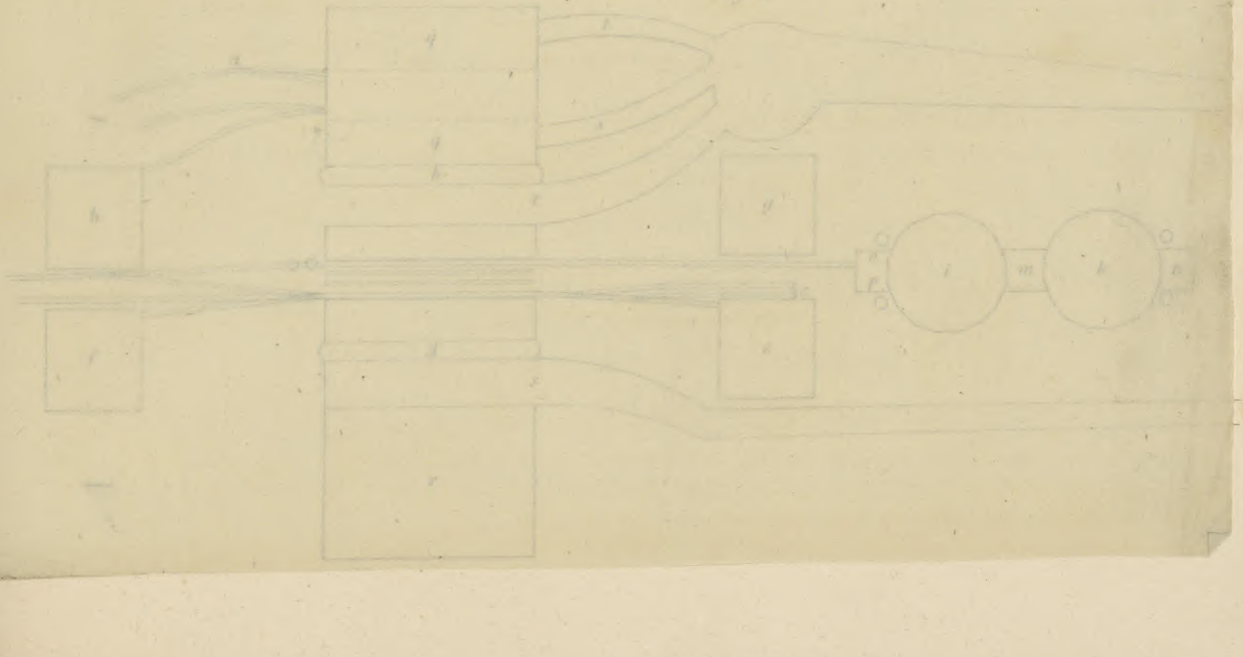


Fig. 1.



count, R.N. Del^{t}

Geo. Aikman, Sculp^{t}

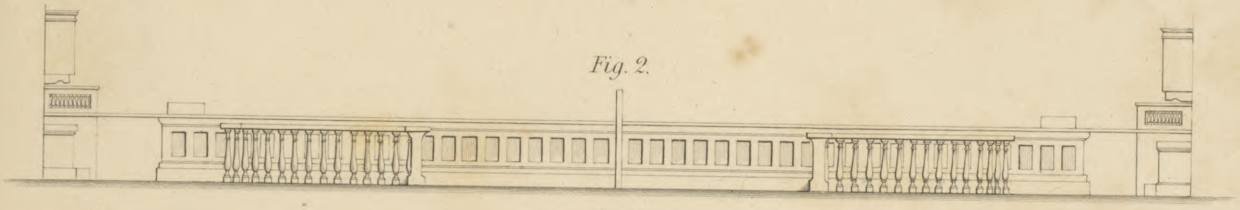


Fig. 2.

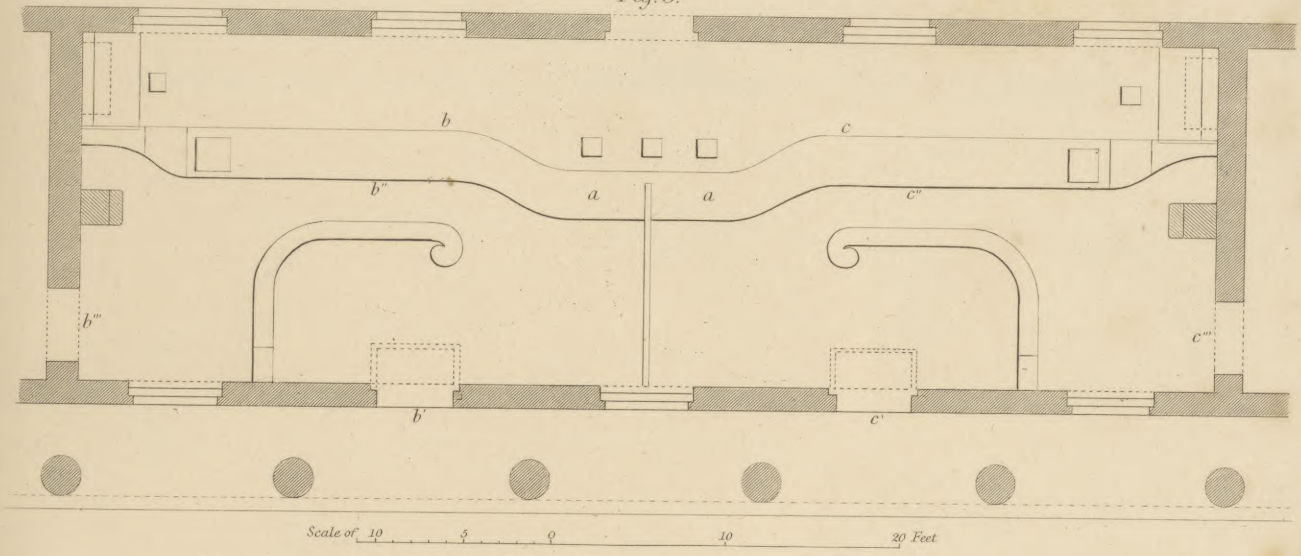


Fig. 3.

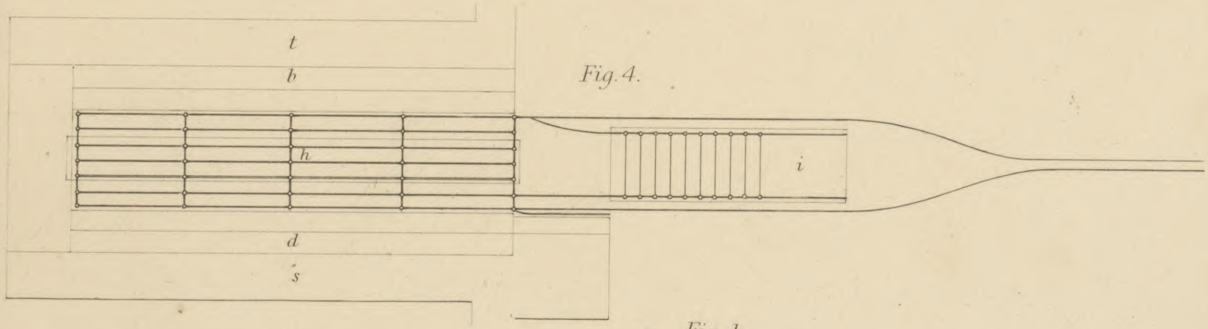


Fig. 4.

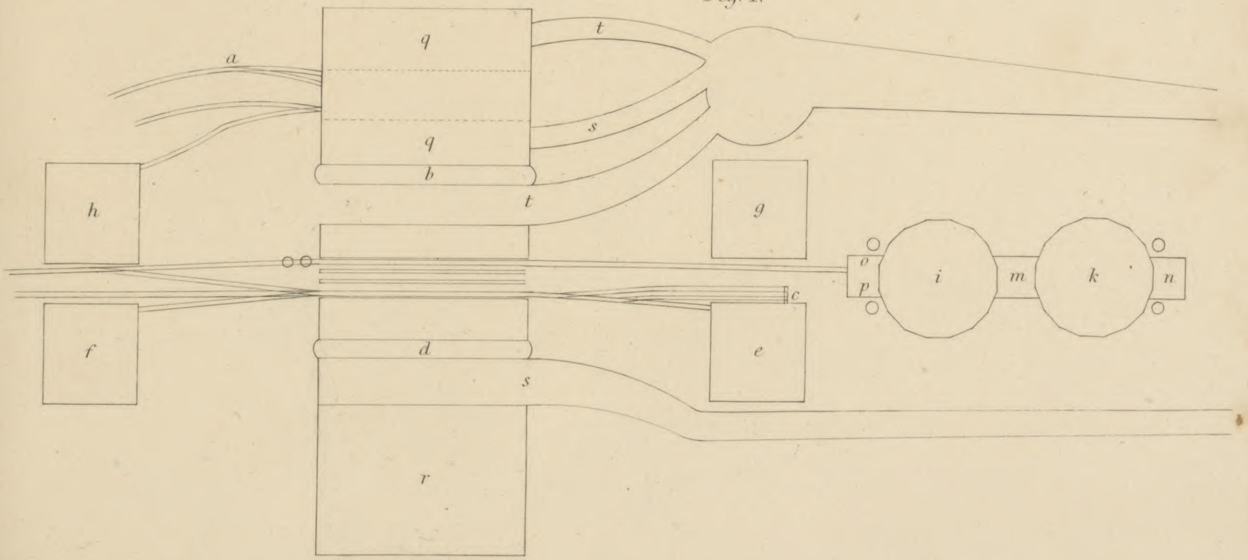


Fig. 1.

ut, R.N. Del^t

Geo. Aikman, Sculp^t

Fig. 2.

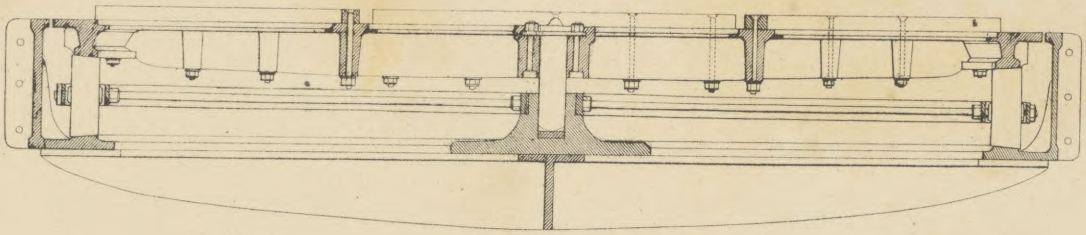
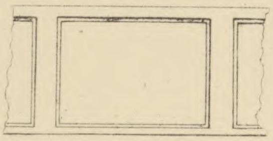


Fig. 3.



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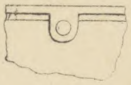
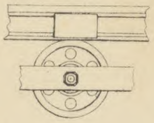


Fig 5.



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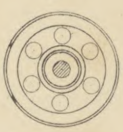

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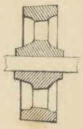

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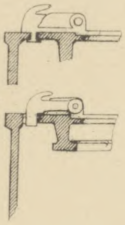
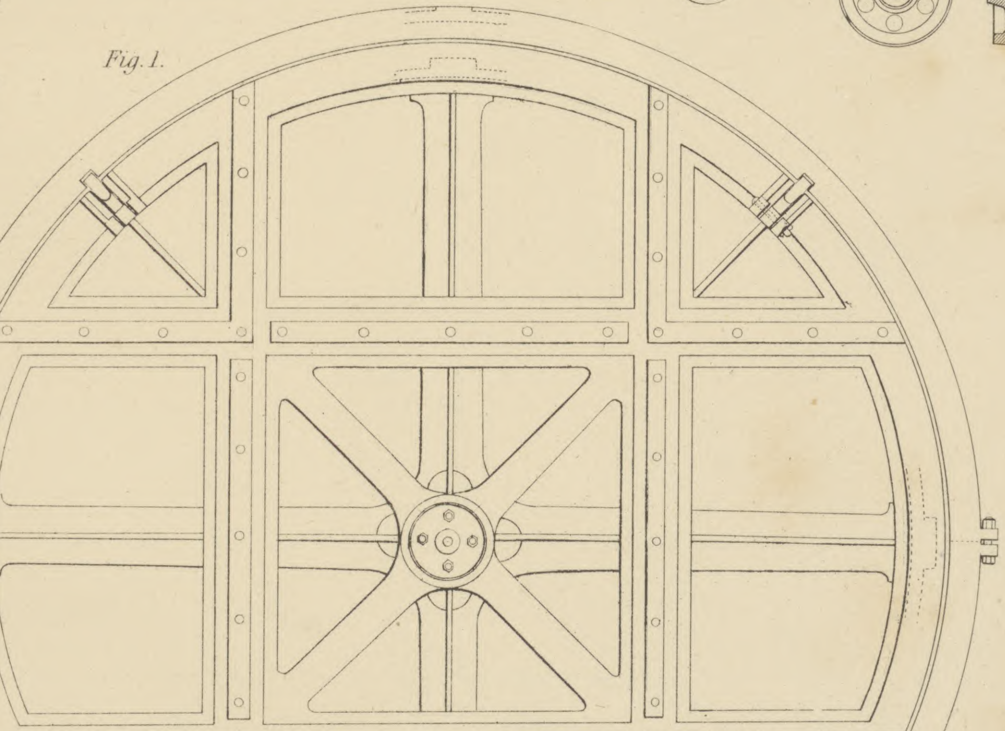
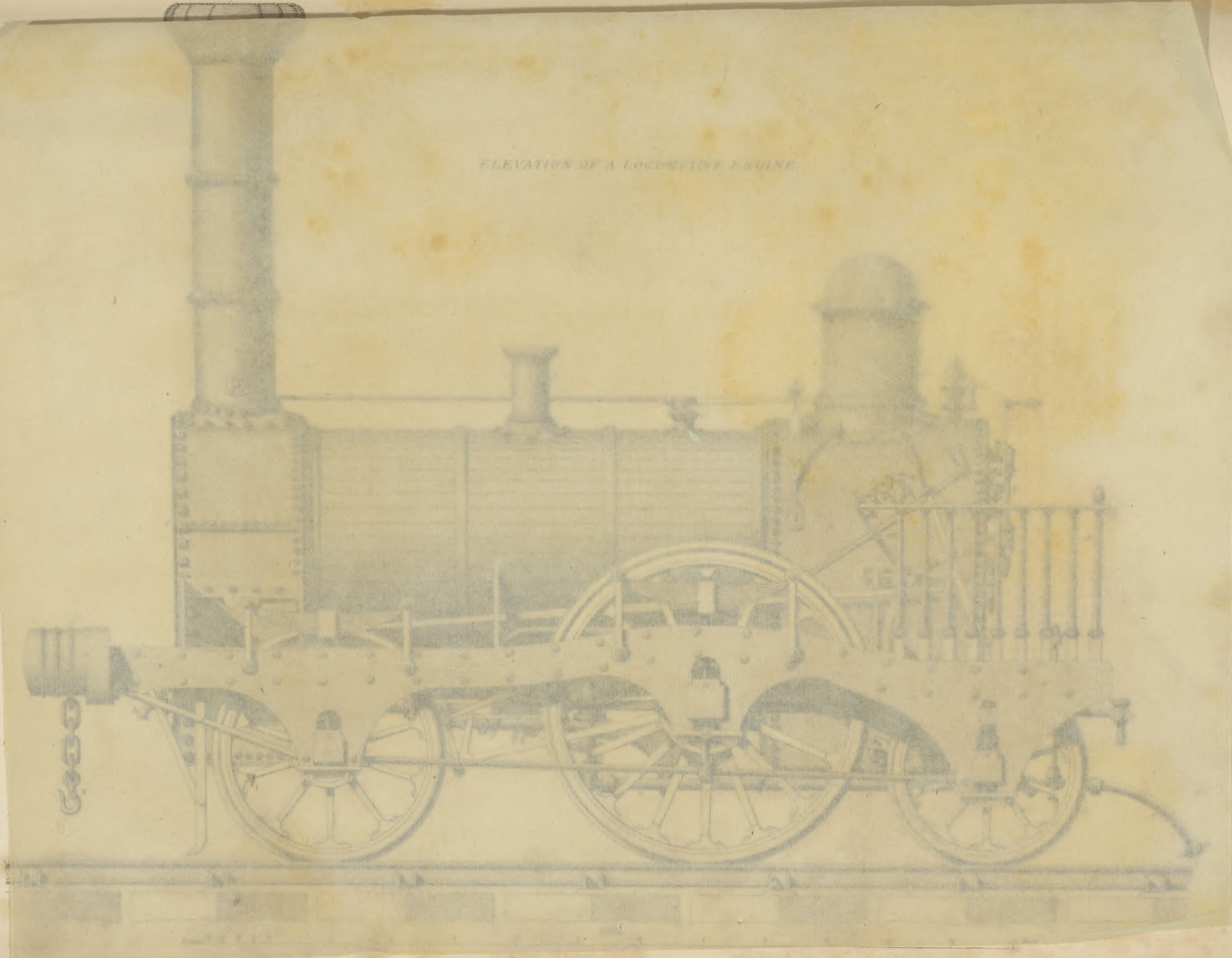


Fig. 1.



Lt Lieut. R.N. Delt
Geo. Aikman Sculpt

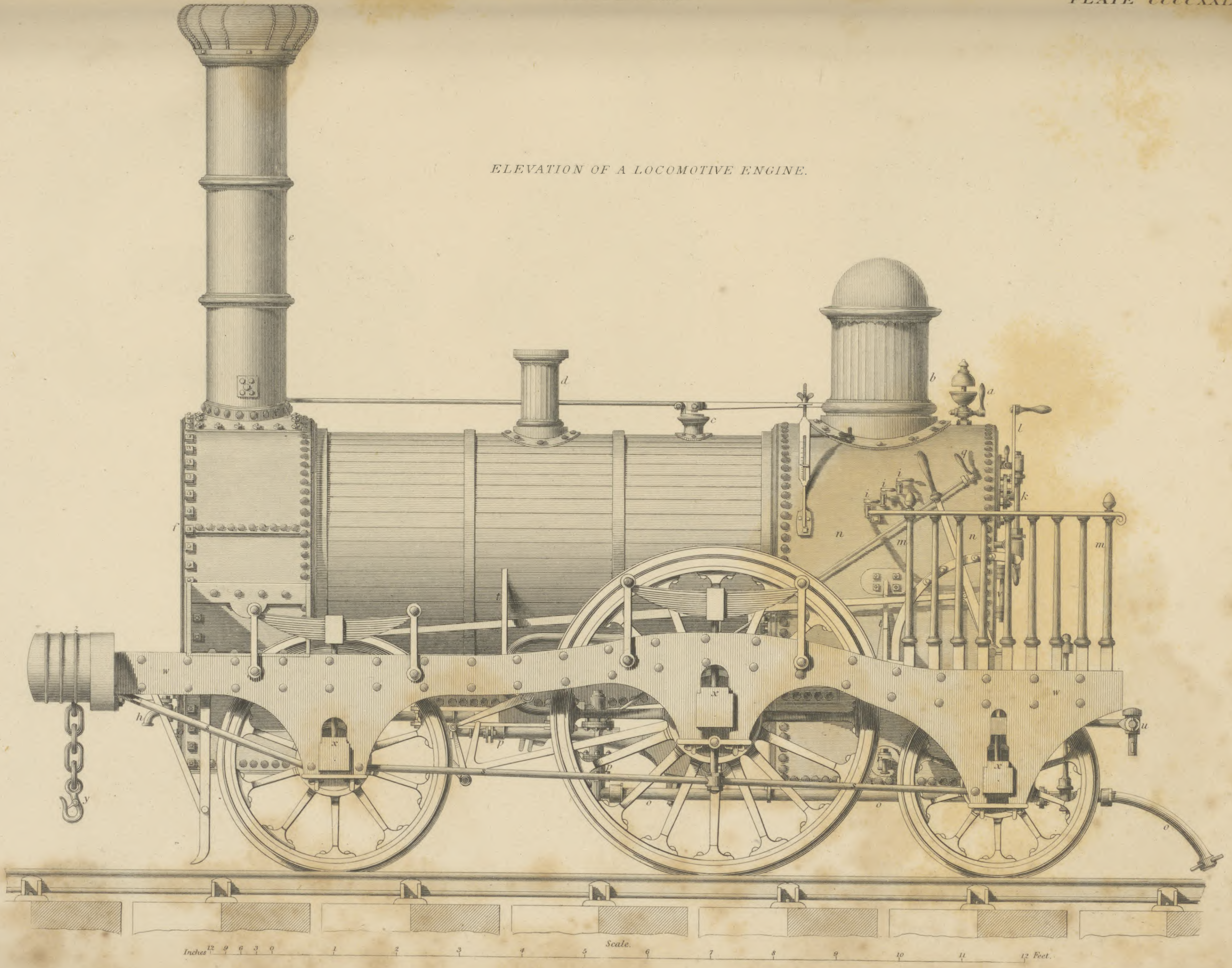
ELEVATION OF A LOCOMOTIVE ENGINE



J. H. Taunton, Delt.

Geo. Aikman, Sculpt.

ELEVATION OF A LOCOMOTIVE ENGINE.



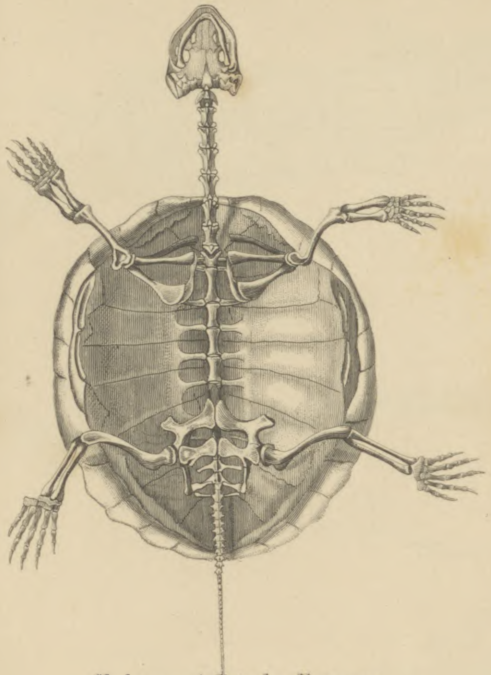
J. H. Taunton, Delt.

Geo. Aikman, Sculpt.

REPTILIA.

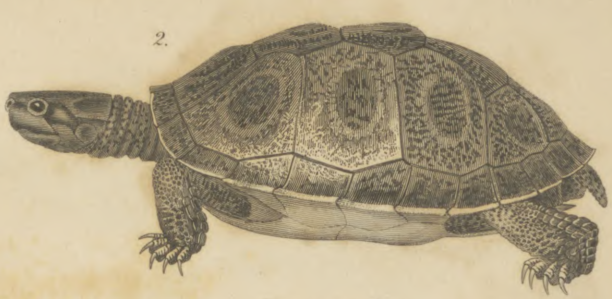
PLATE CCCCXXX.

1.



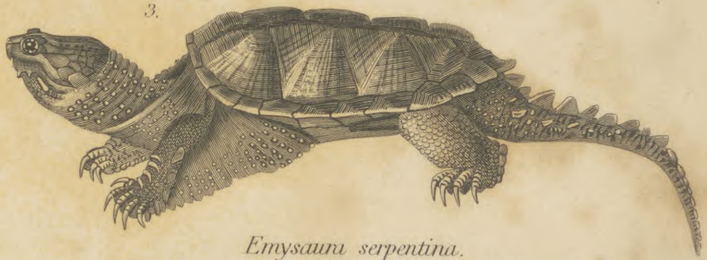
Skeleton of Testuda Europæa.

2.



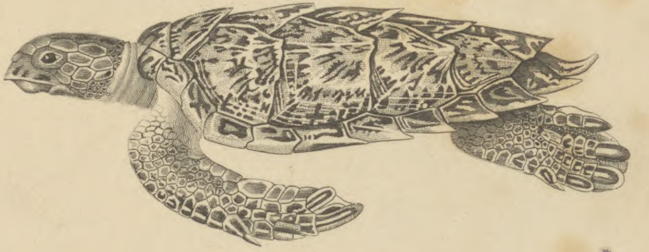
Emys ocellata.

3.



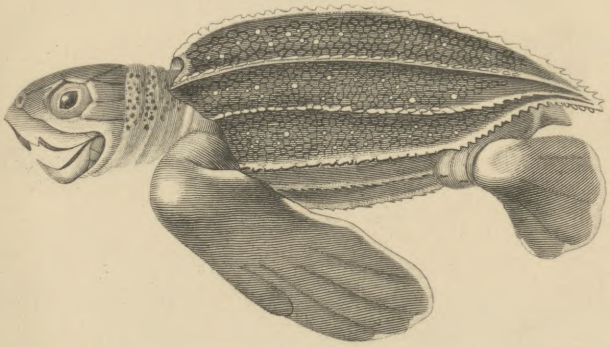
Emysaura serpentina.

4.



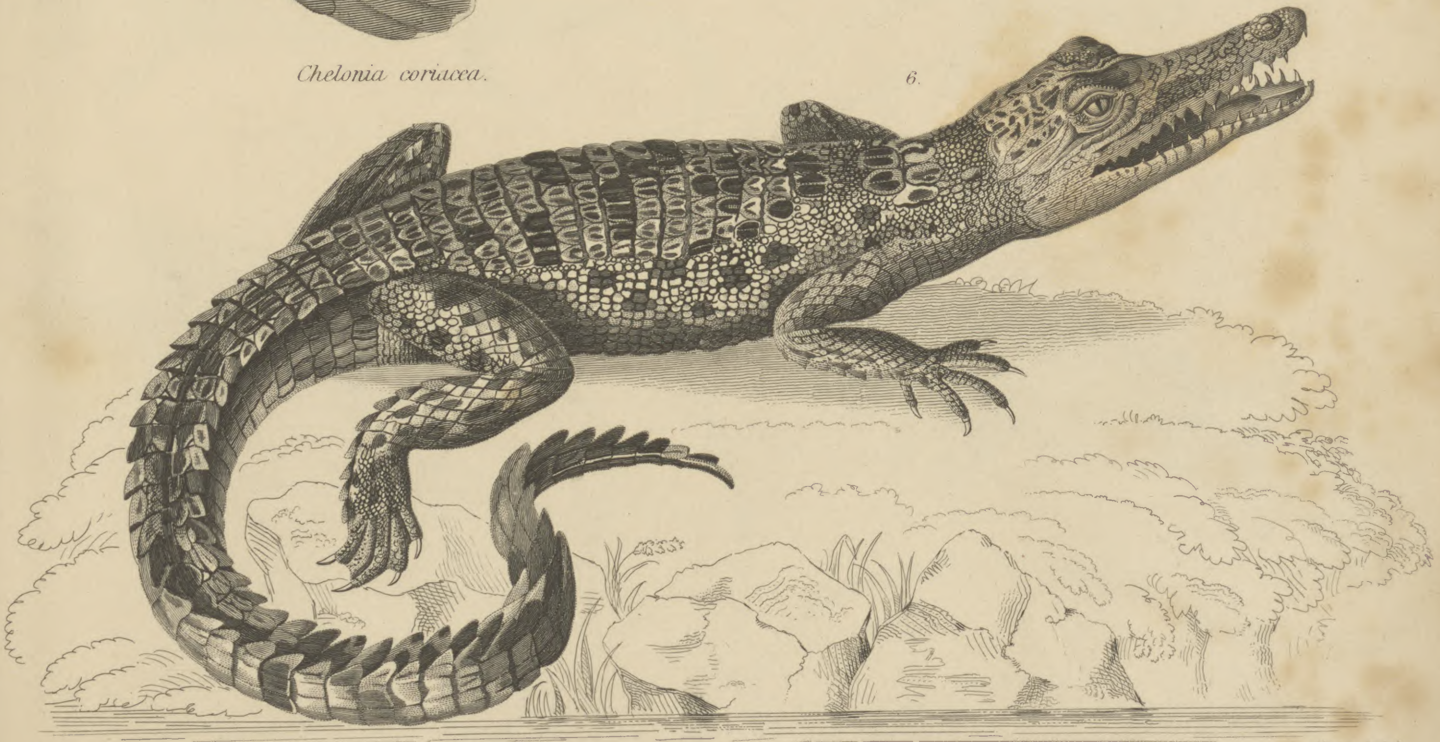
Chelonia imbricata.

5.



Chelonia coriacea.

6.



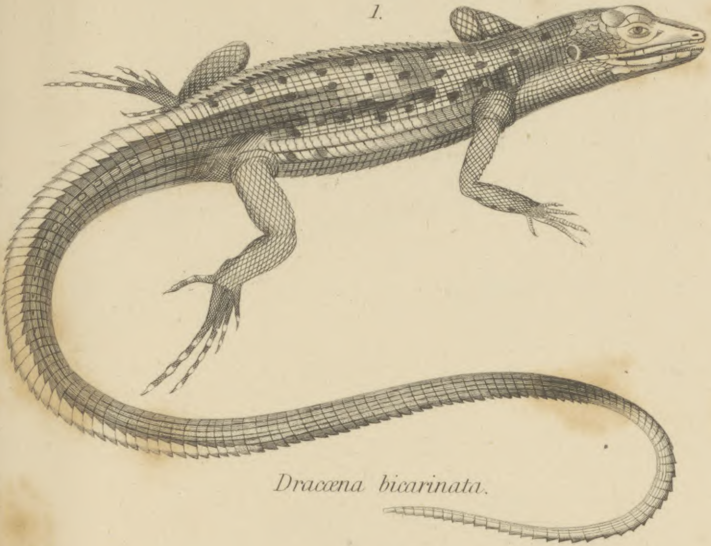
Crocodilus biporcatus.

Geo. Aikman, Sculpt.

REPTILIA.

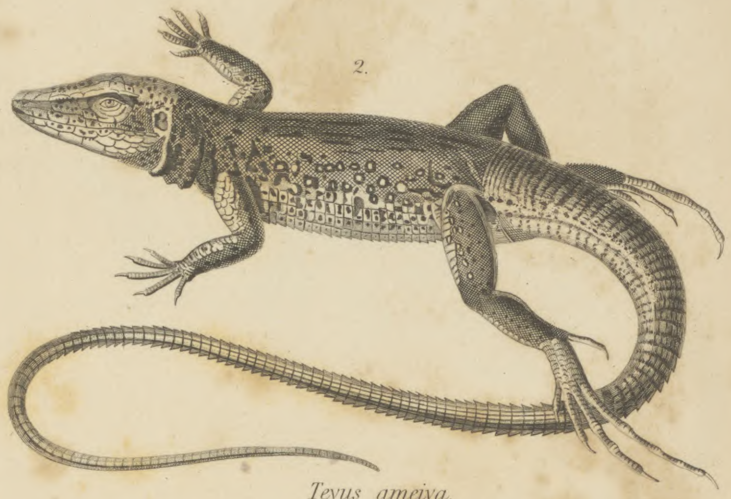
PLATE CCCCXXXI.

1.



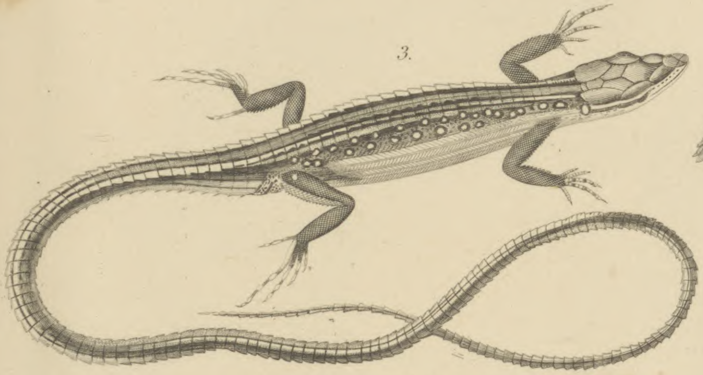
Dracœna bicarinata.

2.



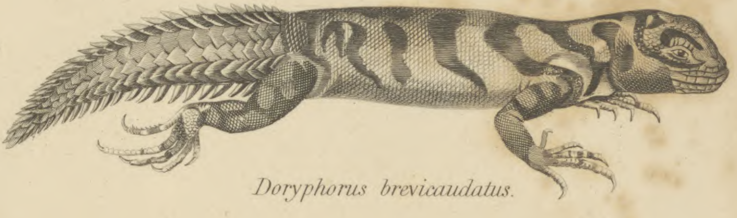
Teyus ameiva.

3.



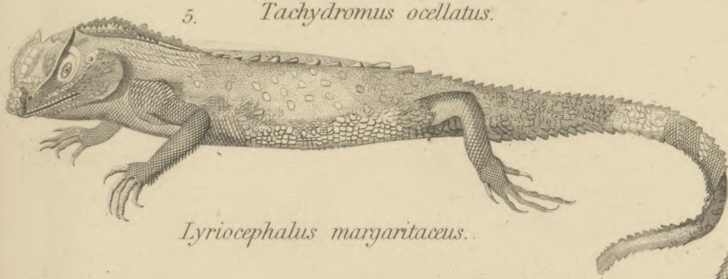
Tachydromus ocellatus.

4.



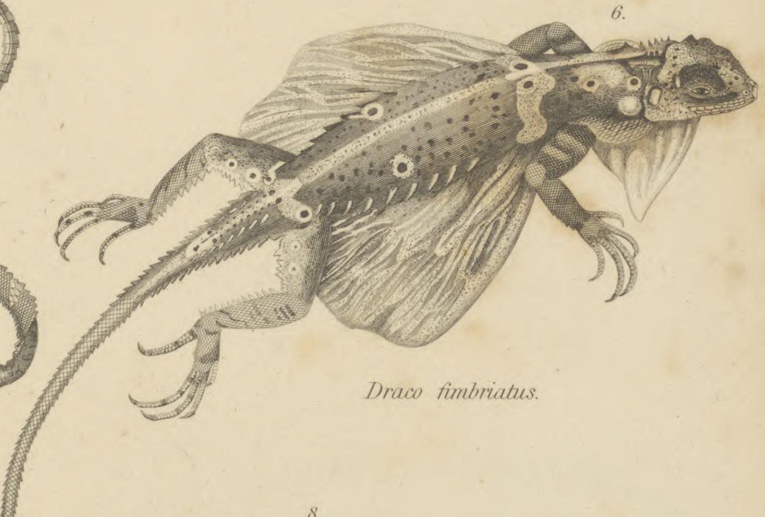
Doryphorus brevicaudatus.

5.



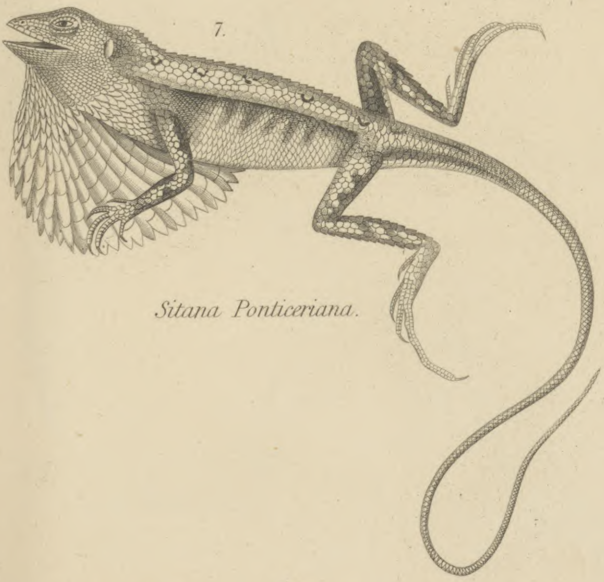
Lyriocephalus margaritaceus.

6.



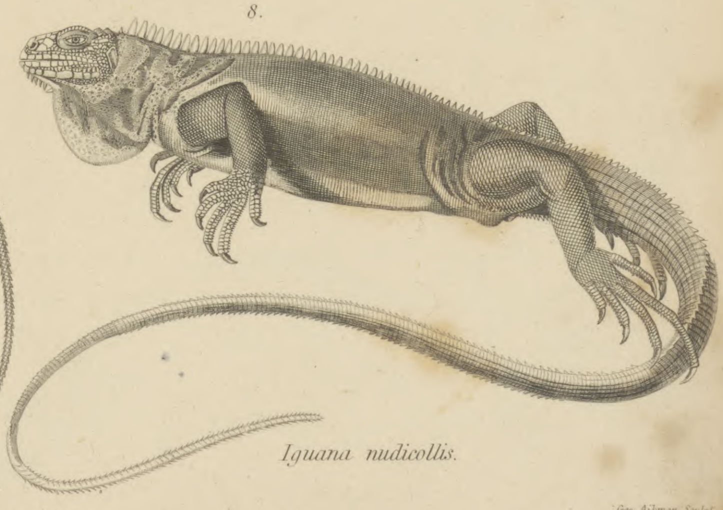
Draco fimbriatus.

7.



Sitana Ponticeriana.

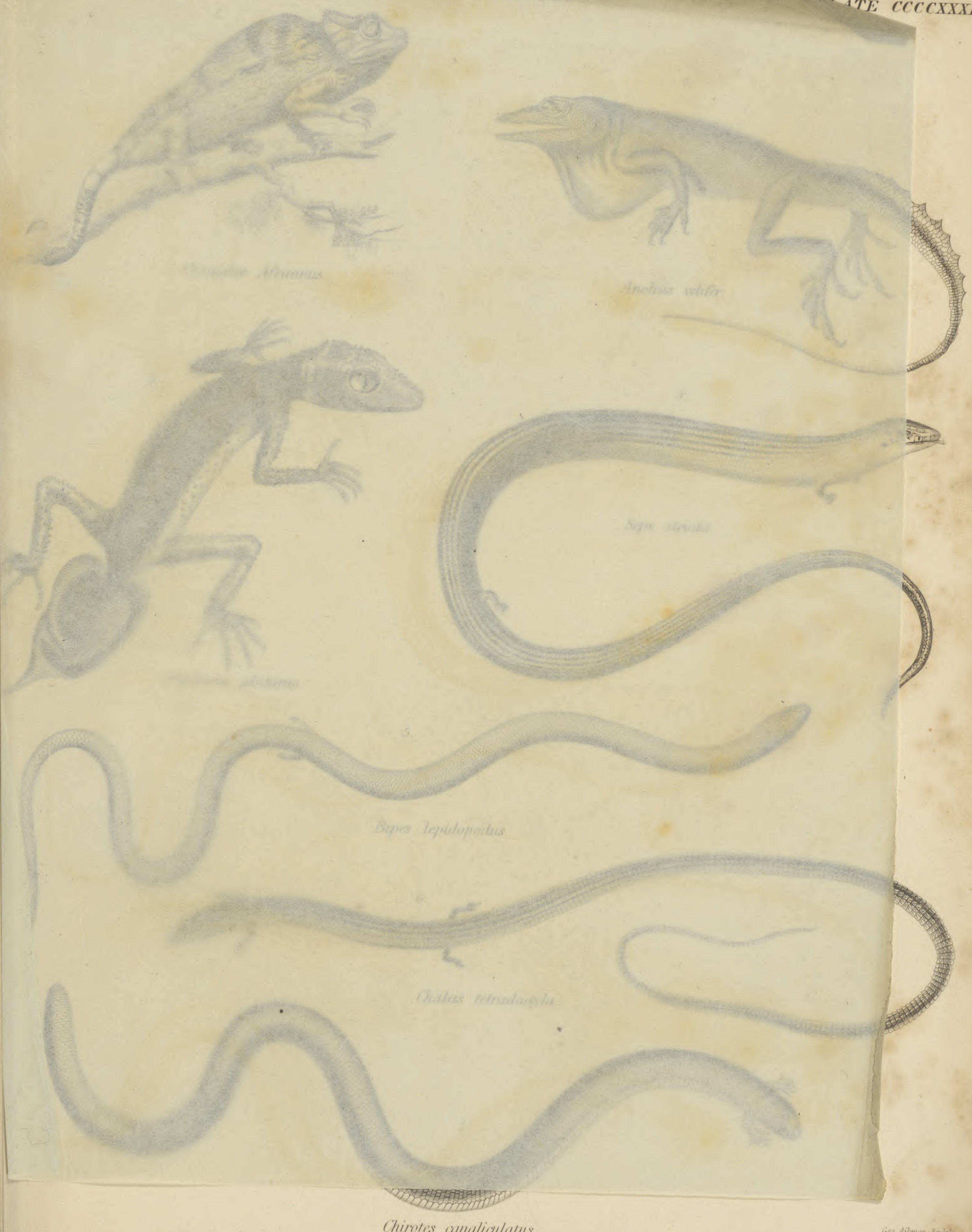
8.



Iguana nudicollis.

Geo. Aikman, Sculpt.

REPTILIA. PLATE CCCCXXXII.



Chamæleo Africanus

Anolius velifer

[illegible] fimbriatus

Seps striata

Bipes lepidopodus

Chalcis tetradactyla

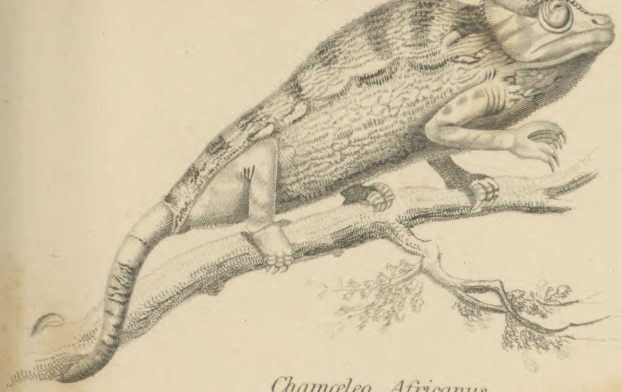
Chirotes canaliculatus.

Geo. Aikman, Sculpt.

REPTILIA.

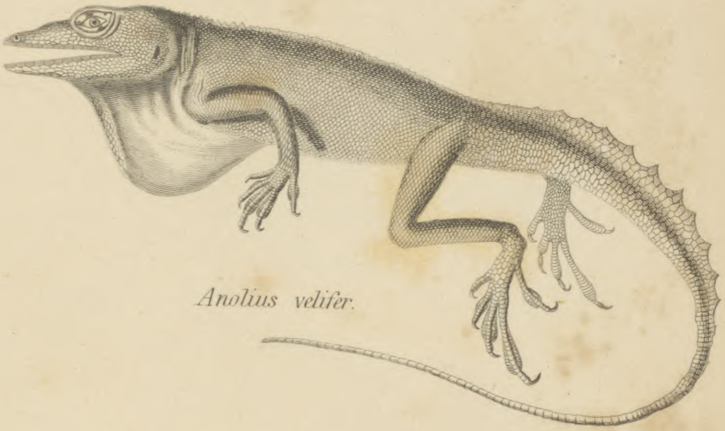
PLATE CCCCXXXII.

1.



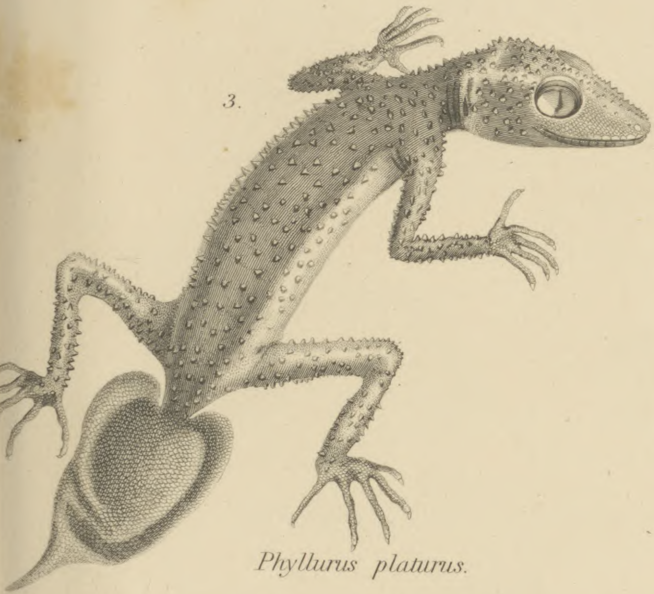
Chamæleo Africanus.

2.



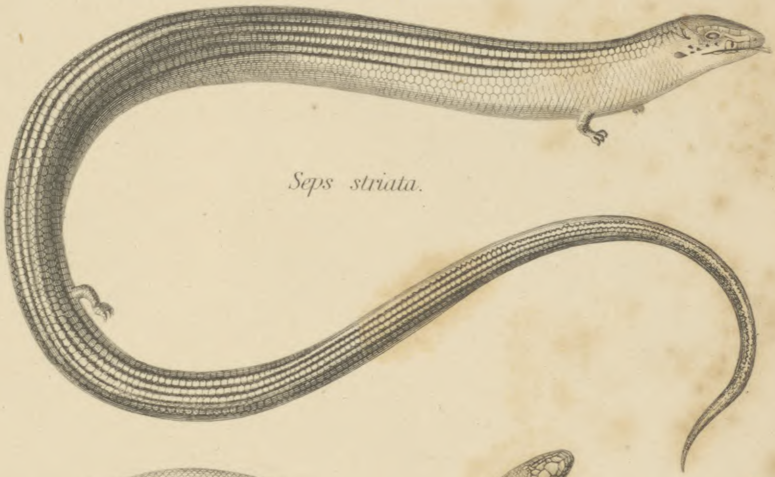
Anolius velifer.

3.



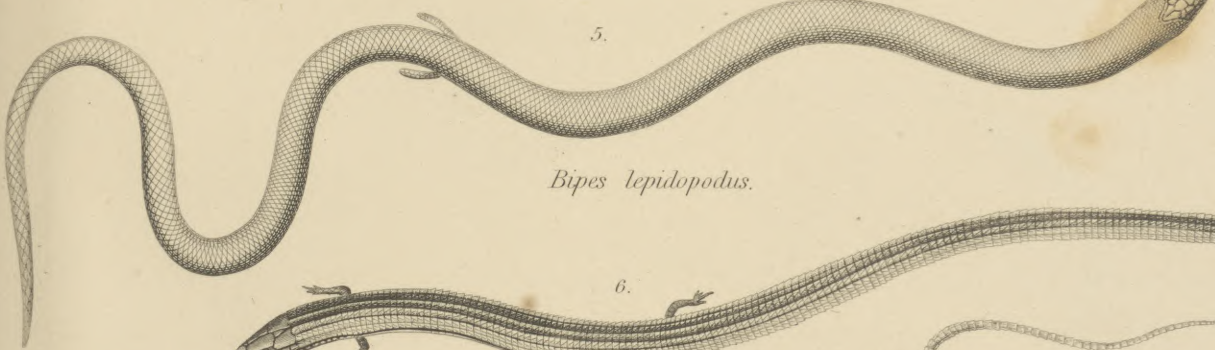
Phyllurus platurus.

4.



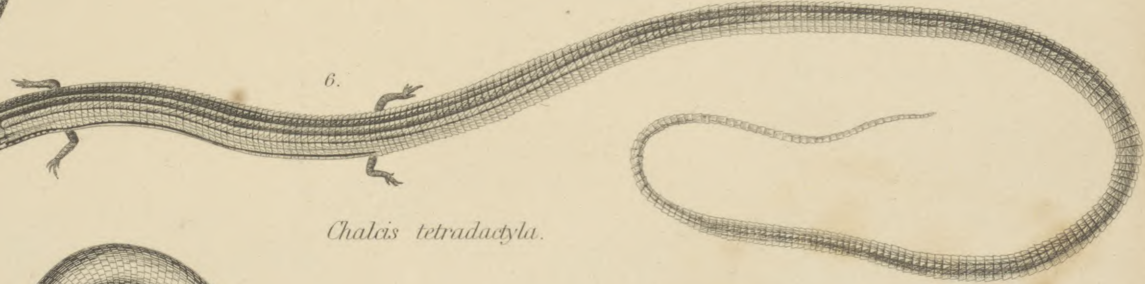
Seps striata.

5.



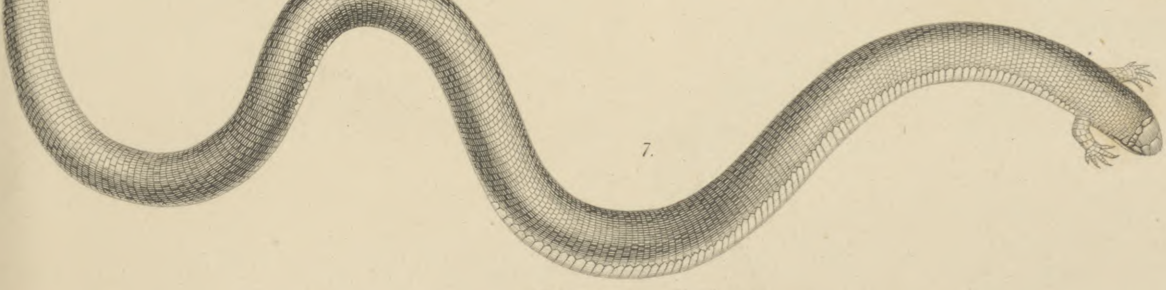
Bipes lepidopodus.

6.



Chalcis tetradactyla.

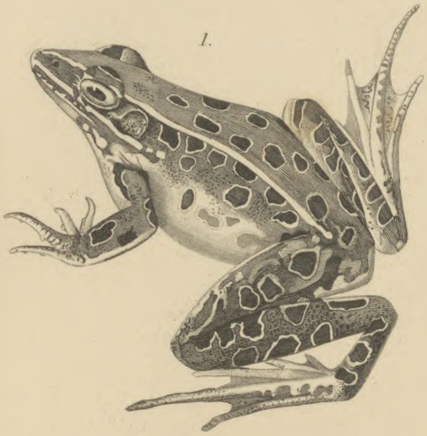
7.



Chirotes canaliculatus.

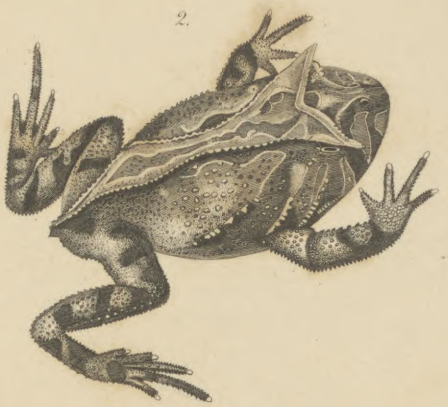
Geo. Aikman, Sculpt.

1.



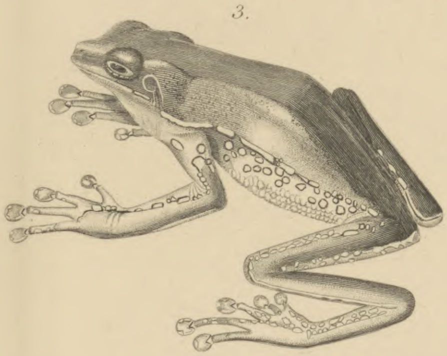
Rana palustris.

2.



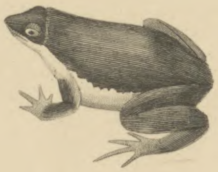
Ceratrophris granosa.

3.



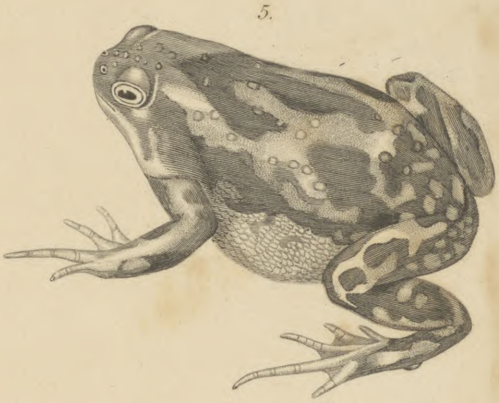
Hyla bicolor.

4.



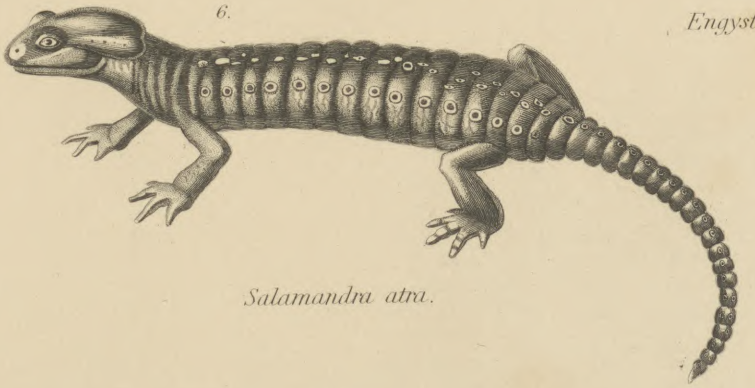
Oxyrhynchus bicolor.

5.



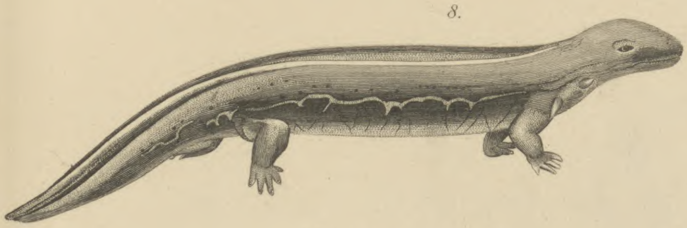
Engystoma marmoratum.

6.



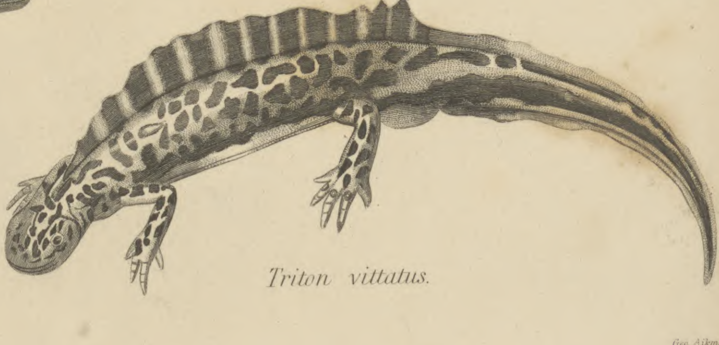
Salamandra atra.

8.



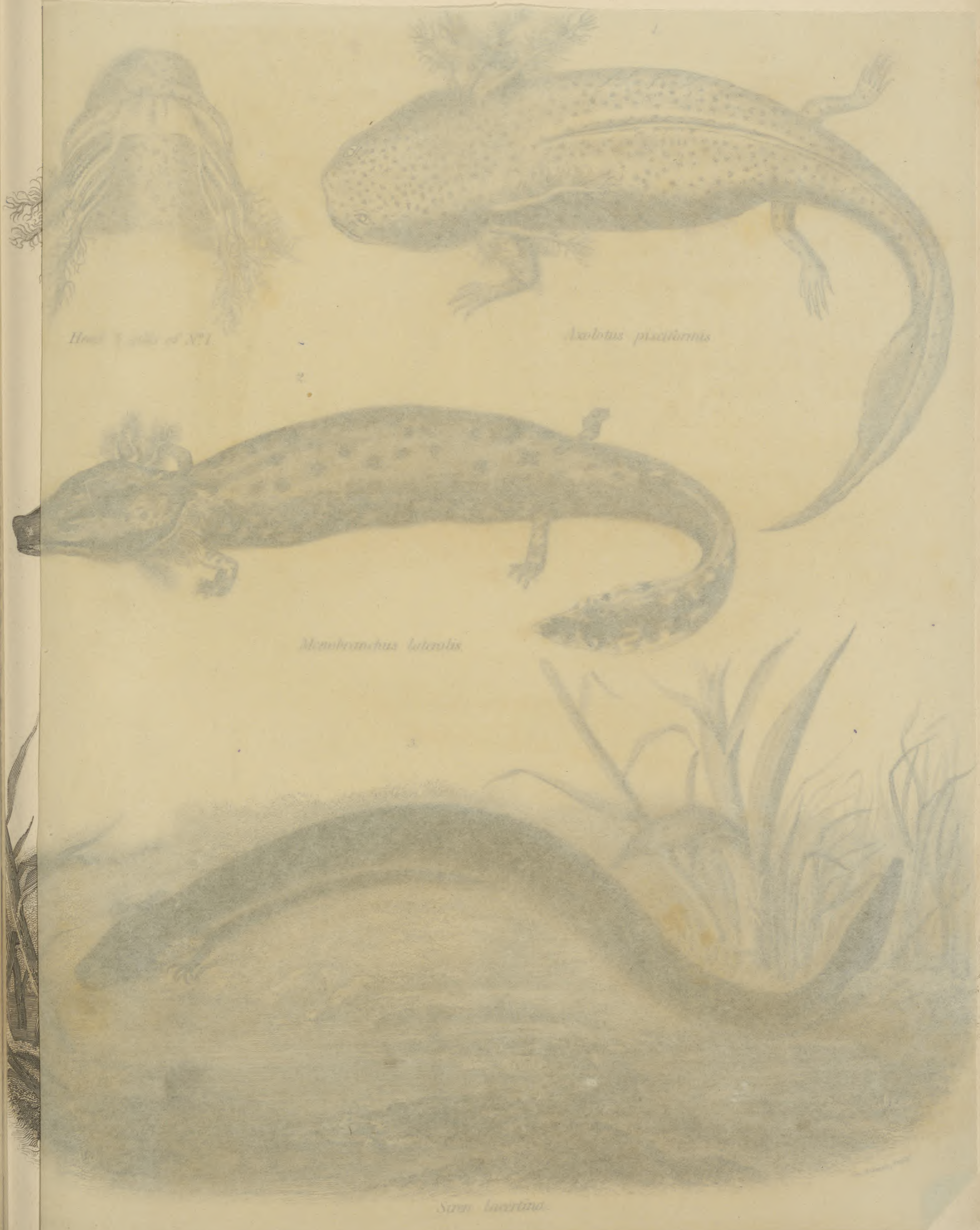
Menopoma gigantea.

7.



Triton vittatus.

Geo. Aikman, Sculpt

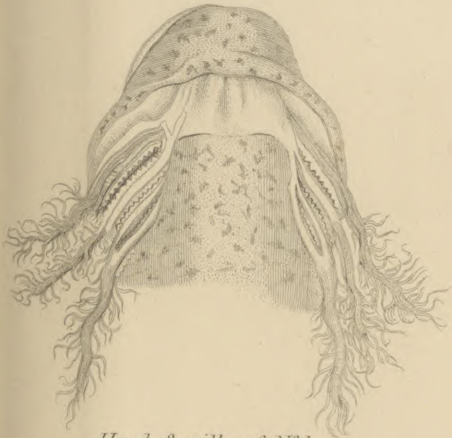


Head & gills of Nº 1.

Axolotus pisciformis.

Menobranchus lateralis.

Siren lacertina.



Head & gills of No. 1.

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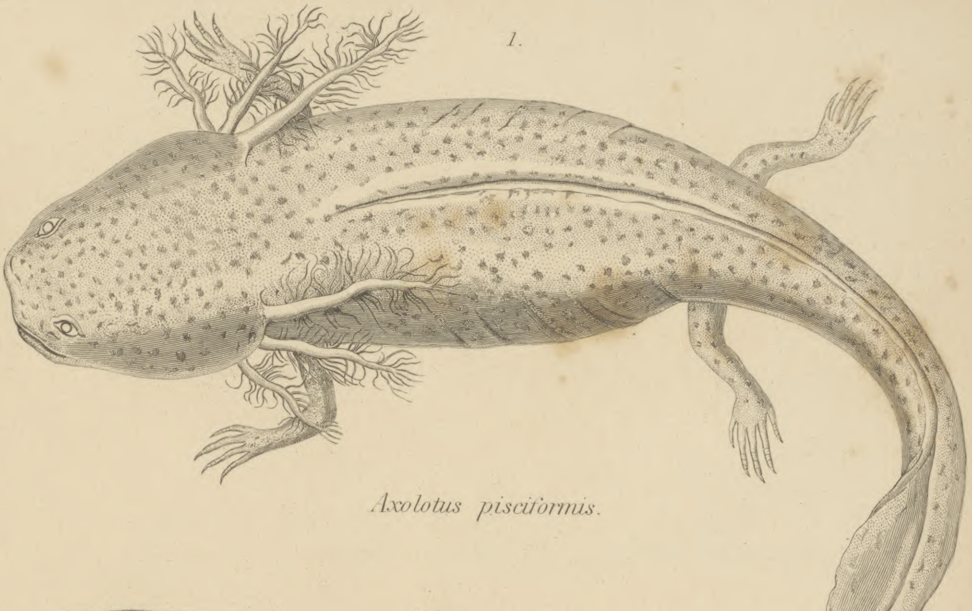

Axolotus pisciformis.

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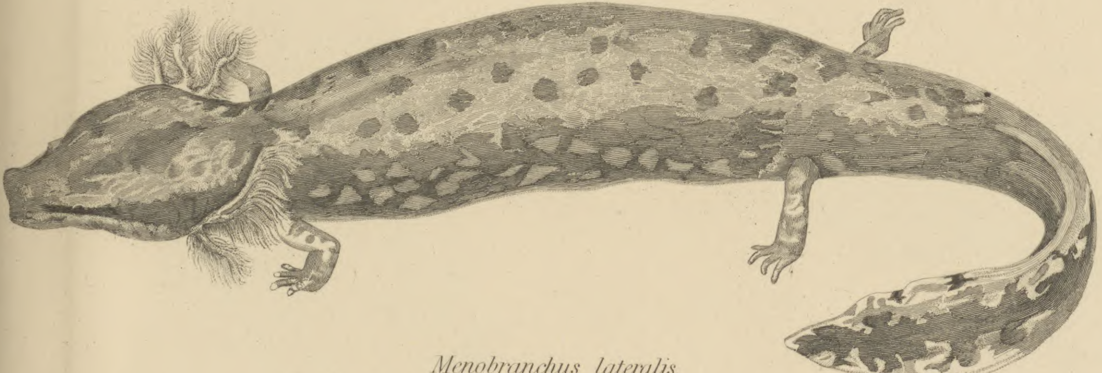
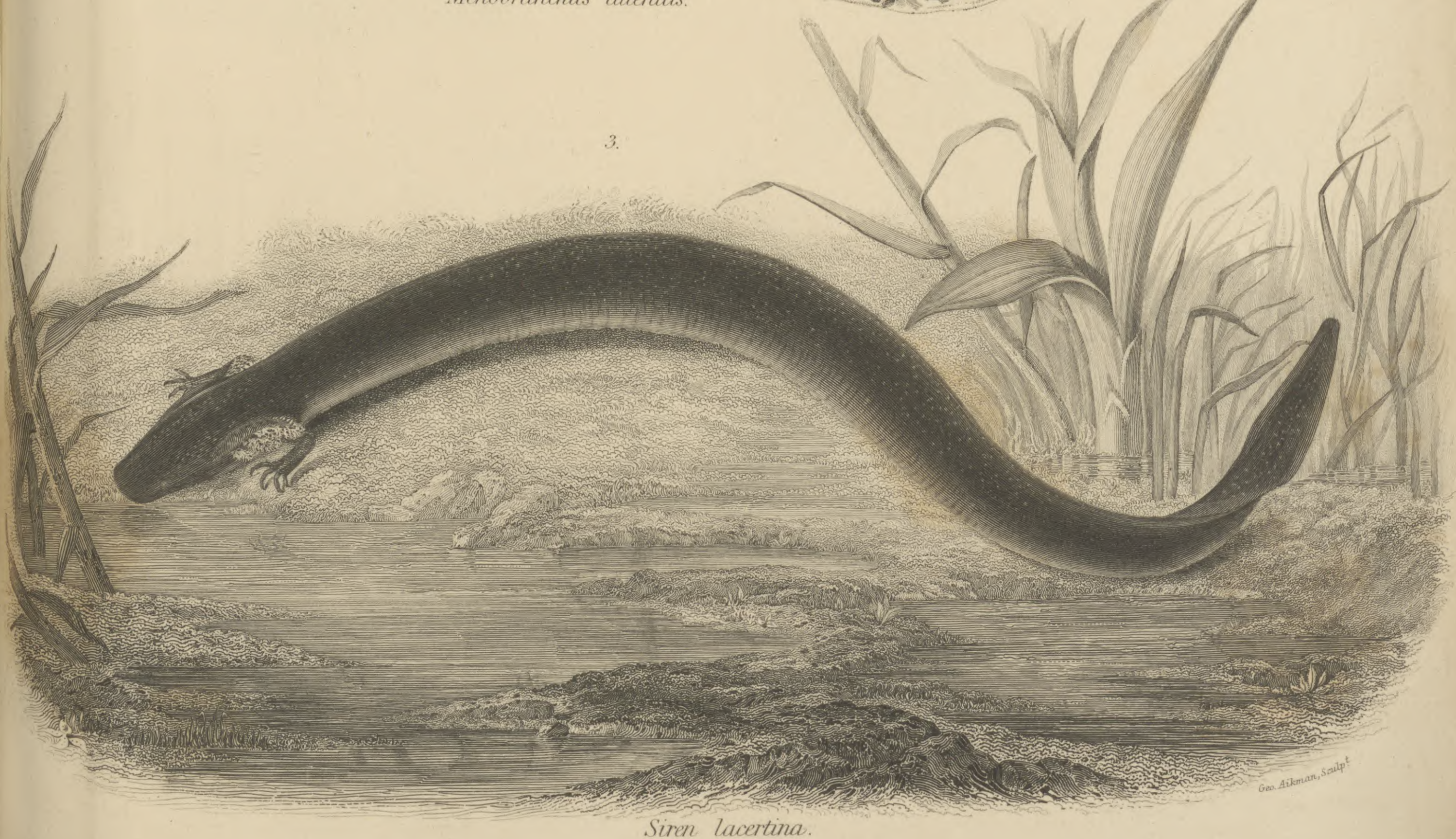


Menobranchus lateralis.

3.



Geo. Aikman, Sculpt.

Siren lacertina.

RETICULATION.

PLATE CCCCXXXV.

Fig. 1.

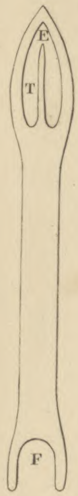
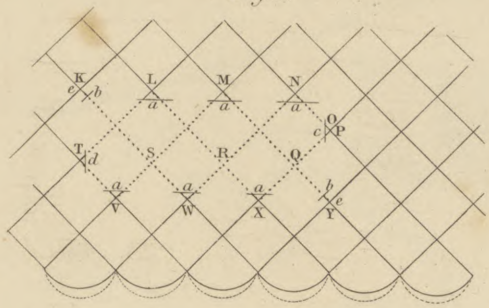


Fig. 2.

Fig. 3.

Fig. 5.



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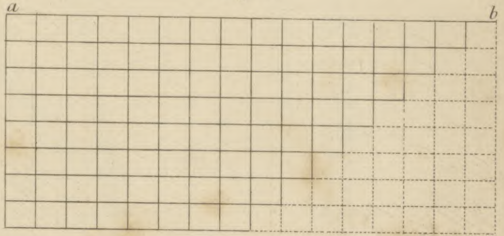
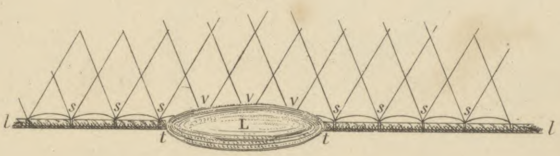


Fig. 7.*



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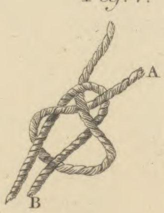

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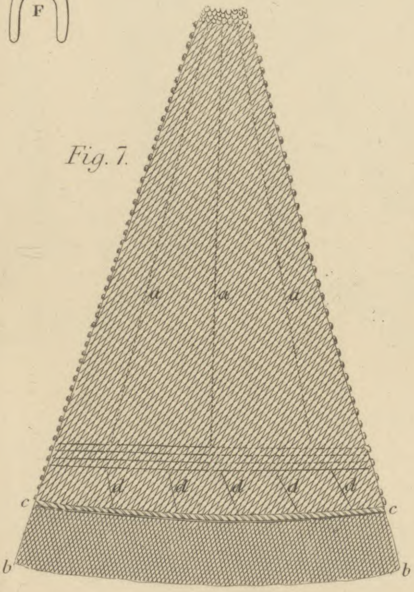

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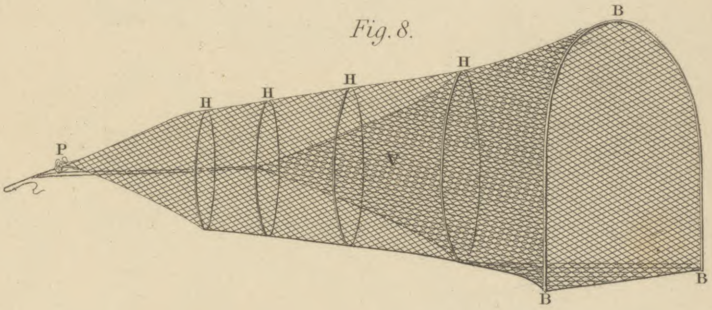
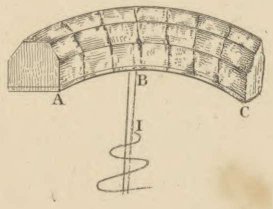


Fig. 12.



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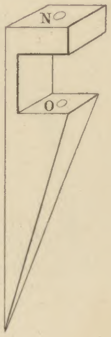


Fig. 9.

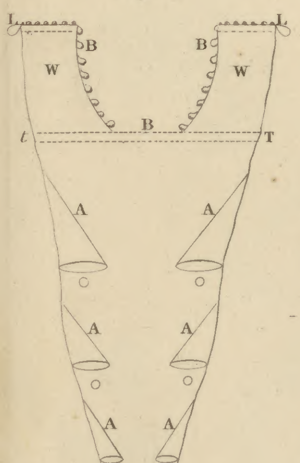


Fig. 10.

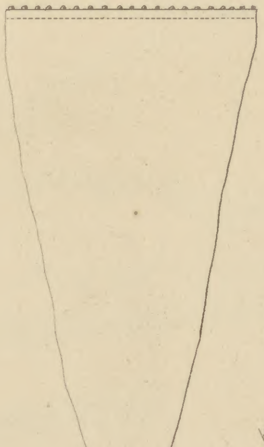
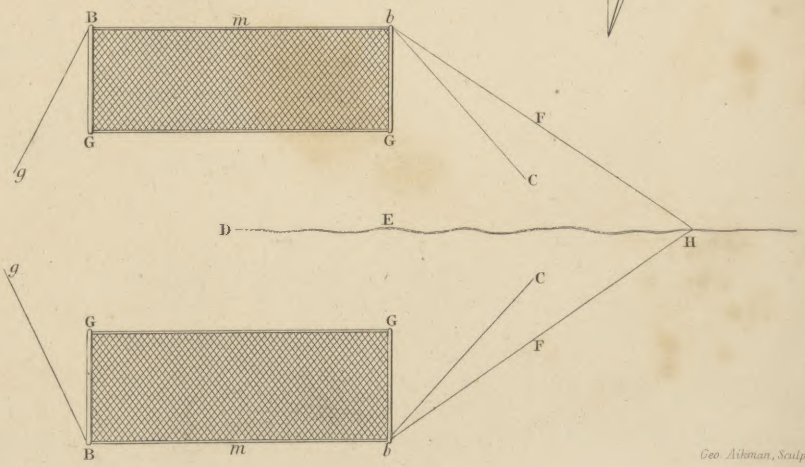


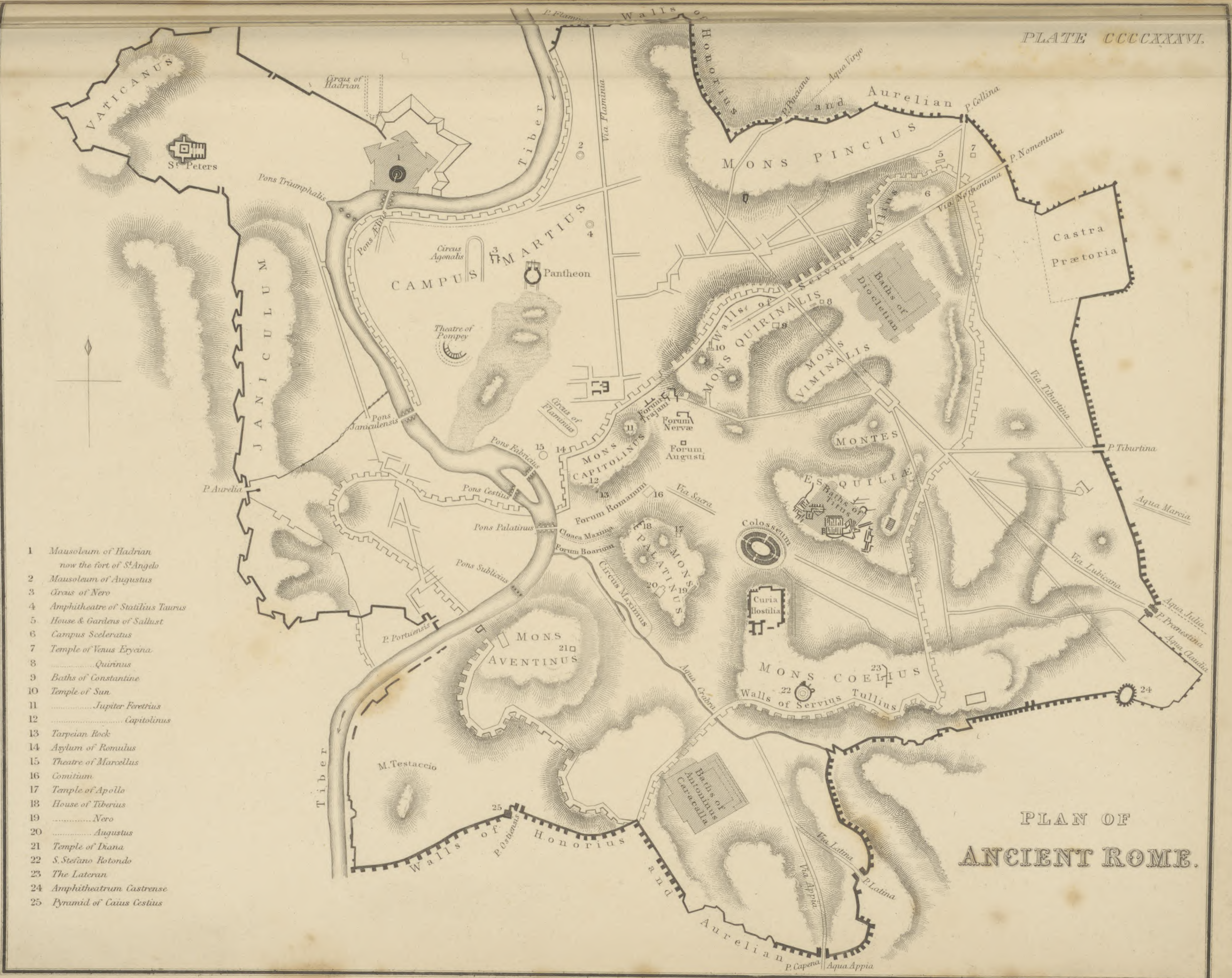
Fig. 11.



Geo. Aikman, Sculpt.

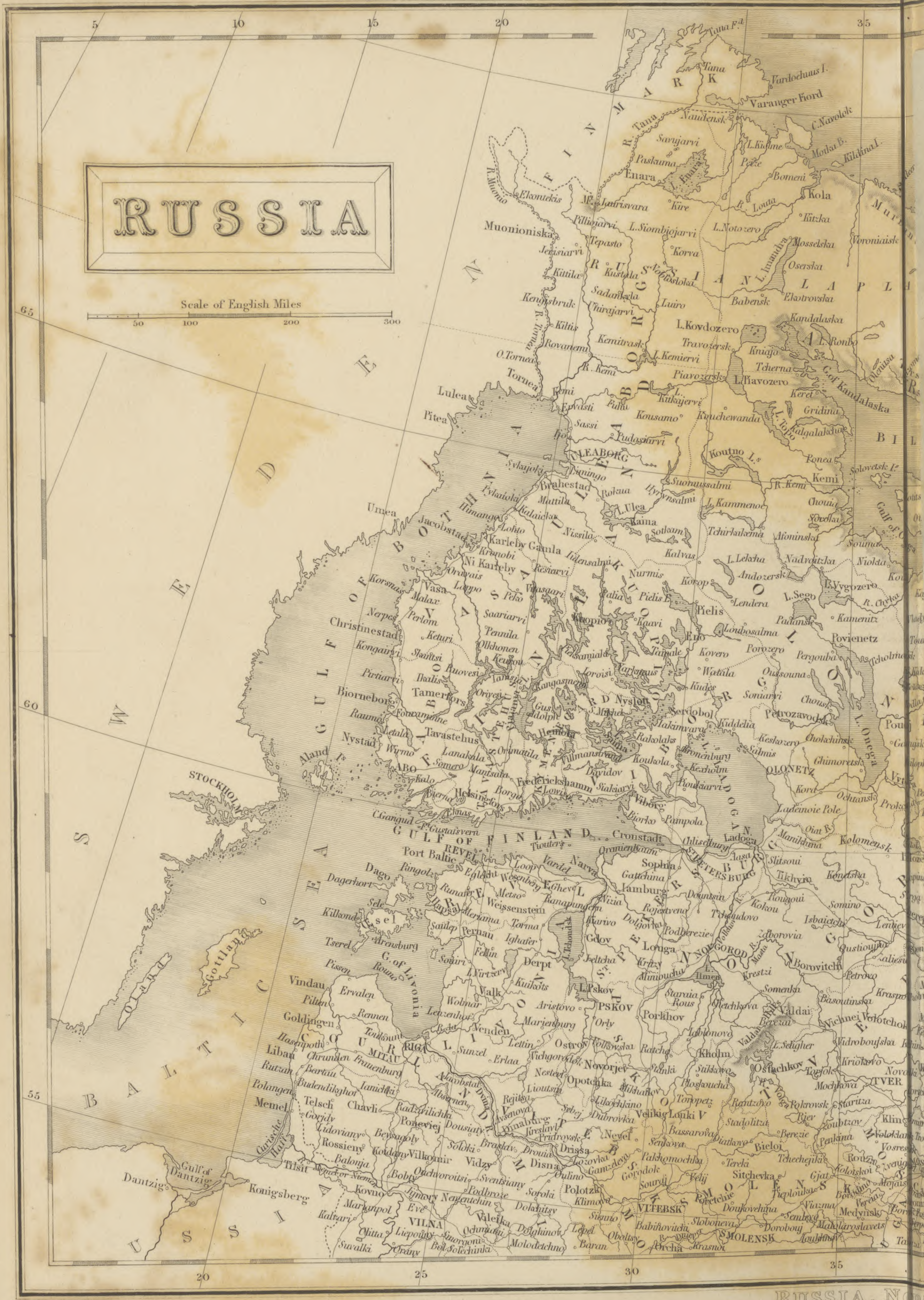
PLATE CCCCXXXVI.

PLAN OF
ANCIENT ROME.



1	Mausoleum of Hadrian now the fort of St. Angelo
2	Mausoleum of Augustus
3	Circus of Nero
4	Amphitheatre of Statilius Taurus
5	House & Gardens of Sallust
6	Campus Sceleratus
7	Temple of Venus Erycina
8	.... Quirinus
9	Baths of Constantine
10	Temple of Sun
11	.... Jupiter Feretrius
12	.... Capitolinus
13	Tarpeian Rock
14	Asylum of Romulus
15	Theatre of Marcellus
16	Comitium
17	Temple of Apollo
18	House of Tiberius
19	.... Nero
20	.... Augustus
21	Temple of Diana
22	S. Stefano Rotondo
23	The Lateran
24	Amphitheatrum Castrense
25	Pyramid of Caius Cestius

Geo. Aikman, Sculpt.



RUSSIA

Scale of English Miles
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Tana
Vardoehuus I.
Varanger Fiord
Naudensk
C. Navolok
Motka B.
Kildina I.
F I N M A R K
R. Tana
Savujarvi
Paskuma
Enara
L. Enara
L. Kildine
Peze
Bomeni
Kola
Kitzka
R. Louta
Kire
Mt. Laurisvara
L. Siombiojarvi
L. Notozero
R. Muonio
Ekontekis
Pilliojarvi
Muonioniska
Tepasto
Jerisiarvi
Korva
Mosselska
Voroniaisk
Oserska
Kittila
Kustala
Sodankyla
Sadankyla
Chirajarvi
Luiro
Babensk
Ekotrovska
L A P L
Kengisbruk
R. Tornea
Kiltis
Rovaniemi
Kemitrask
L. Kovdozero
Kandalaska
Travozersk
Kniaja
Tcherna
L. Ronbo
O. Tornea
Tornea
R. Kemi
L. Kemiervi
Piavozersk
L. Piavozero
G. of Kandalaska
Keret
Gridina
Kalgalaksha
Lulea
Pitea
Kemi
Epvasti
Pulka
L. Kukajervi
Kousamo
Kouchewanda
L. Topo
Sassi
Io
Pudasiarvi
ULEABORG
Koutno L.
Ponea
B I L
Kemi
Solovetsk I.
Sylajoki
Liminga
Suomussalmi
R. Kemi
Pyhajoki
Brahestad
Rokua
Hyrynsalmi
L. Kammeno
Chouia
Soroka
Gulf of O
Umea
Himango
Mattila
L. Ulea
Kalaicka
Kaina
Lohto
Nissila
Sotkamo
Tchirlaksema
Afoninska
Souma
Jacobstad
Karleby
Gamla
Kronobi
Idensalmi
Kalvas
L. Lekcha
Nadvoitzka
Niokta
Ni Karleby
Oravais
Kesiarvi
Nurmis
Korop
Andozersk
Vasa
Malax
Lappo
Peko
Viasaari
Palia
Pielis L.
L. Sego
L. Vygozero
R. Chyrka
Korsnas
Nerpes
Perlom
Saariarvi
Kuopio
Kaavi
Pielis
Lendera
Padansk
Kamenitz
Christinestad
Pennila
Loubosalma
Kongairvi
Keturi
Olkhonen
Eno
Povienetz
Kovero
Porozero
Pergouba
Tcholmuksa
Pirtiarvi
Ikalis
Ruovesi
Tamela
Joroisi
Varkaus
Tajpale
Watala
Oussouna
Tamerfors
Orivesi
Sankaisi
Kudes
Sonianvi
Chousk
Biorneborg
Fouvamoinen
Gus. Adolph
Mikkeli
Nyslott
S. Michel
Serdobol
Petrozavodsk
Rauma
Hakimvara
Kiddelia
L. Onega
Nystad
Metala
Tavastehus
Heinola
Gulia
Rakolaks
Keskozero
Cholachinsk
Wirmo
Lanakala
Orimatila
Tillmanstrand
Kronenburg
Salmis
Ghimoretsk
Aland Is.
ABO
Somero
Mantsala
Davidov
Koukola
Kexholm
OLONETZ
Kalo
Borga
Fredrickshamm
Lowiza
Siakiarvi
Roukiarvi
Kord
Ochtansk
STOCKHOLM
Bierno
Helsingfors
Viborg
L A D O G A
Ladenoie Pole
Ekenas
Biorko
Pampola
Oiat R.
C. Gangud
F. Gustaisvern
GULF OF FINLAND
Cronstadt
Schlusselburg
Ladoga
Kolomensk
Tiouters
Oranienbaum
ST. PETERSBURG
Manilshina
Port Baltic
REVEL
Loop
Vardet
Narva
Sophia
Slitsoui
Pingel
Egleshi
Wesenberg
Gatchina
Tikhvin
Konetsha
Dago
Dagerhort
Runafr
Metso
E. Chevel
Iamburg
Dountsin
Rougoui
Somino
Hapsal
Weissenstein
Ranapungen
Wizia
Rojestvenо
Tchoudovo
Kokou
Isbaictchi
Sele
Killsond
Oesel
Sailep
Feriama
Torma
Pernau
Igliafer
Narivo
Dolgovia
Podberezie
Arensburg
Tserel
Souiri
Fellin
Gdov
Louga
Zborovia
Oustioujna
G. of Livonia
Gottland
Oland
Pissen
Rouno
Dorpat
Werro
Jeltcha
Krizy
NOVGOROD
Borovitchi
Petrovo
Vindau
Piltin
Ervalen
Kuikots
L. Pskov
Ilmen
Krestzi
Valk
L. Ilmen
Staruia Rous
Somenka
Goldingen
Rennen
Wolmar
Aristovo
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Porkhov
Ietchkova
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Basoutinska
Krasno
Hasenpoth
Tuckum
Lenzenhof
Venden
Marienburg
Orly
Lobonovo
Vichnei Volotchok
Libau
C O U R L A N D
MITAU
RIGA
L I V O N I A
Lettin
Ostrov
Kotchevka
Ratcha
L. Seligher
Vidroboufska
Rutzau
Chrunden
Frauenburg
Sunzel
Erlaa
Tchgorod
Novorjev
Kholm
Krioukovo
Bartau
Iacobstadt
Nestera
Opotchka
Toukki
Ostachkov
Torjok
Polangen
Budendikghof
Ianichki
Lioutsin
Mikhailov
Ploskoucha
Mochkova
TVER
Memel
Telsch
Chavli
Radziviliski
Novo Alexandrovsk
Rejitsa
Likochkino
Toropetz
Rantzovo
Pokrowsk
Staritza
Gorjdy
Ponevej
Lusenova
Dinaburg
Sebej
Dubrovka
Veliki Louki
Bier
Zoubtzov
Lidoviany
Beysagoly
Dousiaty
Jiruslavl
Pridrovsk
Nevel
Stadolitza
Berezie
Rossieny
Koldany
Vilkomir
Sololki
Braslav
Droui
Drissa
Senkovo
Bassarova
Diatkovo
Bieloi
Tchechejika
Rouza
Curische Haff
Balonja
Nesvij
Vidzy
Disna
Lozovka
Palskomochka
Tereki
Sitchevka
Gjat
Koloskoi
Gulf of Dantzig
Tilsit
Ochwiroitsi
Sventsiany
Oulino
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Kovno
Bobty
Podbroze
Soroki
Polotzk
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Poretchie
Douhovchina
Viazma
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Borodino
Mojaisk
Mariampol
Janovy
Nementchin
Dokchitsy
Klimova
S M O L E N S K
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Senkovo
Maloiaroslavets
Kalvari
Eve
VILNA
Vileika
Sirouno
Babinovitchi
Dorobouj
Olitta
Liepouny
Smorgoni
Ochmiana
Dolghinov
Lepel
Obolts
Slobonova
Gelyar
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Souvalki
Orany
Bol. Solechinka
Molodetchno
Baran
Orcha
Krasnoi
Ioukhnov
Kaluga
B A L T I C   S E A
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S W E D E N
R U S S I A
R U S S I A N   L A P L A N D
A B O
N Y L A N D
K U O P I O
O L O N E T Z
L I V O N I A
E S T H O N I A
S T.   P E T E R S B U R G
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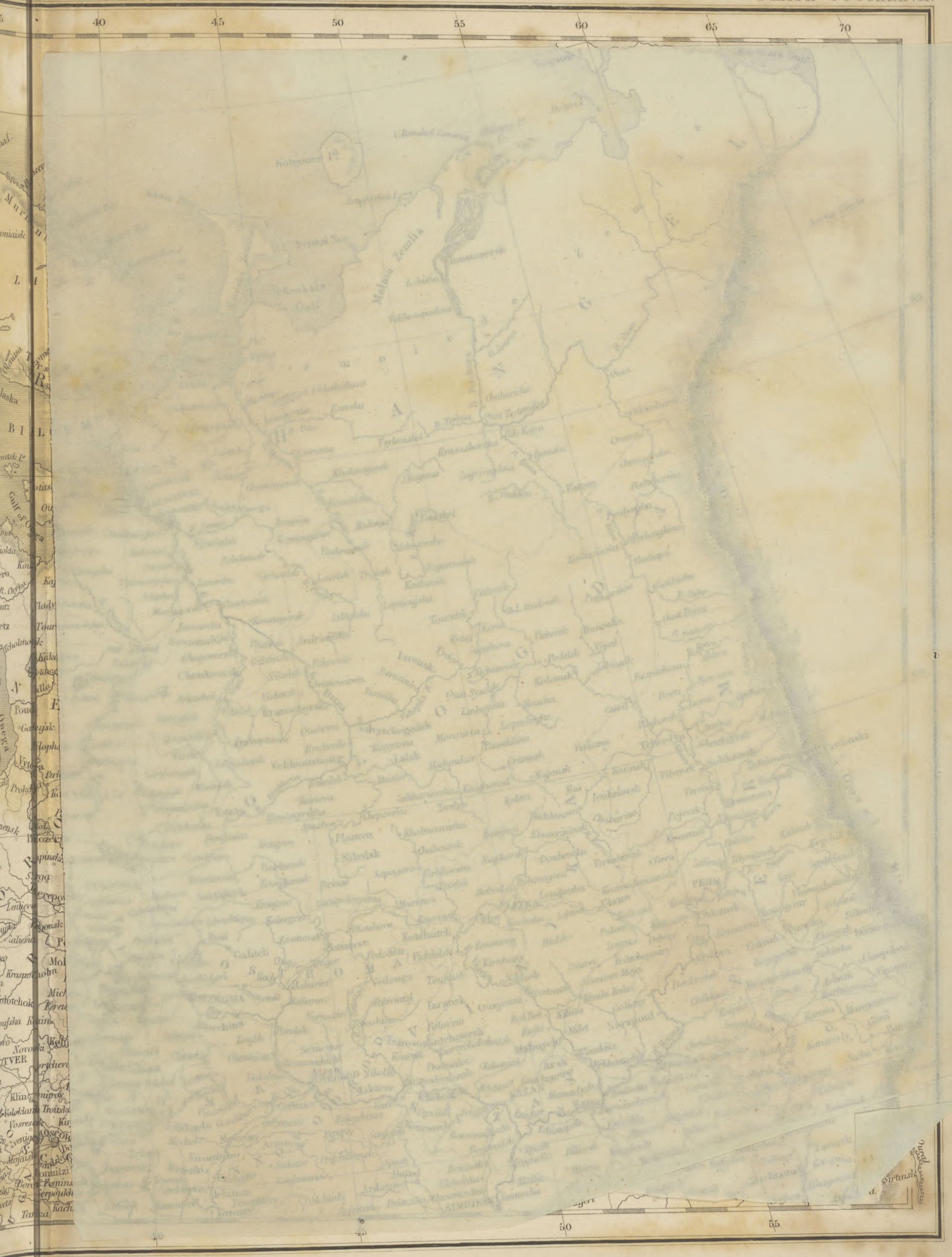

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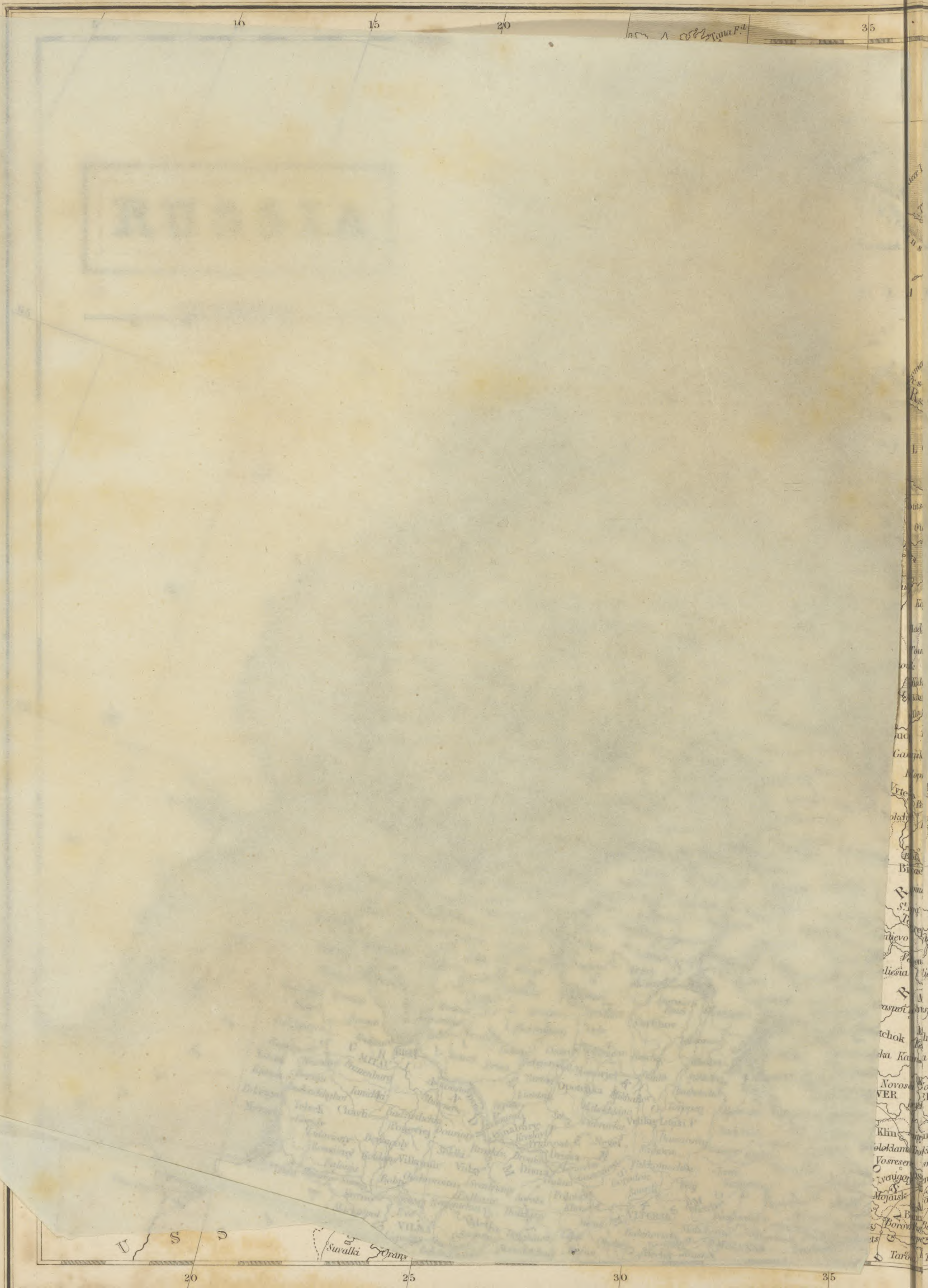
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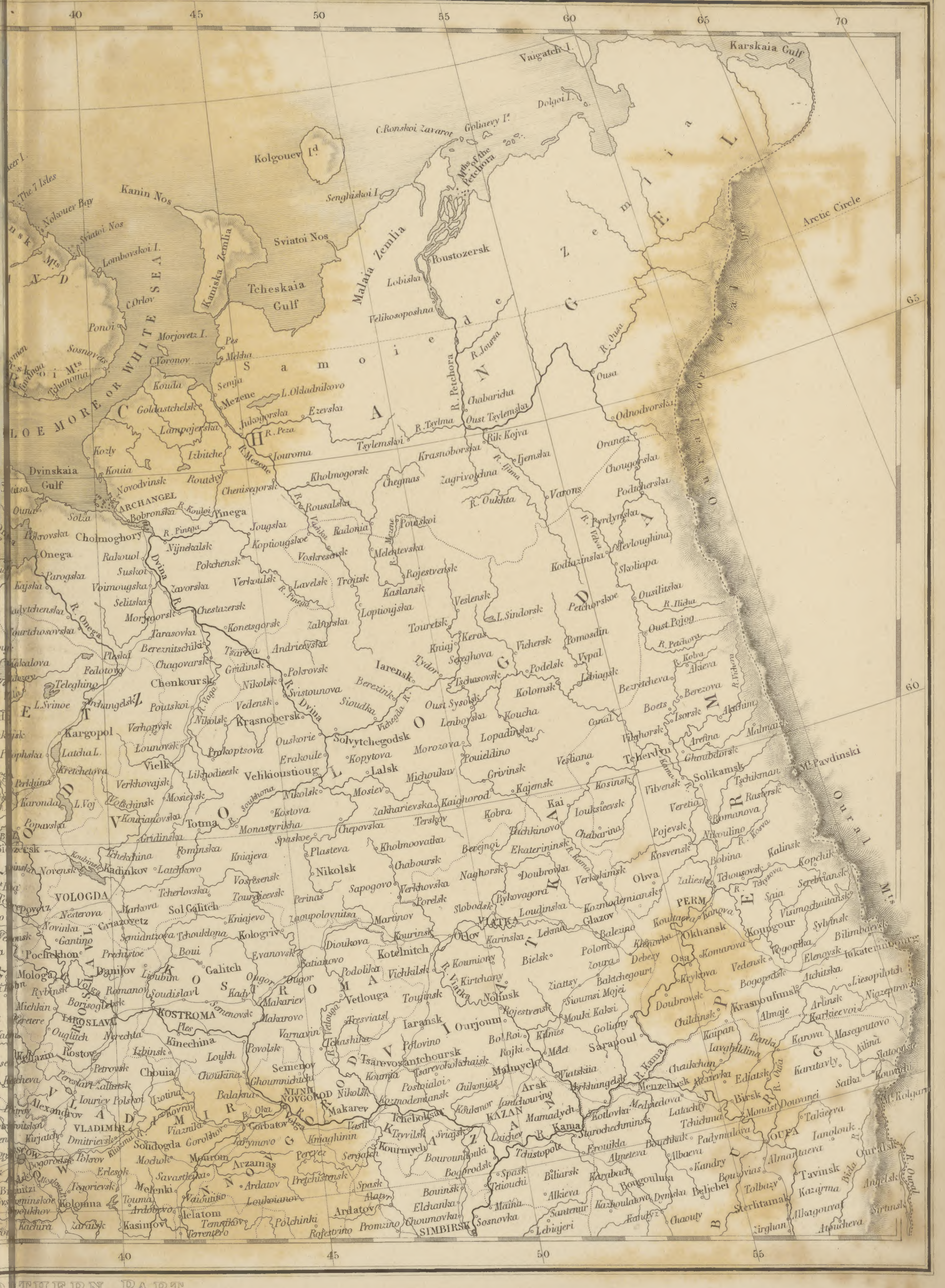
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Dolgoi I.
C.Ronskoi Zavarot
Goliaevy Is.
Kolgouev Id.
Mths. of the Petchora
The 7 Isles
Kanin Nos
Senghiskoi I.
Nokouev Bay
Sviatoi Nos
Lombovskoi I.
Sviatoi Nos
Kaniska Zemlia
Tcheskaia Gulf
Malaia Zemlia
Poustozersk
Lobiska
Velikosoposhna
C.Orlov
Ponoi
Morjovetz I.
Sosnovets
C.Voronov
Pes
Meldia
Senjia
Mezene
L.Okladnikovo
Kouda
Goldastchelsk
Jukovgorska
Ezevska
Lampojerska
R. Peza
R.Tsylma
Tsylemskoi
Chabaricha
Oust Tsylemska
R. Petchora
R. Joursa
R. Ousa
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Rik Kojva
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Chougorska
Podtcherska
Kozly
Kouia
Izbitche
R.Mezene
Iouroma
Dvinskaia Gulf
Novodvinsk
Routchy
Chenisegorsk
Kholmogorsk
Chegmas
Zagrivochna
R. Ijma
R. Oukhta
Varons
ARCHANGEL
Bobronska
R. Koulei
Pinega
Rousalska
Solza
Ouna
Pokrovska
Cholmoghory
R. Pinega
Nijnekalsk
Jougska
Koptiougskoe
Radonia
Pouiskoi
R. Mezene
Melentevska
Voskresensk
R. Pyrdynska
Vevloughina
Kodiazinska
Skoliapa
Onega
Rakowl
Suskoi
Pokchensk
Verkoulsk
Lavelsk
Troitsk
Rojestvensk
Kaslansk
Parogska
Kajska
Voimougska
Selitska
Dvina
Zavorska
Chestazersk
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Loptioujska
Veslensk
L.Sindorsk
Petchorskoe
Ousilitska
R. Ilicha
R. Onega
Morjegorsk
Konetsgorsk
Zaborska
Touretsk
Keras
Vichersk
Pomosdin
Oust Pojog
R. Petchora
Tarasovka
Bereznitschiki
Andrievska
Kniaj
Seeghova
Vypal
Kakalova
Pluska
Tsareva
Chagovarsk
Iarensk
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Akieva
Fedotovo
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Tschasovsk
Kolomsk
Teleghino
Chenkoursk
Nikolsk
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Svistounova
Berezova
L.Svinoe
Archangelsk
Poutskoi
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R. Vaga
Dvina
Sioudka
Vichegda R.
Oust Sysolsk
Koucha
Boets
Isorsk
Akadum
R. Vichera
Kargopol
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Pilghorsk
Arefina
Malmas
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Vielk
Prokoptsova
Erakoule
Kopytova
Pouieldino
Vesliana
Tcherdyn
Ghoubdorsk
Ms. Pavdinski
Perkhina
Verkhovajsk
Lilinodieesk
Velikioustioug
Lalsk
Michoukav
Grivinsk
Kama
Solikamsk
Tschikman
Karonda
L.Voj
Mosiersk
Nikolsk
Mosiev
Kaighorod
Kajemsk
Kosinsk
Vilvensk
Rastersk
Popavska
Tschinsk
Kourianovska
Totma
Kostova
Zakharievska
Kobra
Kai
Iouksieevsk
Veretia
Romanova
Monastyriksha
Chepovska
Terskov
Tschkinovo
Chabarina
Pojevsk
Nikoulino
Gridinska
Spaskoe
Plasteva
Kholmoovatka
Beregnoi
Ekaterininsk
Kosvensk
Bobina
Kalinsk
Koubinsk
Tchekchina
Fominska
Kniajeva
Nikolsk
Chaboursk
R. Kama
R. Kosva
Novensk
Kadinkov
Latchkovo
Vosresensk
Sapogovo
Naghorsk
Doubrovka
Verkolamsk
Obva
Zaliesk
Tchousovsk
Kopchik
VOLOGDA
Tcherlovska
Taurdieevsk
Perinas
Verkhovska
Porelsk
Bykovagora
Kozmodemiansk
Tchousova
Serebriansk
Nesterova
Markova
Sol Galitch
Slobodsk
Loudinska
PERM
Saia
Visimochaitansk
Novinka
Griazovetz
Kniajevo
Zaoupolovnitsa
Martinov
VIATKA
Glazov
Kanova
Koungour
Sylvinsk
Gantino
Semiantsova
Tchoukloma
Kologriv
Dioukova
Kourinsk
Orlov
Karinska
Lekma
Balezino
Koultaeva
Okhansk
Bilimbaevsk
Pochekhon
Prechistoe
Boui
Evanovsk
Kotelnitch
Koumiony
Bielsk
Polom
Klanovka
Debezy
Osa
Komarova
Vedensk
Pogodka
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Danilov
Galitch
Batianovo
Podolika
Vichkilsk
Zoura
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Atchitska
Liesopilotch
Rybinsk
Volga
Lioubim
Ougor
Ougor
Kirtchany
Ziattsy
Siounsi Mojei
Doubrovsk
Krasnoufimsk
Niazepetrovsk
Romanov
Soudislavl
Kady
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Toujinsk
Nolinsk
Arlinsk
Michkin
Borisoglebsk
KOSTROMA
Makariev
Rojestvensk
Mouki Kaksi
Childinsk
Almaje
Karkieevoi
Koretere
IAROSLAVL
Semenovsk
Makarovo
Tresviatsl
Iaransk
Ourjoum
Goliany
Karova
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Vetlouga
Bol Roi
Kaipan
Ouglitch
Nerechta
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Kilmies
Sarapoul
Iavghildina
Banki
Ailina
Rostov
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Loukh
Povolsk
Tsarevosantchoursk
Rojki
Viatskiia
Tchaikchan
Kalazin
Petrovsk
Chouia
Semenov
Tsarevokokchaisk
Malmych
Elabouga
Menzelinsk
Karatavly
Satka
Kouvach
Chouksina
Ghoumnichtch
Kounia
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Aktchangelsk
Edjatsk
Ms. Kolgun
Pereslavl Zaliesk
Balakna
NIJNI NOVGOROD
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Chikonias
Kama
Bekievka
Birsk
Iouriev Polskoi
Izotina
Makarev
Kozmodemiansk
Koukenor
Iandhouring
Kotlovka
Mednedova
Latachty
Monast
Douvanei
Alexandrov
VLADIMIR
Oka
Gorbatov
Tchebolsar
KAZAN
Mamadych
Starochechminsk
Tchichma
Takieva
Kirjatch
Dmitrievsk
Soudogda
Gorokhov
Iarymovo
Vasil
Tsyvilsk
Sviajsk
Laichev
Kama
Padymalova
OUFA
Ianolouk
Pokrov
Mochok
Mourom
Knaghinin
Sergatch
Kourmych
Bourounlouki
Tchistopol
Erouikla
Bouchkik
Almeteva
Albaeva
Almantaeva
Ouralsk
R. Oural
Bogorodsk
Erlesok
Savastleika
Arzamas
Pereyez
Bogorodsk
Spask
Tetiouchi
Biliarsk
Karabach
Bougoulma
Kandry
Bouwias
Tavinsk
Iegorievsk
Melenki
Ardatov
Pretchistensk
Spask
Alatyr
Bouinsk
Alkieva
Dymska
Beljebei
Tolbazy
Kazarma
Bida
Angelsk
Kolomna
Touma
Vadoutino
Loukoianov
Elchanka
Maina
Santenur
Kazhoulatovo
Sterlitamak
Allagouvat
Sirtinsk
Ardotovo
Ielatom
Ardatov
Choumovka
Sosnovka
Kandyz
Chaouty
Zirghan
Atoucheva
Kachura
Zaraisk
Kasimov
Temnikov
Terrentero
Polchinki
Rofestvino
Promzino
SIMBIRSK
Lebiajeri
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BIELOE MORE OR WHITE SEA
OURAL Mts.
Ourals or Poias Mts.
Arctic Circle
65
60
55
40
45
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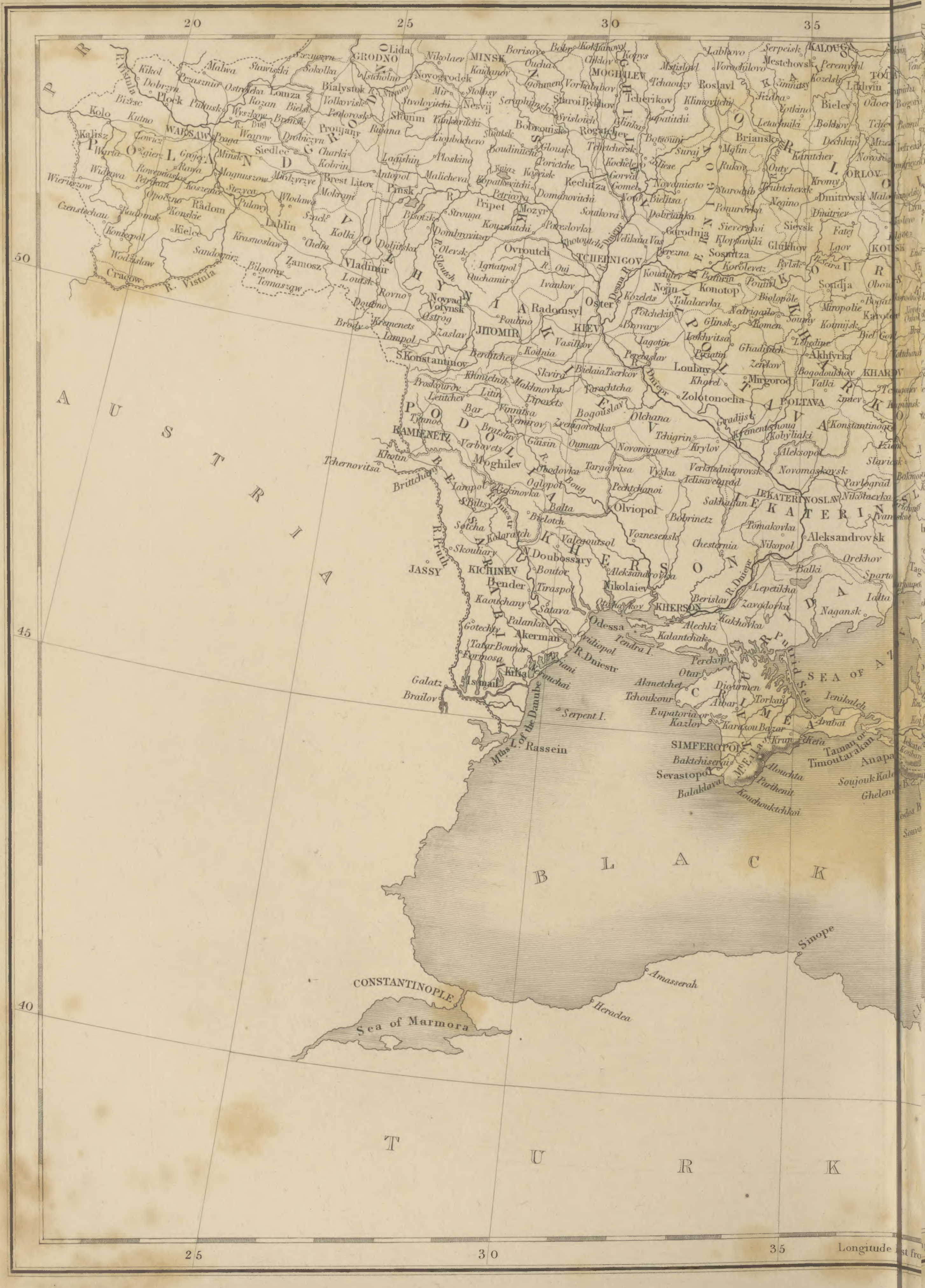
OTHERN PART.

RUSSIA, SOUT



20
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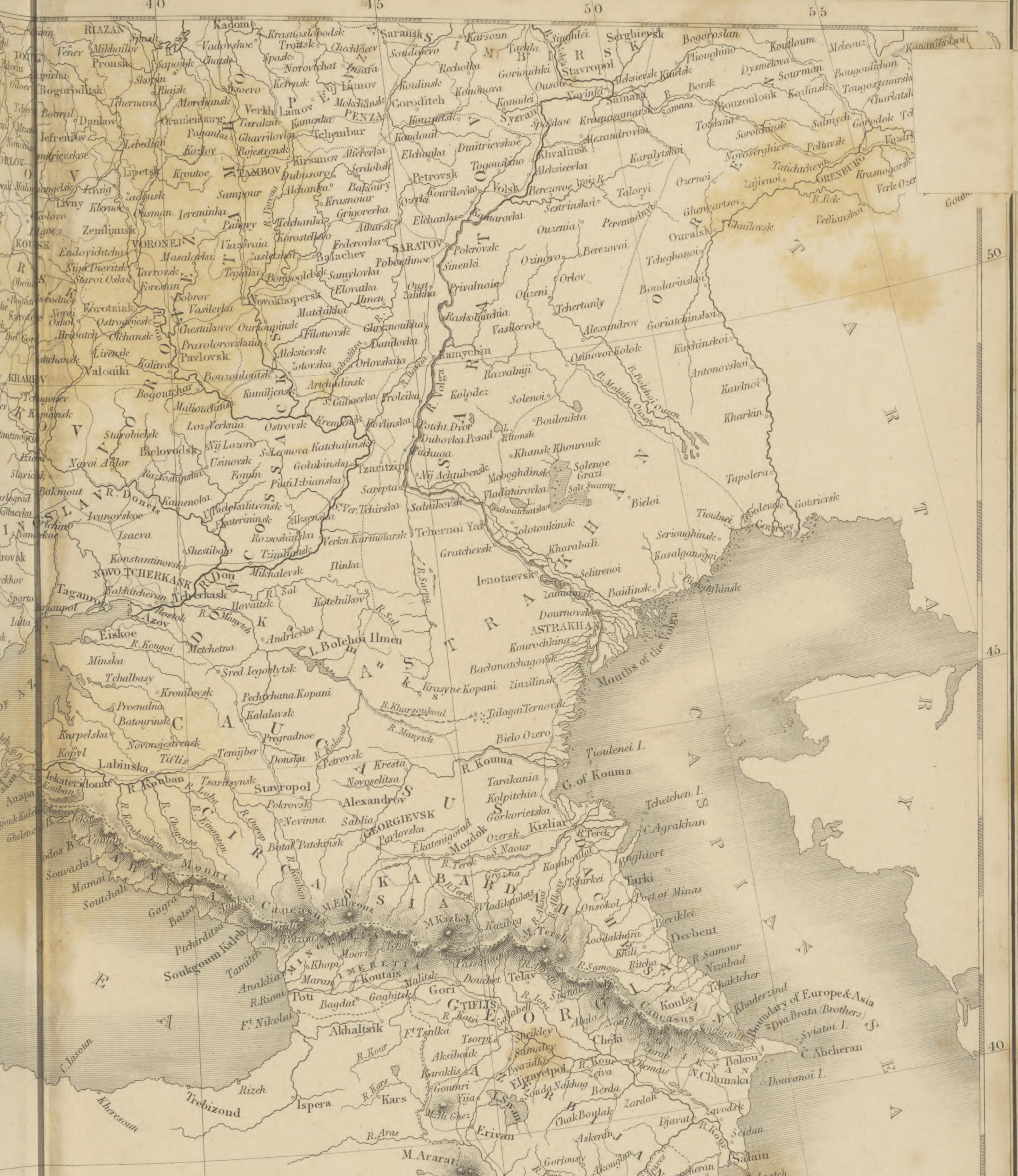
P R
P O L A N D
WARSAW
Cracow
R. Vistula
Plock
Radom
Lublin
Kielce
Zamosc
Siedlec
GRODNO
Bialystok
Brest Litov
Pinsk
MINSK
MOGHILEV
Bobrouisk
Rogatchev
Gomel
Mozyr
Tchernigov
KIEV
Jitomir
Berditchev
Vinnitsa
KAMIENETZ
Khotin
Tchernovitsa
Brody
S. Konstantinov
Ovroutch
Radomsyl
Vladimir
Lousk
Rovno
Doubno
Kremenets
Novrad Volynsk
Ostrog
Zaslav
Iampol
Proskourov
Letichev
Bar
Bratslav
Nemirov
Gaisin
Ouman
Balta
Olviopol
Voznesensk
Bobrinetz
Novomirgorod
Tchigrin
Krylov
Kremenchoug
Zolotonocha
Pereiaslav
Poltava
Mirgorod
Romen
Konotop
Nejin
Glukhov
Sosnitza
Starodub
Briansk
Roslavl
Orlov
Kromy
Dmitrovsk
Kalouga
Serpeisk
Mestchovsk
Peremyshl
Kozelsk
Lichvin
Bielev
Odoev
Kharkov
Valki
Bogodoukhov
Akhtyrka
Sumy
Kotelva
Konstantinograd
Novomoskovsk
Ekaterinoslav
Pavlograd
Verkhnedneprovsk
Elisavetgrad
Aleksopol
Nikopol
Aleksandrovsk
Orekhov
Kherson
Nikolaiev
Berislav
Aleshki
Odessa
Ovidiopol
Tiraspol
Bender
Kichinev
Jassy
R. Pruth
Dubossary
Akerman
Ismail
Kilia
Galatz
Brailov
Tendra I.
R. Dniestr
Mths of the Danube
Serpent I.
L. Rassein
Perekop
Eupatoria or Kozlov
Simferopol
Baktchiserai
Sevastopol
Balaklava
Karasou Bazar
Alouchta
Parthenit
Koutchouktchkoi
Kertch
Ienikaleh
Arabat
Taman
Timoutarakan
Anapa
Soujouk Kale
Ghelendjik
Sea of Azov
Putrid Sea
B L A C K
Sinope
Amasserah
Heraclea
CONSTANTINOPLE
Sea of Marmora
A U S T R I A
P O D O L I A
V O L H Y N I A
K I E V
P O L T A V A
T C H E R N I G O V
B E S S A R A B I A
K H E R S O N
E K A T E R I N O S L A V
T A U R I D A
C R I M E A
T U R K
Longitude East fro



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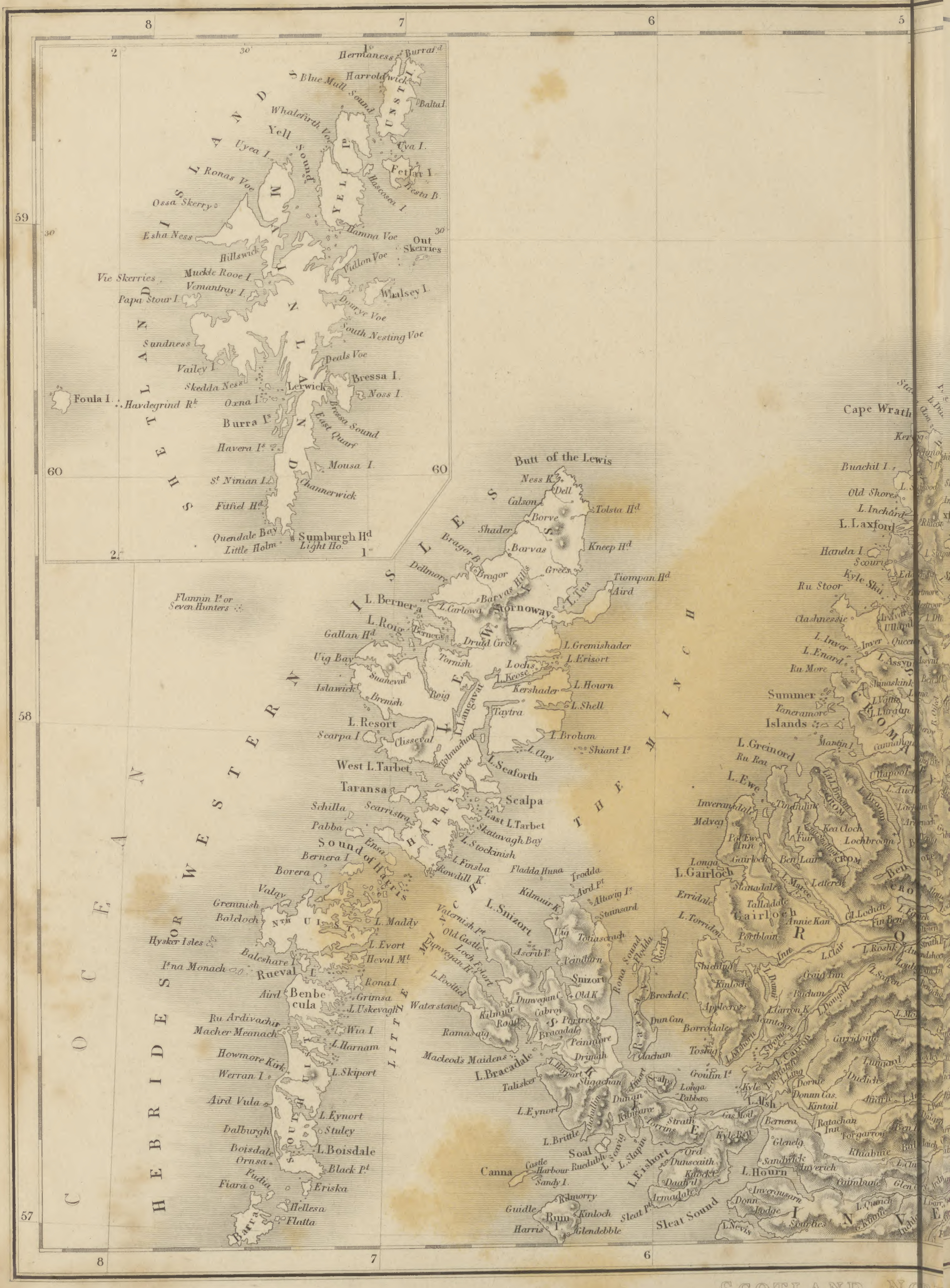
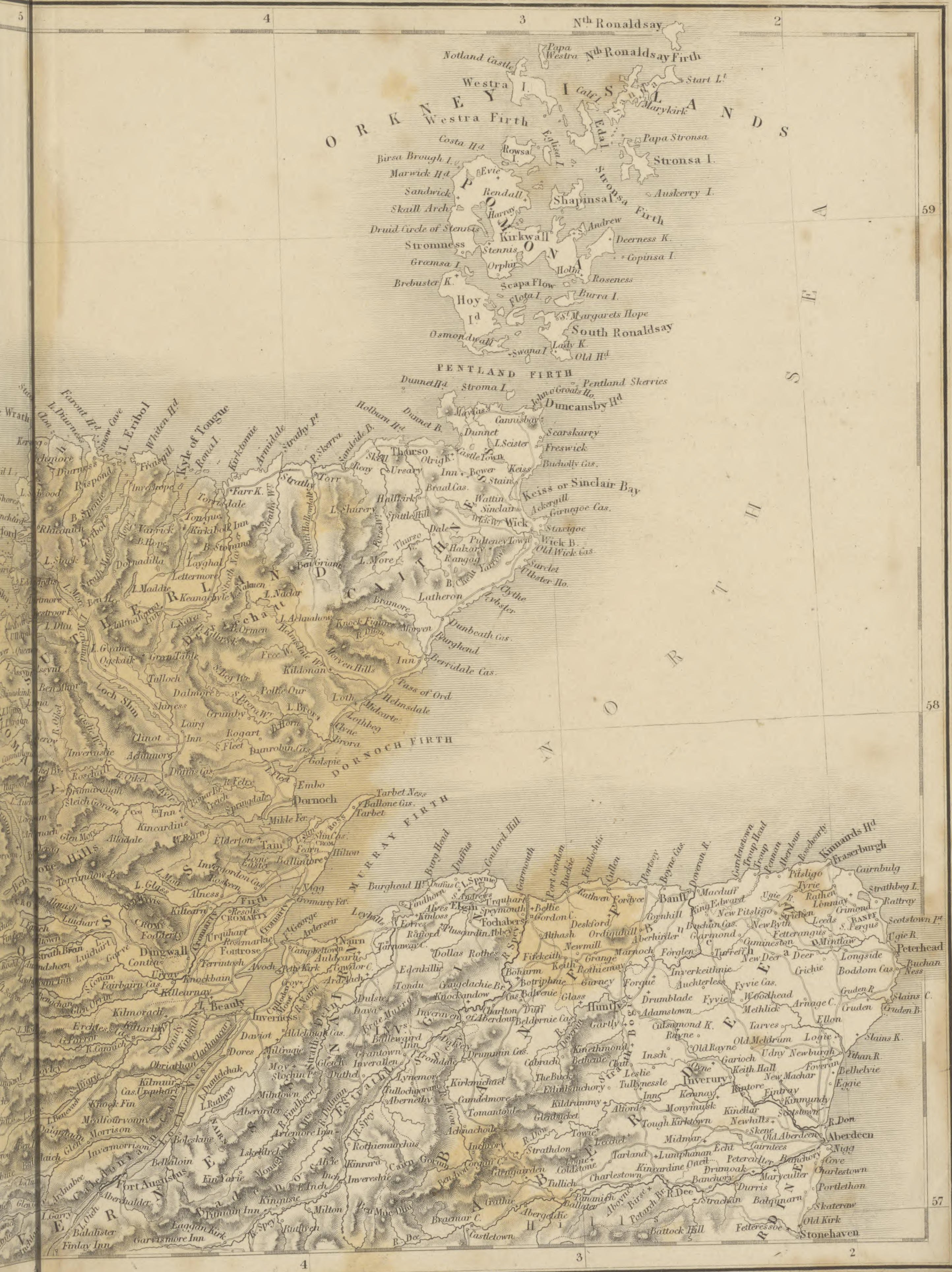
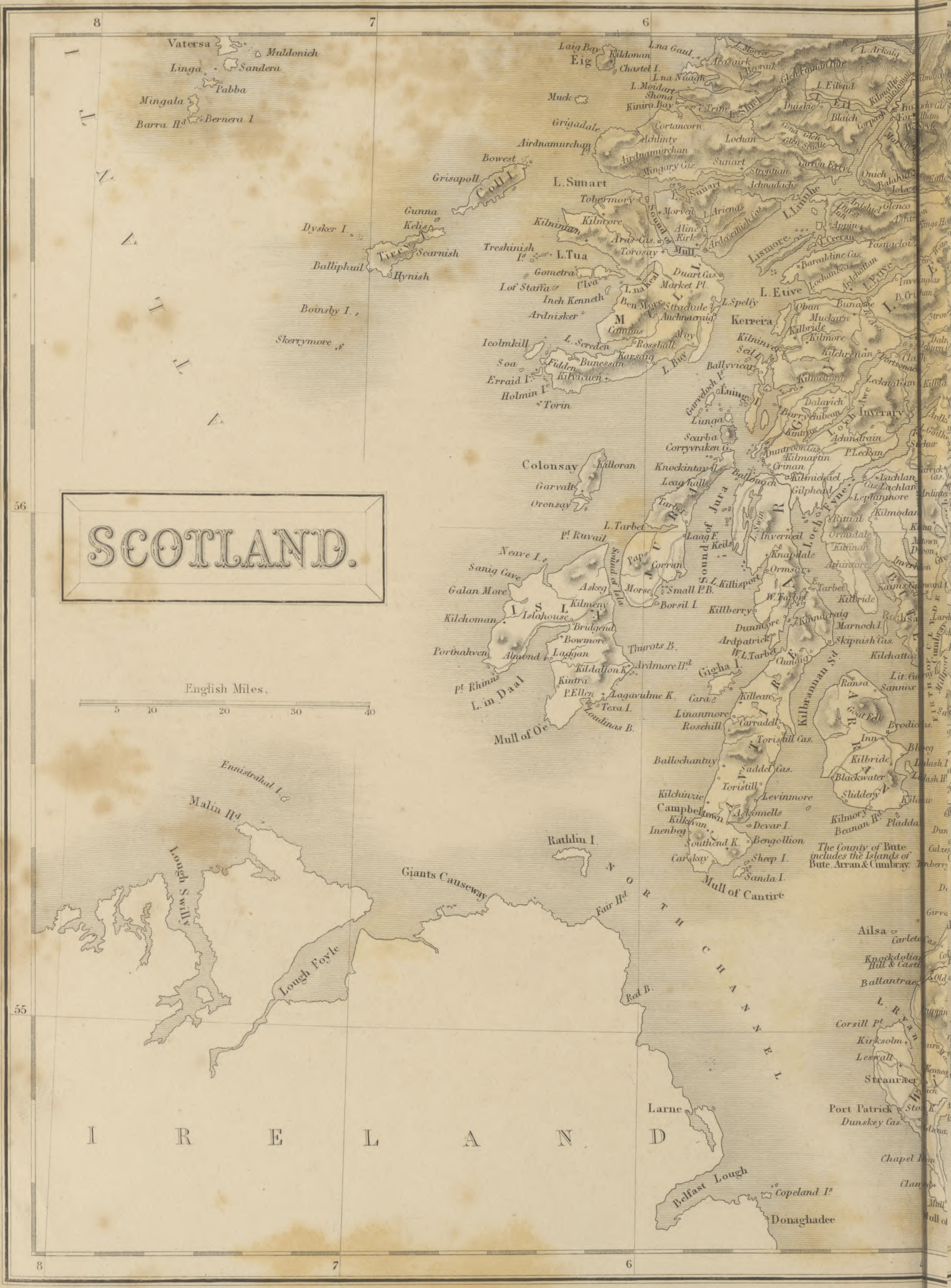


SCOTLAND, NOR



NORTHERN PART.


SCOTLAND.
English Miles.
5
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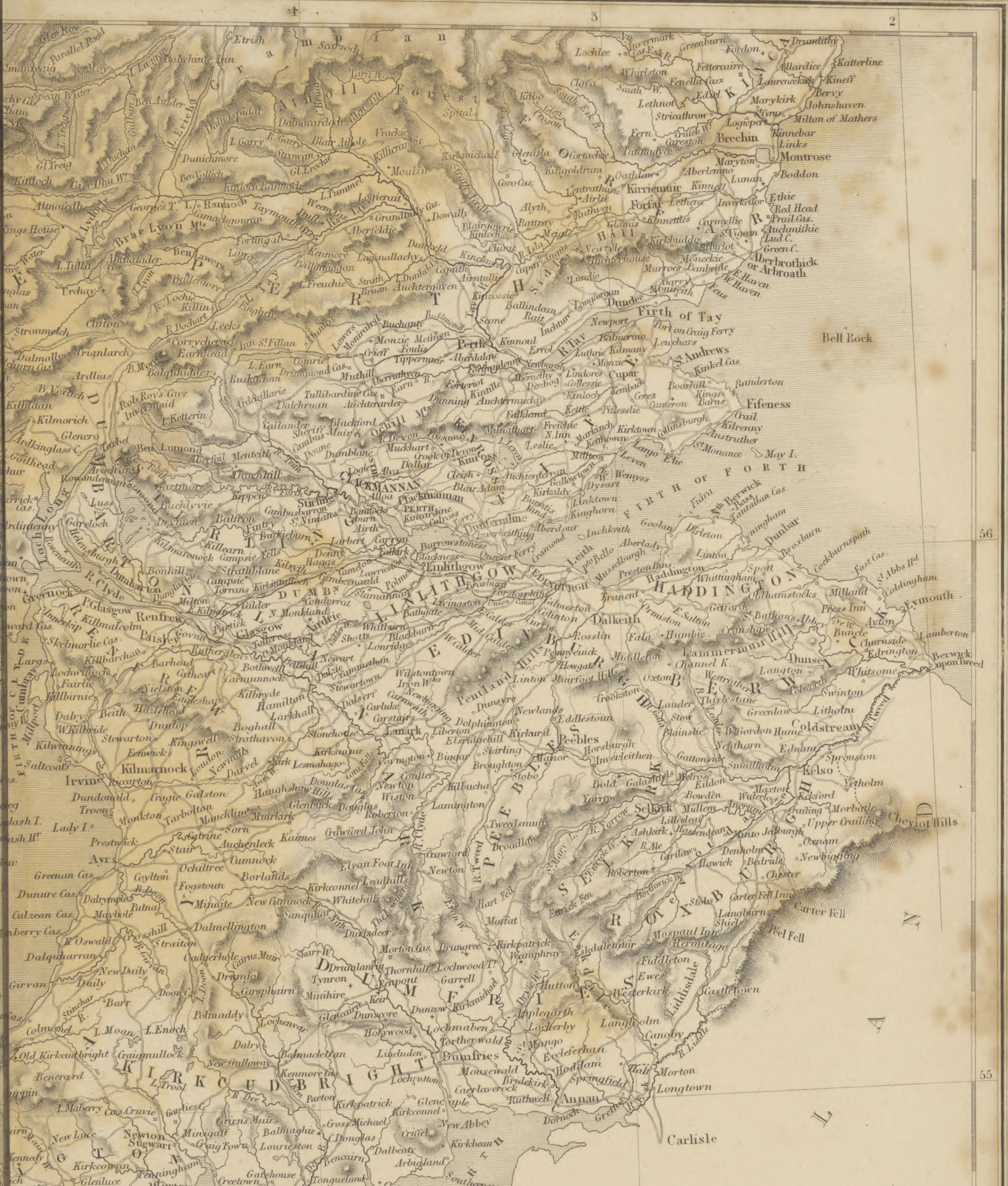
6
56
55
ATLANTIC
NORTH CHANNEL
IRELAND
Vatersa
Muldonich
Linga
Sandera
Pabba
Mingala
Barra Hd.
Bernera I.
Eig
Laig Bay
Kildonan
Chastel I.
Muck
L. na Gaul
L. Morrer
Arasaik
L. Beoraik
L. na Nuagh
L. Meidart
Shona
Kinira Bay
L. Arkaig
L. Eil
L. Eilend
Duiskie
Blaich
Kilmallie
Grigadale
Airdnamurchan Pt.
Cortancorn
Achlinty
Airdnamurchan
Mingary Cas.
Lochan
Sunart
Strontian
Achnaduch
Bowest
Coll I.
Grisapoll
L. Sunart
Tobermory
Sound of Mull
Morven
Aline Kirk
L. Ariendas
Ardtornish Cas.
L. Linnhe
Lismore
Appin
L. Creran
Glenco
Gunna
Kelis
Dysker I.
Tiree
Scarnish
Balliphuil
Hynish
Kilninian
Kilmore
Aras Cas.
Torosay
Mull
Treshinish Is.
L. Tua
Gometra
Ulva
I. of Staffa
Inch Kenneth
L. na Keal
Market Pl.
Duart Cas.
Ben More
Strachule
Auchnacraig
L. Spelfy
L. Etive
Ardnisker
Boinsby I.
Skerrymore
Campus
Moy
Kerrera
Oban
Bunawe
Muckarn
Kilbride
Kilmore
Kilchrenan
Icolmkill
L. Screden
Rosshall
Soa
Fidden
Bunessan
Kilvicuen
Karsaig
L. Buy
Erraid I.
Holmin I.
Torin
Kilninver
Seil I.
Ballyvicar
Garvelloch Is.
Luing I.
Lunga
Scarba
Corryvraken G.
Dalavich
Barrychubean
Kilmartin
Inverary
Achindrain
Duntroon Cas.
Kilmartin
Crinan
P. Leckan
Colonsay
Killoran
Garvalt
Oronsay
Knockintay
Leag hall
Ballonoch
Kilmichael
Gilphead
Lachlan Cas.
Lephinmore
Kilmodan
Tarbet
Jura
Sound of Jura
L. Tarbet
Pt. Ruvail
Sound of Islay
Paps
Corran
Laag F.
Keils
Inverneil
Knapdale
Ormsary
Kilfinan
Neave I.
Sanig Cave
Galan More
Kilchoman
Islay
Islahouse
Kilmeny
Askeg
Morse
Small F. B.
Borsil I.
L. Killisport
W. Tarbet
E. Tarbet
Kilbride
Killberry
Dunmore
Kilnacraig
Marnoch I.
Skipnish Cas.
Ardpatrick
W. L. Tarbet
Clunaig
Bridgend
Bowmore
Portnahven
Almond
Laggan
Thurots B.
Kildalton K.
Ardmore Hd.
Gigha I.
Cara
Kintra
P. Ellen
Lagavulme K.
Texa I.
Loudinas B.
Pt. Rhinns
L. in Daal
Mull of Oe
Linanmore
Rosehill
Killean
Carradell
Torisdill Cas.
Kilbrannan Sd.
Arran
Ransa
Goat Fell
Inn
Kilbride
Blackwater
Sliddery
Kilmory
Beanan Hd.
Pladda
Ballochantuy
Saddel Cas.
Toristill
Levinmore
Kilchinzie
Campbeltown
Aslomells
Kilkivan
Devar I.
Inenbeg
Southend K.
Bengollion
Carskay
Sheep I.
Sanda I.
Mull of Cantire
The County of Bute includes the Islands of Bute, Arran & Cumbray.
Ennistrahal I.
Malin Hd.
Lough Swilly
Rathlin I.
Giants Causeway
Fair Hd.
Lough Foyle
Red B.
Larne
Belfast Lough
Copeland Is.
Donaghadee
Ailsa
Ballantrae
L. Ryan
Corsill Pt.
Kirksolm
Leswall
Stranraer
Port Patrick
Dunskey Cas.
Chapel



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